

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO



DELEGATURA PROPIEDAD INDUSTRIAL

División de Nuevas Creaciones

PCT
SOLICITUD

PATENTE DE INVENCION

ENTRADA EN FASE NACIONAL

21. EXPEDIENTE No.

07-30616

54. TITULO

HERRAMIENTAS DE TRINQUETE

51. CLASIFICACION INTERNACIONAL

71. SOLICITANTE

LODA ENTERPRISES, INC.

DOMICILIO

CHICAGO, ILLINOIS, ESTADOS UNIDOS DE AMERICA

74. APODERADO

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Folio 84-4-2002

Fdo. Cadenas

PETITORIO

AS: 103.504



SECRETARÍA DE INDUSTRIA Y COMERCIO
 Rad: 07-030616-00000-0000
 Fec: 2007-03-21 10:50:05 Usp. 2000 NUCLEACIONES
 TRL 11 PATENTE
 EVO: 3/0 FASE NACIONAL
 Act 411 PRESENTACION FOLIO: 122

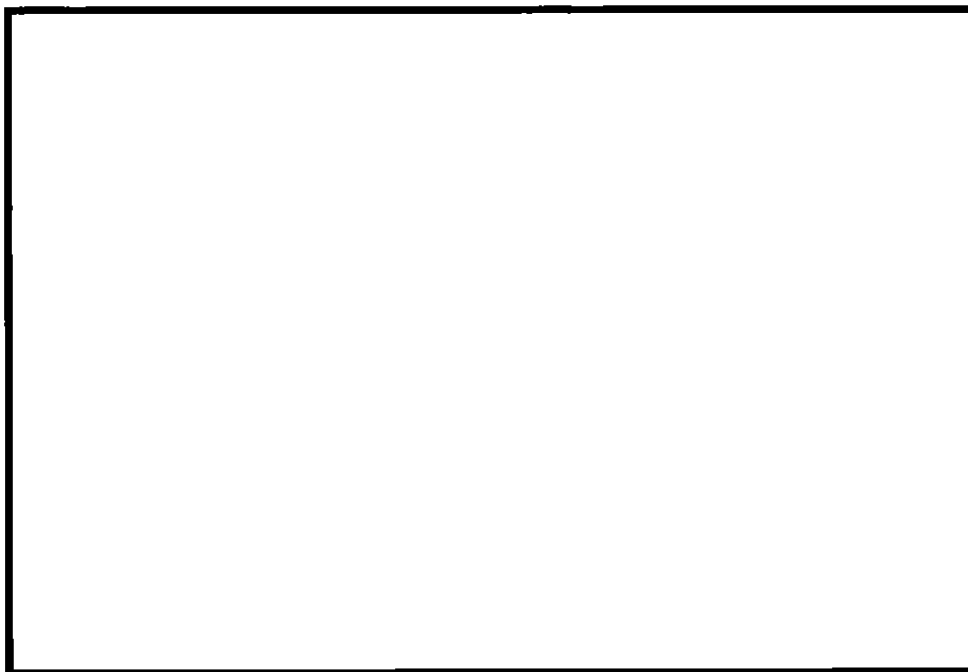
FORMULARIO ÚNICO DE SOLICITUD DE PATENTE PCT ENTRADA EN FASE NACIONAL

1 SOLICITUD DE:			
☒ Patente de Invención.		☐ Patente de Modelo de Utilidad.	
☐ Capítulo I.		☒ Capítulo II.	
2 SOLICITANTE (71)	Nombre: JODA ENTERPRISES, INC. Dirección: 2440 Lakeview Avenue, Chicago, IL 60614, Estados Unidos de América Nacionalidad o Domicilio: Estados Unidos Lugar de Constitución: Estados Unidos Teléfono: Fax: E-mail:		IDENTIFICACION C.C. ☐ NIT ☐ C.E. ☐ Otro ☐ Cual _____ Número _____
3 REPRESENTANTE O APODERADO	Nombre: JUAN PABLO CADENA SARMIENTO Dirección: Carrera 7 # 71 - 21 Torre B - Piso 4 Teléfono: 744-2200 Fax: 744-2700 E-mail:		IDENTIFICACION C.C. ☒ NIT ☐ C.E. ☐ Otro ☐ Cual _____ Número 80.410.337 TP 57492
4 INVENTOR (ES) (72)	Nombre: John B. DAVIDSON, George F. CHARVAT Dirección: 2440 Lakeview Avenue, #3A, Chicago, IL 60614 (US); 309 Manor Hill Court, Lombard, IL 60148 (US) Respectivamente Nacionalidad o Domicilio: Estados Unidos de América (Respectivamente)		
5 PCT (86) Solicitud Internacional No. <u>PCT/US2005/031726</u> Fecha <u>30-08-2005</u> Publicación Internacional No. <u>WO 2006/036477 A1</u> Fecha <u>06-04-2006</u>			
6 Título (54): <u>HERRAMIENTAS DE TRINQUETE</u>			
7 Clasificación Internacional (51) _____			
8 Prioridad	(33) País de Origen	(32) Fecha	(31) Número de Solicitud
SI ☒ NO ☐	US	28-09-2004	10/953,470
9 Comprobante de pago No. <u>07-18,603</u> Fecha <u>27-03-2007</u>			

Instrucciones para el diligenciamiento del presente formulario, ver reverso de esta página.

2020-F06 (01-11-15)

- ☒ Comprobante de pago de la tasa de presentación de la solicitud. \$482.000
- ☐ Documento que acredita la existencia y representación legal cuando el solicitante sea persona jurídica.
- ☐ Poderes, si fuere el caso. Fotocopia Autenticada
- ☐ Documento de cesión del inventor al solicitante o a su causante.
- ☐ Declaraciones
- ☒ Copia de la solicitud internacional. (Resumen, descripción, reivindicaciones, dibujos)
- ☒ Traducción de la solicitud internacional al castellano. (Resumen, descripción, reivindicaciones, dibujos)
- ☒ Copia del examen preliminar efectuado por la IPEA.
- ☐ Traducción del examen preliminar efectuado por la IPEA.
- ☐ De ser el caso, copia del contrato de acceso.
- ☐ De ser el caso, documento que acredite la licencia o autorización de uso de conocimientos tradicionales de las comunidades indígenas.
- ☐ De ser el caso, certificado de depósito del material biológico.
- ☐ Arte final 12x12.
- ☐ De ser el caso, información sobre otras solicitudes de patente o títulos obtenidos en el extranjero por el mismo titular o su causante, relacionadas parcial o totalmente con la invención de esta solicitud.
- ☒ Otros: Tarjeta de Propietarios
Documentos PCT

11 FIGURA CARACTERÍSTICA:**12** Solicito la concesión de la patente,**NOMBRE:** JUAN PABLO CADENA SARMIENTO**FIRMA:**
C.C. 80.410.337 de Usaquén TP 57492 del C.S.J.

Instrucciones para la presentación de los anexos, ver reverso de esta página.

A 103 J04

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO
Rad: 07-030818-00000-0000
Pec: 2007-03-27 10:30:00 LOP. 2000 NUEVE CIENTOS
18. 11 PATENTE
Evo: 3/00 FASE NACIONAL
Act 411 PRESENTACION FORM: 122

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO

NIT : B00176089-2

RECIBO OFICIAL DE CAJA : 07 - 18,603
FECHA : MARZO 5 DE 2007

***** CONSIGNACION *****

DEPOSITANTE	TIPO PAGO	BANCO	CUENTA	No. PAGO	FECHA PAGO	Vr. PAGO
BRIGARD & CASTRO LTDA	CONSIGNACION	BANCO POPULAR	050-00110-6	59310738	05/03/2007	36,230,000.00

***** C O N C E P T O *****

ENT. RENTISTICO	CONCEPTO	TOTAL CONCEPTO
1 50005-01-01 SOLICITUDES	1 TRAMITES DE SOL. DE PATENTE DE IN	482,000.00
	TOTAL :	\$ 482,000.00

SOM: CUATROCIENTOS OCHENTA Y DOS MIL PESOS

RESPONSABLE : 

RECIBO DE CAJA APLICADO AL EXPEDIENTE No. _____

SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO
DIVISION DE NUEVAS CREACIONES

PATENTE ☒ PCT/US2005/031726 MODELO DE UTILIDAD ☐ DISEÑO INDUSTRIAL ☐

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DOMICILIO CHICAGO, ILLINOIS, ESTADOS UNIDOS DE AMERICA

APODERADO JUAN PABLO CADENA SARMIENTO

TITULO HERRAMIENTAS DE TRINQUETE

CLASIFICACION

EXPEDIENTE No. FECHA DE SOLICITUD ROLLO MICROFILM

CERTIFICADO No. FECHA DE CONCESION VIGENCIA DESDE HASTA

PRORROGA CAMBIO DE NOMBRE

TRASPASO A

INVENTOR (ES) JOHN B. DAVIDSON, GEORGE F. CHARVAT

OTROS

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau(43) International Publication Date
6 April 2006 (06.04.2006)

PCT

(10) International Publication Number
WO 2006/036477 A1(51) International Patent Classification:
B25B 13/46 (2006.01) B25B 15/04 (2006.01)(21) International Application Number:
PCT/US2005/031726

(22) International Filing Date: 30 August 2005 (30.08.2005)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:
10/953,470 28 September 2004 (28.09.2004) US

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(72) Inventors; and

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(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GR, GH, GI, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

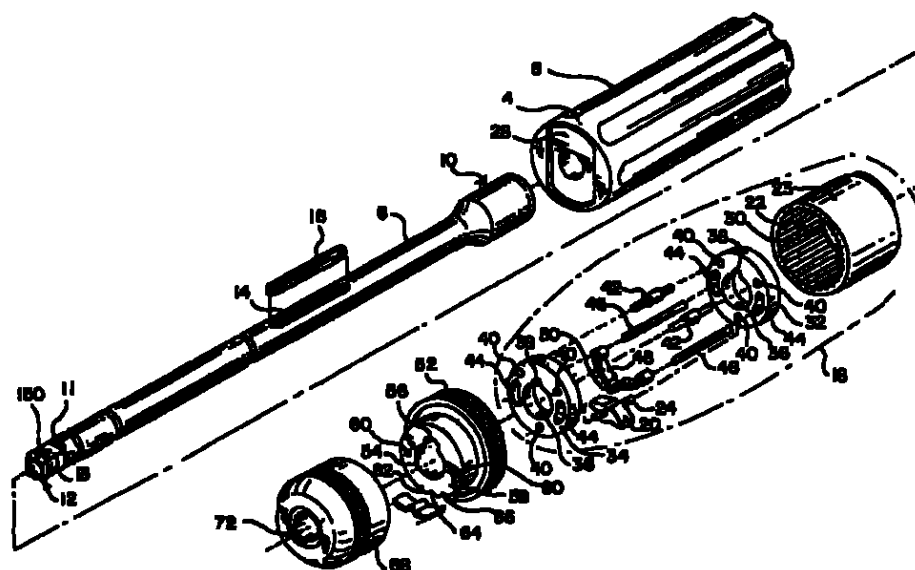
(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KR, LS, MW, MZ, NA, SD, SI, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TO).

Published:

— with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: RATCHETING TOOLS



(57) Abstract: Ratcheting tools are described that include: (a) a tool body (4); (b) a driven element (6); (c) a ratchet mechanism (18) coupling the driven element to the tool body, wherein the ratchet mechanism is configured for adjustment between a plurality of a forward configuration, a reverse configuration, and a neutral configuration; (d) an adjustable first biasing element (48) coupled to the ratchet mechanism and configured to bias the ratchet mechanism to at least one of the forward, reverse, and neutral configurations; and (e) an adjustable second biasing element (76) coupled to the ratchet mechanism and configured to bias the ratchet mechanism to at least one of the forward, reverse, and neutral configurations.

WO 2006/036477 A1

RATCHETING TOOLS

FIELD OF THE INVENTION

[0001] The present invention relates to hand tools and, in particular, to ratcheting hand tools configured for providing forward ratcheting action, reverse ratcheting action, and neutral or non-ratcheting action.

BACKGROUND

[0002] Hand tools capable of providing clockwise (e.g., forward) ratcheting action, counterclockwise (e.g., reverse) ratcheting action, and freewheeling (e.g., neutral or non-ratcheting) action provide advantages in use because a user is not required to reposition his or her hand on a handle multiple times in order to provide continuous rotation in a selected direction.

[0003] In the hand tools described in United States Patent No. 6,182,536 to Roberts et al., assigned to the assignee of the present invention, the position of a pivotably mounted pawl 34 having first, second, and third depressions therein corresponding to forward, neutral, and reverse ratcheting actions of the hand tool, respectively, is controlled by a single spring 42. Whichever of the three depressions is engaged by spring 42 determines the direction of ratcheting action.

[0004] In the hand tools described in United States Patent No. 6,044,730 to Roberts et al., also assigned to the assignee of the present invention, the position of a reversing lever 18 movable between forward, neutral, and reverse positions is controlled by a detent mechanism in which a single spring-loaded detent ball engages one of forward detent recess 23, reverse detent recess 24, and non-ratcheting detent recess 22 in a pawl 25.

[0005] Although the above-described ratcheting tools are well-suited for a variety of applications, it would be desirable in certain applications to increase the stability of the neutral position in order to minimize or prevent inadvertent slippage into either of the forward or reverse ratcheting positions.

**SUMMARY**

[0006] The scope of the present invention is defined solely by the appended claims, and is not affected to any degree by the statements within this summary.

[0007] By way of introduction, a first ratcheting tool embodying features of the present invention includes: (a) a tool body; (b) a driven element; (c) a ratchet mechanism coupling the driven element to the tool body, wherein the ratchet mechanism is configured for adjustment between a plurality of a forward configuration, a reverse configuration, and a neutral configuration; (d) an adjustable first biasing element coupled to the ratchet mechanism and configured to bias the ratchet mechanism to at least one of the forward, reverse, and neutral configurations; and (e) an adjustable second biasing element coupled to the ratchet mechanism and configured to bias the ratchet mechanism to at least one of the forward, reverse, and neutral configurations.

[0008] A second ratcheting tool embodying features of the present invention includes: (a) a tool body; (b) a driven element containing a drive stud; (c) a ratchet mechanism coupling the driven element to the tool body, wherein the ratchet mechanism is configured for adjustment between a forward configuration, a reverse configuration, and a neutral configuration; (d) a first biasing element coupled to the ratchet mechanism and configured to bias the ratchet mechanism to at least one of the forward, neutral, and reverse configurations; (e) a second biasing element coupled to the ratchet mechanism and configured to bias the ratchet mechanism to at least one of the forward, neutral, and reverse configurations; (f) a control element coupled to the ratchet mechanism and containing first, second and third outwardly facing notches, each of which is configured to engage with the second biasing element, such that engagement of the first notch biases the ratchet mechanism to the forward configuration, engagement of the second notch biases the ratchet mechanism to the neutral configuration, and engagement of the third notch biases the ratchet mechanism to the reverse configuration; and (g) a control element retainer coupled to the control element, wherein the control element retainer contains an arcuate recess configured to receive the

-3-

second biasing element. The ratchet mechanism includes a toothed element and a pawl configured to engage the toothed element.

[0009] A third ratcheting tool embodying features of the present invention includes: (a) a tool body; (b) a driven element comprising a drive stud; (c) a ratchet mechanism coupling the driven element to the tool body, wherein the ratchet mechanism is configured for adjustment between a forward configuration, a reverse configuration, and a neutral configuration; (d) a first biasing element coupled to the ratchet mechanism and configured to bias the ratchet mechanism to at least one of the forward, neutral, and reverse configurations; (e) a second biasing element coupled to the ratchet mechanism and configured to bias the ratchet mechanism to at least one of the forward, neutral, and reverse configurations; (f) a control element coupled to the ratchet mechanism, wherein the control element includes a recess configured to receive the second biasing element; and (g) a control element retainer containing first, second and third notches, each of which is configured to engage with the second biasing element, such that engagement of the first notch biases the ratchet mechanism to the forward configuration, engagement of the second notch biases the ratchet mechanism to the neutral configuration, and engagement of the third notch biases the ratchet mechanism to the reverse configuration. The ratchet mechanism includes a toothed element and a pawl configured to engage the toothed element.

[0010] A fourth ratcheting tool embodying features of the present invention includes: (a) a tool body; (b) a driven element; (c) a ratchet mechanism coupling the driven element to the tool body, wherein the ratchet mechanism is configured for adjustment between a plurality of a forward configuration, a reverse configuration, and a neutral configuration; (d) an adjustable first biasing element coupled to the ratchet mechanism and configured to bias the ratchet mechanism to at least one of the forward, reverse, and neutral configurations; and (e) an adjustable second biasing element coupled to the ratchet mechanism and configured to bias the ratchet mechanism to at least one of the forward, reverse, and neutral configurations.

At least one of the first biasing element and the second biasing element is configured to bias the ratchet mechanism to the neutral configuration.

BRIEF DESCRIPTION OF THE DRAWINGS

[0011] FIG. 1 shows an elevation view of a first ratcheting tool embodying features of the present invention.

[0012] FIG. 2 shows an exploded perspective view of the ratcheting tool shown in FIG. 1.

[0013] FIG. 3A shows a side elevation view of a tool body.

[0014] FIG. 3B shows a top plan view of the tool body of FIG. 3A.

[0015] FIG. 3C shows a bottom view of the tool body of FIG. 3A.

[0016] FIG. 3D shows a cross-sectional view of the tool body of FIG. 3A taken through a plane containing the line 3D—3D.

[0017] FIG. 4A shows a side elevation view of a driven element.

[0018] FIG. 4B shows a top plan view of the driven element of FIG. 4A shown from a drive stud end.

[0019] FIG. 4C shows a cross-sectional view of the driven element of FIG. 4A taken through a plane containing the line 4C—4C.

[0020] FIG. 5A shows a side elevation view of a tool body extension.

[0021] FIG. 5B shows a top plan view of a toothed element provided on an inner surface of the tool body extension of FIG. 5A.

[0022] FIG. 5C shows a bottom view of the tool body extension of FIG. 5A.

[0023] FIG. 5D shows a cross-sectional view of the tool body extension of FIG. 5A taken through a plane containing the line 5D—5D.

[0024] FIG. 6A shows an elevation view of a key element.

[0025] FIG. 6B shows a side elevation view of the key element of FIG. 6A.

[0026] FIG. 6C shows a top plan view of the key element of FIG. 6A.

[0027] FIG. 7A shows a top plan view of a pawl carrier.

[0028] FIG. 7B shows a cross-sectional view of the pawl carrier of FIG. 7A taken through a plane containing the line 7B—7B.

- [0029] FIG. 8A shows a top plan view of a pawl.
- [0030] FIG. 8B shows a side elevation view of the pawl of FIG. 8A.
- [0031] FIG. 9A shows a side elevation view of a pin.
- [0032] FIG. 9B shows a top plan view of the pin of FIG. 9A.
- [0033] FIG. 9C shows a cross-sectional view of the pin of FIG. 9A taken through a plane containing the line 9C—9C.
- [0034] FIG. 10A shows a side elevation view of a post.
- [0035] FIG. 10B shows a top plan view of the post of FIG. 10A.
- [0036] FIG. 11A shows a top plan view of a spring.
- [0037] FIG. 11B shows side elevation view of the spring of FIG. 11A.
- [0038] FIG. 12A shows a side elevation view of a first control element.
- [0039] FIG. 12B shows a top plan view of the control element of FIG. 12A.
- [0040] FIG. 12C shows a bottom view of the control element of FIG. 12A.
- [0041] FIG. 12D shows a cross-sectional view of the control element of FIG. 12A taken through a plane containing the line 12D—12D.
- [0042] FIG. 13A shows a side elevation view of a first control element retainer.
- [0043] FIG. 13B shows a top plan view of the control element retainer of FIG. 13A.
- [0044] FIG. 13C shows a bottom view of the control element retainer of FIG. 13A.
- [0045] FIG. 13D shows a cross-sectional view of the control element retainer of FIG. 13A taken through a plane containing the line 13D—13D.
- [0046] FIG. 14 shows a top plan view of a spring configured for placement in the control element retainer of FIG. 13A.
- [0047] FIG. 15A shows an elevation view of a second ratcheting tool embodying features of the present invention.
- [0048] FIG. 15B shows a cross-sectional view of the ratcheting tool of FIG. 15A taken at a right angle to the longitudinal axis through a plane containing the line 15B—15B.

[0049] FIG. 15C shows a cross-sectional view of the ratcheting tool of FIG. 15A taken at a right angle to the longitudinal axis through a plane containing the line 15C—15C.

[0050] FIG. 15D shows a cross-sectional view of the ratcheting tool of FIG. 15A taken at a right angle to the longitudinal axis through a plane containing the line 15D—15D.

[0051] FIG. 16A shows a top plan view of a second control element.

[0052] FIG. 16B shows a bottom view of the control element of FIG. 16A.

[0053] FIG. 16C shows a cross-sectional view of the control element of FIG. 16A taken through a plane containing the line 16C—16C.

[0054] FIG. 17A shows a top plan view of a second control element retainer.

[0055] FIG. 17B shows a bottom view the control element retainer of FIG. 17A.

[0056] FIG. 17C shows a cross-sectional view of the control element retainer of FIG. 17A taken through a plane containing the line 17C—17C.

[0057] FIG. 18A shows a top plan view of a bottom pawl support for use a third ratcheting tool embodying features of the present invention.

[0058] FIG. 18B shows a bottom view of the pawl support of FIG. 18A.

[0059] FIG. 19A shows a front perspective view of a fourth ratcheting tool embodying features of the present invention in a first ratcheting configuration.

[0060] FIG. 19B shows a perspective view of the ratcheting tool of FIG. 19A in a second ratcheting configuration.

[0061] FIG. 19C shows a perspective view of the ratcheting tool of FIG. 19A in a non-ratcheting configuration.

[0062] FIG. 19D shows a side perspective view of the ratcheting tool of FIG. 19C.

DETAILED DESCRIPTION

[0063] Ratcheting tools have been discovered and are described below that provide forward ratcheting action, reverse ratcheting action, and neutral (i.e., freewheeling or non-ratcheting) action, wherein the stability of the neutral

position is significantly improved as compared to previous designs, and wherein forces acting at different positions of the tool may be independently adjusted using separate biasing mechanisms. In some embodiments, as further described below, the ratcheting tools embodying features of the present invention include a plurality (i.e., two or more) biasing elements (e.g., springs, spring-loaded detent balls, and the like, and combinations thereof), at least one of which is configured for biasing the ratchet mechanism to at least the neutral position.

[0064] In some embodiments, a first biasing element biases the ratchet mechanism to either the forward or reverse configuration while a second biasing element biases the ratchet mechanism to the neutral position. In other embodiments, a first biasing element biases the ratchet mechanism to either the forward, neutral or reverse configuration while a second biasing element biases the ratchet mechanism to the neutral position. In other embodiments, a first biasing element biases the ratchet mechanism to either the forward, neutral or reverse configuration while a second biasing element acts in concert with the first biasing element to further bias the ratchet mechanism to the desired configuration.

[0065] Throughout this description and in the appended claims, the following definitions are to be understood:

[0066] The term "coupled" is intended broadly to encompass both direct and indirect coupling. Thus, first and second parts are said to be coupled together when they are directly connected and/or functionally engaged (e.g. by direct contact), as well as when the first part is functionally engaged with an intermediate part which is functionally engaged either directly or via one or more additional intermediate parts with the second part. Also, two elements are said to be coupled when they are functionally engaged (directly or indirectly) at some times and not functionally engaged at other times.

[0067] The phrase "biasing element" refers to any device that can be moved and/or reversibly deformed, such that the movement and/or deformation provides a biasing force against a member mechanically coupled thereto. Representative biasing elements include but are not limited to

springs (e.g., elastomeric torsion springs, coil springs, leaf springs, tension springs, compression springs, spiral springs, volute springs, flat springs, and the like), detents (e.g., spring-loaded detent balls, cones, wedges, and the like), pneumatic devices, hydraulic devices, and the like, and combinations thereof.

[0068] The designations "top" and "bottom" used in reference to elements shown in the drawings are applied merely for convenience of description.

These designations are not to be construed as absolute or limiting and may be reversed. For the sake of clarity, unless otherwise noted, the term "top" generally refers to the side of an element that faces away from the tool body end of a ratcheting tool in its assembled state (e.g., towards the drive stud end in the representative depiction shown in FIGS. 1-2). In addition, unless otherwise noted, the term "bottom" generally refers to the side of an element that faces towards the end of the ratcheting tool opposite the drive stud.

[0069] The designations "inwardly facing" and "outwardly facing" used in reference to various elements (e.g., the teeth of a toothed element, the sides of a cavity including any notch) are likewise applied merely for convenience of description. These designations are not to be construed as absolute or limiting and may be reversed. For the sake of clarity, unless otherwise noted, the phrase "inwardly facing" generally refers to an orientation towards the central axis of a ratcheting tool (such as, for example, the axis that runs the length of the driven element). In addition, unless otherwise noted, the phrase "outwardly facing" generally refers to orientation away from the central axis of the ratcheting tool and towards the outer exposed surface of the tool body.

As used in reference to notches, orientation towards and away from the central axis is determined relative to the concave opening of the notch.

[0070] The terms "forward" and "reverse" used in reference to directions of ratcheting action generally refer to first and second opposing ratcheting directions. Technically speaking, these terms should be understood in reference to the drive stud end of the ratcheting tool, such that "forward" corresponds to a clockwise transmittal of torque at the drive stud end and "reverse" corresponds to a counterclockwise transmittal of torque at the drive

stud end. However, unless context dictates otherwise, these terms are used interchangeably herein provided it is understood that the absolute directions of rotation to which they refer oppose each other.

[0071] The phrase "extension bar" is intended broadly to encompass any structure with a first coupling element at one end (e.g., a socket, a drive stud, etc.), a second coupling element (e.g., a socket, a drive stud, etc.) at the other end, and at least one torque-transmitting element therebetween. Representative extension bars may include additional elements such as universal joints, and the like.

[0072] The term "handle" refers to any element coupled to and/or integral with a ratcheting tool that is configured to be held by a user thereof. In some embodiments, the tool body of the ratcheting tool provides the handle and in other embodiments, the driven element of the ratcheting tool provides the handle. In some embodiments, the handle is provided by a separate attachment coupled to some portion of the ratcheting tool (e.g., the tool body, either end of the driven element, etc.) at any angle to the longitudinal axis of the ratcheting tool (e.g., collinear with, at right angles to, or at skew angles to the longitudinal axis). It is to be understood that handles provided as separate attachments may be used with any of the ratcheting tools described herein.

[0073] Ratcheting tools embodying features of the present invention include a tool body; a driven element; a ratchet mechanism coupling the driven element to the tool body, wherein the ratchet mechanism is configured for adjustment between a plurality of a forward configuration, a reverse configuration, and a neutral configuration; an adjustable first biasing element coupled to the ratchet mechanism and configured to bias the ratchet mechanism to at least one of the forward, reverse, and neutral configurations; and an adjustable second biasing element coupled to the ratchet mechanism and configured to bias the ratchet mechanism to at least one of the forward, reverse, and neutral configurations.

[0074] In some embodiments further described below, the first and second biasing elements are configured to act in concert to provide the same

type of bias to the ratchet mechanism, such that both the first and second biasing elements simultaneously provide a common bias towards at least one of the forward, reverse, and neutral configurations.

[0075] Representative embodiments in accordance with the present invention will now be described in reference to the appended drawings. It is to be understood that elements and features of the various representative embodiments described below may be selected or combined in different ways to produce additional embodiments that likewise fall within the scope of the present invention. Accordingly, the description provided below, when provided in reference to one or more specific figures, is to be understood as being likewise applicable to other embodiments, including but not limited to those shown in other drawing figures whether or not they are specifically referenced.

[0076] FIGS. 1 and 2 show a first ratcheting tool 2 embodying features of the present invention. The ratcheting tool 2 includes a tool body 4 and a longitudinally extending driven element 6. The tool body 4, best shown by FIGS. 3A-3D, is mounted around driven element 6 and is freely rotatable thereabout. In some embodiments, tool body 4 includes one or more grooves 8, as shown in FIG. 3A, or other features (e.g., knurling, non-slip textured materials formed around the tool body or applied by adhesives or other means, and the like) in order to provide a comfortable gripping surface.

[0077] The driven element 6 may be an extension bar containing a first coupling end (e.g., male or female) and a second coupling end (e.g., male or female). By way of example, the driven element 6 may be an extension bar containing a socket 10 and a drive stud 12 provided on opposite ends thereof, as best shown by FIGS. 4A-4C. However, any element to be turned or driven by a ratcheting or freewheeling action has been contemplated for use in accordance with the present invention. In some embodiments, driven element 6 is a continuous, solid element from end to end while in others, driven element 6 is partially or substantially hollowed. In the neutral position, tool body 4 may be used to steady driven element 6 while driven element 6 is

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rotated by a tool such as a socket wrench (not shown) engaged with socket 10.

[0078] The socket 10 is formed with a usually out-of-round cross section which may, for example, be square, hexagonal or the like. Socket 10 is configured to receive the drive stud of a socket wrench (not shown) or other drive tool when the socket wrench or other tool is used to apply torque to driven element 6. The drive stud 12 includes a usually out-of-round drive portion 13 and an adjacent portion 11. The drive portion 13 is shaped to fit within a tool attachment (not shown) to apply torque to the tool attachment. The out-of-round drive portion 13 may be provided with any desired cross-sectional shape and may, for example, be generally square or hexagonal in cross section. The driven element 6 and the outer portion of socket 10 may be substantially rotationally symmetrical about a longitudinal axis L.

[0079] As best shown by FIGS. 4A and 4C, driven element 6 includes a recessed cavity 14 in an intermediate portion thereof, which is configured to receive a key element 16 that has a shape and dimensions complementary thereto. A representative key element 16, best shown by FIGS. 6A-6C, is further described below.

[0080] The ratcheting tool 2 shown in FIGS. 1 and 2 further includes a ratchet mechanism 18 that couples driven element 6 to tool body 4. The ratchet mechanism 18 is configured for adjustment between a plurality (i.e., at least two) of a forward configuration, a reverse configuration, and a neutral configuration wherein the tool body 4 is allowed to free-wheel with respect to driven element 6. In some embodiments, ratchet mechanism 18 includes a pivotably mounted pawl 20, best shown by FIGS. 8A and 8B, and a toothed element 22, best shown by FIGS. 5A-5D. The toothed element 22 may be provided by and/or supported on an inner surface of a tool body extension 23, as best shown by FIG. 5B. The pawl 20 is pivotably mounted on a pin 24 and configured to engage toothed element 22 such that in the forward configuration, driven element 6 is allowed to rotate freely in a forward direction but is substantially prevented from rotating in a reverse direction, and in the

reverse configuration, driven element 6 is allowed to rotate freely in a reverse direction but is substantially prevented from rotating in a forward direction.

[0081] As best shown by FIGS. 5C and 3B, the bottom surface of tool body extension 23 includes a tenon-like ledge 26 configured to be received in a complementary mortise-like depression 28 on the top surface of tool body 4. When key element 16 is positioned in recessed cavity 14, detachment of the mortise-like joint formed between ledge surface 26 and depression 28 is substantially prevented, and toothed element 22 is configured to move in unison with tool body 4. When key element 16 is positioned in recessed cavity 14, longitudinal separation of tool body 4 from tool body extension 23 is likewise substantially prevented due to the abutment of a bottom edge of key element 16 against a top interior surface of toothed element 22. In alternative configurations, tool body 4 may be integrally formed with tool body extension 23 and optionally with toothed element 22. The tool body 4 and tool body extension 23 may be shaped as desired, and may include both cylindrical and non-cylindrical shapes.

[0082] Toothed element 22 includes a plurality of teeth 30 configured to engage with pawl 20. In some embodiments, as best shown by FIG. 5B, inwardly facing teeth 30 are provided on an inner periphery of toothed element 22. In this configuration, pawl 20 is configured to rotate with driven element 6. In other embodiments, outwardly facing teeth may be provided (e.g., on driven element 6), such that pawl 20 is configured to rotate with tool body 4. Such arrangements are well known in the art and are commonly used in ratcheting mechanisms including but not limited to roundhead ratchets.

[0083] The ratcheting tool 2 shown in FIGS. 1 and 2 further includes first and second pawl supports 32 and 34, respectively, best shown by FIGS. 7A and 7B, between which pivotably mounted pawl 20 and a first biasing element, further described below, are sandwiched. As further described below, pawl supports 32 and 34 are configured to rotate in unison with driven element 6. As best shown by FIG. 7A, pawl supports 32 and 34 include a central bore 36 configured to receive driven element 6, and a semi-circular cutout 38 configured to receive key element 16. Pawl supports 32 and 34

further include three circular openings 40 arranged as shown in FIG. 7A. The opening 40 furthest from semi-circular cutout 38 is configured to receive pin 24 on which pawl 20 is pivotably mounted. The two remaining circular openings 40, adjacent to semi-circular cutout 38, are configured to receive a pair of cylindrical pins 42, best shown in FIGS. 9A-9C, that have a central portion of increased diameter relative to the diameters of the ends. In some embodiments, pins 42 are continuous, solid elements while in others, pins 42 are partially or substantially hollowed. Pawl supports 32 and 34 further include a pair of arcuate slots 44 disposed on opposite sides of central bore 36, which are configured to receive a pair of posts 46, best shown by FIGS. 10A and 10B.

[0084] The pawl 20 may be pivoted about pin 24 so as to engage or not engage teeth 30 of toothed element 22. The pawl 20 is controlled as further described below.

[0085] Ratcheting tool 2 shown in FIGS. 1 and 2 further includes a first biasing element coupled to ratchet mechanism 18 that is configured to bias ratchet mechanism 18 to at least one of the forward, reverse, and neutral positions. In some embodiments, as shown in FIGS. 11A-11B, the first biasing element is provided by an apical spring 48, the ends of which are looped around posts 46 and held thereon. The position of pawl 20 about pin 24 is controlled by spring 48, which includes a central portion 50, best shown by FIG. 11A, configured to bear directly on a rear surface of pawl 20. When spring 48 is rotated in a first direction in relation to the pawl, one end of pawl 20 is urged into contact with toothed element 22 to provide a ratcheting action in which tool body 4 is allowed to rotate freely in a first direction but is substantially prevented from rotating in an opposite direction on the backstroke. Conversely, when spring 48 is rotated in a second direction in relation to the pawl, the other end of pawl 20 is pressed into engagement with toothed element 22, thereby allowing tool body 4 to rotate freely in a second direction but substantially preventing it from rotating in an opposite direction on the backstroke. When the central portion 50 of spring 48 is centered with respect to the rear surface of pawl 20, spring 48 operates to hold pawl 20 in a

neutral position, wherein pawl 20 is maintained out of contact with toothed element 22 and tool body 4 is allowed to free-wheel about the longitudinal axis L with respect to driven element 6.

[0086] The ratcheting tool 2 shown in FIGS. 1 and 2 further includes a control element 52, best shown by FIGS. 12A-12D. Control element 52 includes a central bore 54 configured to receive driven element 6, and an obround cutout 56 configured to receive key element 16. When assembled, key element 16 protrudes slightly above obround cutout 56 on the top side 58 of control element 52, such that it is configured to engage with a control element retainer, as further described below. As best shown by FIGS. 12B and 12C, control element 52 further includes a pair of circular openings 60 disposed on either side of central bore 54, which are configured to receive posts 46 around which the ends of spring 48 are looped. Thus, when control element 52, first pawl support 32 and second pawl support 34 are assembled together with key element 16, the central portion 50 of spring 48 will be positioned to bear against a rear surface of pawl 20, thereby biasing pawl 20 towards forward, reverse or neutral ratcheting actions.

[0087] Control element 52 is rotatable with respect to driven element 6 about a limited arc. When control element 52 is rotated, posts 46 slide in arcuate slots 44 of the pawl supports 32 and 34, which limits the range of travel available to posts 46 during rotation of control element 52. In some embodiments, arcuate slots 44 are dimensioned to hold posts 46 out of substantial load-bearing contact with pawl support 32 and thereby to protect posts 46 from excessive shear loads.

[0088] In some embodiments, control element 52 further includes at least one, and in some embodiments, such as that shown in FIG. 12B, a plurality of outwardly facing notches. As shown in FIG. 12B, control element 52 includes first, second and third outwardly facing notches, 62, 64, and 66, respectively, each of which is configured to engage with a contact region of a second biasing element described below.

[0089] The ratcheting tool 2 shown in FIGS. 1 and 2 further includes a control element retainer 68 best shown by FIGS. 13A-13D. The control

element retainer 68 is press-fit in place on driven element 6, such that there is substantially no rotational movement therebetween, or, for example, held in place with a ring clip. Control element retainer 68 includes an arcuate recess 70 in an inner side wall thereof that is configured to receive a second biasing element further described below. This second biasing element is configured to engage with first, second, and third notches, 62, 64, and 66, respectively. As best shown by FIG. 13C, control element retainer 68 includes a central bore 72 configured to receive driven element 6, and a semi-circular cutout 74 configured to receive the portion of key element 16 that protrudes beyond obround cutout 56.

[0090] The ratcheting tool 2 shown in FIGS. 1 and 2 further includes a second biasing element coupled to ratchet mechanism 18 that is configured to bias ratchet mechanism 18 to at least one of the forward, reverse, and neutral configurations. In some embodiments, as shown in FIG. 14, the second biasing element is provided by a spring 76 press fit into the arcuate recess 70 in control element retainer 68. The spring 76 includes a central portion 78 configured to bear on one of first, second and third outwardly facing notches, 62, 64, and 66, respectively. In this configuration, engagement of first notch 62 biases ratchet mechanism 18 to a first ratcheting configuration, engagement of second notch 64 biases ratchet mechanism 18 to the neutral configuration, and engagement of third notch 66 biases ratchet mechanism 18 to the second ratcheting configuration.

[0091] The above-described configuration of ratcheting tool 2 is designed such that rotation of tool body 4 rotates pawl 20, which rotates pin 24 on which pawl 20 is mounted, which rotates first and second pawl supports 32 and 34, respectively, in unison. By rotating control element 52, the direction of ratcheting action of ratcheting tool 2 may be controlled. As shown in FIG. 13A, indicial markings may optionally be provided on an exterior surface of control element retainer 68 to indicate the positions to which control element 52 should be shifted in order to engage one of the forward, neutral, and reverse ratcheting positions. Control element 52 may likewise be provided with an indicial marking, as shown in FIG. 12A, such that alignment of the

mark on control element 52 with one of the marks on control element retainer 68 enables a user to easily locate a desired ratcheting position.

[0092] In the ratcheting tool 2 described above in reference to FIGS. 1-14, control element 52 includes a plurality of outwardly facing notches while control element retainer 68 includes spring 76 which serves as a second biasing element. However, in alternative embodiments, such as the representative example shown in FIGS. 15-17, the positions of the notches and second biasing element may be reversed.

[0093] By way of example, a ratcheting tool 80 shown in FIG. 15A includes a control element 82 having an arcuate recess 84 configured to receive a second biasing element coupled to the ratchet mechanism, and to bias the ratchet mechanism to at least one of the forward, reverse, and neutral configurations. In some embodiments, as shown in FIGS. 15C and 16A, the second biasing element may be provided by an apical spring 86 press fit into arcuate recess 84. To complement this configuration, ratcheting tool 80 further includes a control element retainer 88, shown in FIGS. 15C and 17A, having first, second and third inwardly facing notches, 90, 92, and 94, respectively, each of which is configured to engage with a contact region 96 of spring 86.

[0094] FIG. 17B shows a bottom view of control element retainer 88 with spring 86 laid in to illustrate the manner of engaging inwardly facing notch 92 in accordance with this embodiment. The manner of retention of spring 86, not shown in FIG. 17B, is best shown by FIG. 16A as described above. As shown in FIG. 15D, the first biasing element configured to engage a pawl (not shown) of a ratcheting mechanism in a manner analogous to that described above in reference to FIGS. 1-14 is likewise provided by an apical spring 98. Thus, in the embodiment shown in FIGS. 15-17, both the first and second biasing elements, 98 and 86, respectively, are provided by apical springs.

[0095] In further alternative ratcheting tools in accordance with the present invention, a second biasing element may be provided that acts to bias the ratchet mechanism to only one of the three ratcheting positions—in a presently preferred configuration, to the neutral position. Ratcheting tools of

this type may be provided by modifying the single-spring designs described in United States Patent No. 6, 182,536 to include a second biasing element. The entire contents of U.S. Patent No. 6,182,536 are incorporated herein by reference, except that in the event of any inconsistent disclosure or definition from the present application, the disclosure or definition herein shall be deemed to prevail.

[0096] By way of example, FIGS. 18A and 18B show a bottom pawl support 100 containing a second biasing element, and in this representative example a pair of such biasing elements, configured for biasing a pawl 102 pivotally mounted on a pin 104 into the neutral position. A central depression 106 on a rear surface of pawl 102 corresponds to the neutral position of the ratcheting mechanism. As shown in FIG. 18A, pawl support 100 includes arcuate slots 108 configured to receive posts 110 that are slidable therein in a manner analogous to that described above in reference to FIGS. 1-14. The first biasing element is provided by an apical spring 112, the ends of which are looped around posts 110 and held thereon. The position of pawl 102 about pin 104 is controlled by spring 112, which includes a central portion 114, best shown by FIG. 18A, configured to bear directly on a rear surface of pawl 102. In this embodiment, pawl 102 and apical spring 112 are provided on the same side of pawl support 100.

[0097] As shown in FIG. 18B, the bottom surface 116 of pawl support 100 includes recessed cavities 118 configured to receive a second biasing element. In some embodiments, as shown in FIG. 18B, the second biasing element is provided by a pair of M-shaped springs 120 press fit into recessed cavities 118. In the neutral configuration, when central portion 114 of apical spring 112 is aligned and engaged with central depression 106 of pawl 102, the posts 110 will be substantially centrally positioned within arcuate slots 108, such that central valley portions 122 of M-shaped springs 120 are configured to engage and retain posts 110.

[0098] As described above and shown in FIG. 18A, pawl 102 includes a central depression 106 configured for engagement with spring 112. In alternative embodiments, the pawl is provided with first, second, and third

notches, analogous to the pawls described in U.S. Patent No. 6,182,538, which correspond to the forward, neutral, and reverse positions. A representative ratcheting tool incorporating these alternative pawls includes (a) a tool body; (b) a driven element, optionally containing a drive stud and/or socket; (c) a ratchet mechanism coupling the driven element to the tool body, wherein the ratchet mechanism is configured for adjustment between a plurality of a forward configuration, a reverse configuration, and a neutral configuration, and wherein the ratchet mechanism includes: a pawl and a toothed wheel, wherein the pawl is configured to engage the toothed wheel, and wherein the pawl comprises first, second, and third contact regions; (d) a first biasing element coupled to the ratchet mechanism and comprising a fourth contact region, wherein the fourth contact region is configured to engage at least one of the first, second, and third contact regions on the pawl, thereby biasing the ratchet mechanism to at least one of the forward, neutral, and reverse configurations, respectively; and (e) a second biasing element coupled to the ratchet mechanism and comprising a fifth contact region, wherein the second biasing element is configured to engage the ratchet mechanism with the fifth contact region and bias the ratchet mechanism to the neutral configuration when the first biasing element is engaged with the second contact region on the pawl.

[0099] In the various embodiments described above, the ratchet mechanisms for coupling the driven element to the tool body include a pawl and a toothed element. However, the present invention is not limited thereto. All manner of alternative ratchet mechanisms, and all equivalents thereto, may likewise be employed. Representative alternative ratchet mechanisms for use in accordance with the present invention include those that employ clutches (e.g., solid or fluid).

[00100] FIGS. 19A-19D show a fourth ratcheting tool 124 embodying features of the present invention. The ratcheting tool 124 includes a friction or clutch-type ratchet mechanism 126. Ratchet mechanism 126 contains a plurality of friction elements 128, for example, though not necessarily, substantially cylindrical pins, as shown in FIGS. 19A-19C, and an out-of-round

collar 130, which may be octagonally shaped as further shown in FIGS. 19A-19C. The friction elements 128 are interposed between a driven element 132 and out-of-round collar 130. Alternative shapes for out-of-round collar 130 may likewise be employed, including but not limited to hexagonal shapes, heptagonal shapes, and the like.

[00101] Friction elements 128 are configured to engage driven element 132, which may include a drive stud as shown in FIGS. 19A-19D. As best shown by FIG. 19D, driven element 132 may be provided with a detent mechanism 133 for releasably engaging a workpiece (not shown), such as a socket. In the forward configuration, driven element 132 is allowed to rotate freely in a forward direction but is substantially prevented from rotating in a reverse direction. In the reverse configuration, driven element 132 is allowed to rotate freely in the reverse direction but is substantially prevented from rotating in the forward direction.

[00102] Ratcheting tool 124 further includes at least one first biasing element, which may be provided by a detent element 134, as best shown by FIGS. 19A-19C. Detent element 134 is configured for bearing against at least one of friction elements 128 and, in some embodiments, detent element 134 is substantially cone-shaped.

[00103] Ratcheting tool 124 further includes at least one second biasing element, which may be provided by a spring 136 mounted in a recess (not shown) in tool head 140, wherein the spring 136 has a contact region 138 configured to receive at least one of the plurality of friction elements 128. As best shown by FIGS. 19A and 19B, spring 136 may be M-shaped, with the central valley of the M being aligned with a vertex 137 of out-of-round collar 130. In a neutral position, spring 136 is configured to receive an adjacent friction element 128 in its central valley portion and to retain this friction element in a manner analogous to that described above in reference to M-shaped spring 120. When the friction element 128 adjacent to spring 136 moves from one side of its corresponding vertex to the other side (e.g., when the ratcheting direction is changed from forward to reverse or vice versa), spring 136 is configured to recede and/or deform into the recess (not shown).

in tool head 140 so as not to substantially impede the movement of friction element 128.

[00104] The ratcheting direction of ratcheting tool 124 may be controlled by moving a reversing lever 144 located on the rear surface of the tool head 140 from one side to the other. The detent mechanism 133 in driven element 132 may be controlled by a push button 146 adjacent to reversing lever 144.

[00105] As shown in FIGS. 19A-19C, out-of-round collar 130 includes a plurality of vertices 137 at least equal in number to the plurality of friction elements 128. Friction elements 128 are positioned slightly to one side of their respective vertices 137 in a forward configuration, as shown in FIG. 19A, slightly to the other side of their respective vertices 137 in the reverse configuration, as shown in FIG. 19B, and substantially in alignment with their respective vertices 137 in the neutral configuration, as shown in FIG. 19C.

[00106] Friction elements 128 are rolled from one side of their respective vertices 137 to the other when the reversing lever 144 coupled thereto is moved accordingly. As shown in FIG. 19C, detent element 134 is forced inside tool body 142 by an adjacent friction element 128 when ratcheting tool 124 is in the neutral position, such that driven element 132 is allowed to free wheel with respect to head 140 of tool body 142. The stability of this neutral position is increased through the agency of M-shaped spring 136, which receives and retains an adjacent friction element 128 in its central valley portion. In alternative embodiments to the representative example shown in FIGS. 19A-19C, ratcheting tool 124 may optionally be provided with a plurality (i.e., two or more) springs 136 configured to receive separate friction elements 128, and/or with two or more detent elements 134 likewise configured to bias separate friction elements 128. In other embodiments, detent element 134 may be omitted and replaced by one or more springs 136.

[00107] Ratcheting tools in accordance with the present invention may further include a quick release mechanism, such as the one described in U.S. Patent No. 6,182,536, incorporated by reference in its entirety above. For example, as shown in FIG. 1, ratcheting tool 2 includes a quick release mechanism 148 that is particularly simple and inexpensive to assemble. The

Illustrated quick release mechanism 148 includes a pin (not shown) that slides in an oblique passageway, as shown and described in the above-referenced patent. As further described therein, the pin is biased in a selected direction by a spring that bears on a ring that in turn bears on the pin. The ring (not shown) is symmetrical about its own plane, and thus the ring may be assembled in either orientation and still perform its function properly. This eliminates the need to orient the ring in a selected orientation at the time of assembly, and thereby simplifies assembly.

[00108] The quick release mechanism 148 is in many respects similar to the quick release mechanism described in United States Patent No. 5,644,958, assigned to the assignee of the present invention, the entire contents of which are incorporated herein by reference, except that in the event of any inconsistent disclosure or definition from the present application, the disclosure or definition herein shall be deemed to prevail. As shown and described in greater detail in U.S. Patent No. 5,644,958, the quick release mechanism 148 may include a locking element which in some embodiments takes the form of a pin. The pin slides in a passageway 150 in driven element 6, best shown by FIG. 4C, that is obliquely oriented with respect to the longitudinal axis L and extends between openings in the out-of-round drive portion 13 and adjacent portion 11 of driven element 6. As further described in the above-referenced patents, the pin may include a first end at the out-of-round drive portion 13 and a second end at the adjacent portion 11. The pin is movable in passageway 150 between a tool attachment engaging position wherein the first end of the pin is positioned to engage a tool attachment, such as a socket, to hold the tool attachment in place on drive portion 13. The alternate position is a tool attachment releasing position analogous to that shown in U.S. Patent No. 5,644,958 wherein the first end of the pin is received substantially within passageway 150 and the tool attachment is released from drive portion 13. In the embodiment described, the pin is biased away from the out-of-round drive portion 13 by a releasing spring. However, alternative quick release mechanisms may be employed with equal ease.

[00109] The position of the pin in passageway 150 is controlled by an actuator 152, shown in FIG. 1. In some embodiments, actuator 152 includes a ring biased against the pin by an engaging spring as described in the above-referenced patents. The ring may be lifted away from the drive portion 13 (e.g., upwardly in the orientation shown in FIG. 1) by a collar that defines a ledge that engages the ring. When no external forces are applied to actuator 152, the spring presses the ring against the pin with sufficient force to compress a second spring mounted around the pin to move the first end of the pin outwardly to the tool attachment engaging position.

[00110] From the foregoing, it will be readily apparent that a ratcheting tool has been discovered that has improved stability in its neutral position as compared to tools that contain only a single multi-functional biasing element. A control element, reversing lever or the like may be used to set the ratchet mechanism of tools in accordance with the present invention for clockwise ratcheting action, counterclockwise ratcheting action, or free-wheeling. When clockwise or counterclockwise ratcheting action is selected, the tool body may be used manually to tighten or loosen a fastener with a tool attachment such as a hex tool, a torx tool, a socket-mounted screwdriver bit (e.g., slotted, Phillips or torx) or a socket attached to a drive stud. When the ratchet mechanism is positioned in the freewheeling position, the freewheeling tool body may be used as a guide to steady the driven element as it is being rotated by a conventional tool (e.g., a socket wrench) engaged with one of the coupling ends (e.g., a drive socket).

[00111] The foregoing detailed description and accompanying drawings have been provided solely by way of explanation and illustration, and are not intended to limit the scope of the appended claims. Many variations in the presently preferred embodiments illustrated herein will be obvious to one of ordinary skill in the art, and remain within the scope of the appended claims and their equivalents.

CLAIMS

1. A ratcheting tool comprising:
a tool body;
a driven element;
5 a ratchet mechanism coupling the driven element to the tool body,
wherein the ratchet mechanism is configured for adjustment between a
plurality of a forward configuration, a reverse configuration, and a neutral
configuration;
an adjustable first biasing element coupled to the ratchet mechanism
10 and configured to bias the ratchet mechanism to at least one of the forward,
reverse, and neutral configurations; and
an adjustable second biasing element coupled to the ratchet
mechanism and configured to bias the ratchet mechanism to at least one of
the forward, reverse, and neutral configurations.
15
2. The invention of claim 1 wherein the first biasing element is configured
to bias the ratchet mechanism to a plurality of the forward, reverse, and
neutral configurations.
- 20 3. The invention of claim 1 or 2 wherein the first and second biasing
elements bias the ratchet mechanism concertedly to at least one of the
forward, reverse, and neutral configurations.
4. The invention of claim 1 or 2 wherein the first and second biasing
25 elements do not concertedly bias the ratchet mechanism to at least one of the
forward, reverse, and neutral configurations.
5. The invention of claim 1 or 2 wherein the ratchet mechanism comprises
a pawl and a toothed element, wherein the pawl is configured to engage the
30 toothed element such that

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in the forward configuration, the driven element is allowed to rotate freely in a forward direction but is substantially prevented from rotating in a reverse direction; and

5 in the reverse configuration, the driven element is allowed to rotate freely in the reverse direction but is substantially prevented from rotating in the forward direction.

10 6. The invention of claim 1 or 2 wherein the first biasing element comprises a spring configured to bear against a surface of a pawl.

7. The invention of claim 5 wherein the toothed element comprises inwardly facing teeth provided on an inner periphery of the tool body, and wherein the pawl is configured to rotate with the driven element.

15 8. The invention of claim 5 wherein the toothed element comprises outwardly facing teeth provided on the driven element, and wherein the pawl is configured to rotate with the tool body.

20 9. The invention of claim 1 or 2 wherein the ratcheting tool further comprises a control element coupled to the ratchet mechanism, wherein the control element comprises at least one notch configured to engage with the second biasing element, such that engagement biases the ratchet mechanism to at least one of the forward, neutral, and reverse configurations.

25 10. The invention of claim 1 or 2 wherein the ratcheting tool further comprises a control element coupled to the ratchet mechanism, wherein the control element comprises first, second and third notches, each of which is configured to engage with the second biasing element, such that engagement of the first notch biases the ratchet mechanism to the forward configuration,
30 engagement of the second notch biases the ratchet mechanism to the neutral configuration, and engagement of the third notch biases the ratchet mechanism to the reverse configuration.

11. The invention of claim 1 or 2 wherein the ratcheting tool further comprises a control element retainer comprising a recess configured to receive the second biasing element.

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12. The invention of claim 1 or 2 wherein the second biasing element comprises a spring configured to bear against a surface of a notch.

10 13. The invention of claim 10 wherein the second biasing element comprises a spring configured to bear against a surface of the first, second, and third notches.

14. The invention of claim 1 or 2 wherein the driven element comprises a first coupling end selected from the group consisting of a drive stud and a socket, and a second coupling end selected from the group consisting of a drive stud and a socket.

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15. The invention of claim 1 or 2 wherein the ratcheting tool further comprises a control element coupled to the ratchet mechanism, wherein the control element comprises a recess configured to receive the second biasing element.

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16. The invention of claim 15 wherein the ratcheting tool further comprises a control element retainer comprising at least one notch configured to engage with the second biasing element, such that engagement biases the ratchet mechanism to the neutral configuration.

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17. The invention of claim 15 wherein the ratcheting tool further comprises a control element retainer comprising first, second and third notches, each of which is configured to engage with the second biasing element, such that engagement of the first notch biases the ratchet mechanism to the forward configuration, engagement of the second notch biases the ratchet mechanism

30

to the neutral configuration, and engagement of the third notch biases the ratchet mechanism to the reverse configuration.

18. The invention of claim 17 wherein the second biasing element
5 comprises a spring configured to bear against a surface of the first, second, and third notches.

19. The invention of claim 1 or 2 wherein the second biasing element
10 comprises an M-shaped spring, such that a central valley portion thereof provides a contact region.

20. The invention of claim 1 or 2 wherein the ratchet mechanism comprises a plurality of friction elements and an out-of-round collar, wherein the friction elements are configured to engage the driven element such that:
15 In the forward configuration, the driven element is allowed to rotate freely in a forward direction but is substantially prevented from rotating in a reverse direction; and
In the reverse configuration, the driven element is allowed to rotate freely in the reverse direction but is substantially prevented from rotating in
20 the forward direction.

21. The invention of claim 20 wherein the first biasing element comprises a detent element configured for biasing at least one of the friction elements,

22. The invention of claim 21 wherein the detent element is substantially
25 cone-shaped.

23. The invention of claim 21 wherein each of the friction elements
30 comprises a substantially cylindrical pin.

24. The invention of claim 20 wherein the second biasing element comprises a spring configured to engage one of the plurality of friction

elements, such that in the neutral configuration, the driven element is allowed to free wheel with respect to the tool body.

25. The invention of claim 20 wherein the friction elements are interposed
5 between the driven element and the out-of-round collar.

26. The invention of claim 20 wherein the out-of-round collar comprises a plurality of vertices at least equal in number to the plurality of friction elements, and wherein the plurality of friction elements are positioned to one
10 side of the respective vertices in the forward configuration, to the other side of the respective vertices in the reverse configuration, and substantially in alignment with the respective vertices in the neutral configuration.

27. A ratcheting tool comprising:
15 a tool body;
a driven element comprising a drive stud;
a ratchet mechanism coupling the driven element to the tool body,
wherein the ratchet mechanism is configured for adjustment between a forward configuration, a reverse configuration, and a neutral configuration,
20 and wherein the ratchet mechanism comprises:
a toothed element and a pawl configured to engage the toothed element;
a first biasing element coupled to the ratchet mechanism and configured to bias the ratchet mechanism to at least one of the forward,
25 neutral, and reverse configurations;
a second biasing element coupled to the ratchet mechanism and configured to bias the ratchet mechanism to at least one of the forward, neutral, and reverse configurations;
a control element coupled to the ratchet mechanism and comprising
30 first, second and third notches, each of which is configured to engage with the second biasing element, such that engagement of the first notch biases the ratchet mechanism to the forward configuration, engagement of the second

notch biases the ratchet mechanism to the neutral configuration, and engagement of the third notch biases the ratchet mechanism to the reverse configuration; and

5 a control element retainer coupled to the control element, wherein the control element retainer comprises a recess configured to receive the second biasing element.

28. The invention of claim 27 wherein the first biasing element comprises a spring comprising a central portion configured to bear against a surface of the
10 pawl.

29. The invention of claim 28 wherein the second biasing element comprises a spring comprising a central portion configured to bear against a surface of the first, second, and third notches.

15

30. A ratcheting tool comprising:

a tool body;

a driven element comprising a drive stud;

a ratchet mechanism coupling the driven element to the tool body,

20 wherein the ratchet mechanism is configured for adjustment between a forward configuration, a reverse configuration, and a neutral configuration, and wherein the ratchet mechanism comprises:

a toothed element and a pawl configured to engage the toothed element;

25 a first biasing element coupled to the ratchet mechanism and configured to bias the ratchet mechanism to at least one of the forward, neutral, and reverse configurations;

30 a second biasing element coupled to the ratchet mechanism and configured to bias the ratchet mechanism to at least one of the forward, neutral, and reverse configurations;

a control element coupled to the ratchet mechanism, wherein the control element comprises a recess configured to receive the second biasing element; and

5 a control element retainer comprising first, second and third notches, each of which is configured to engage with the second biasing element, such that engagement of the first notch biases the ratchet mechanism to the forward configuration, engagement of the second notch biases the ratchet mechanism to the neutral configuration, and engagement of the third notch biases the ratchet mechanism to the reverse configuration.

10

31. The invention of claim 27 or 30 wherein the first, second, and third notches correspond, respectively, to forward, neutral, and reverse ratcheting configurations.

15 32. The invention of claim 1 or 2 further comprising a handle.

33. The invention of claim 32 wherein the handle is at a right angle to a longitudinal axis of the driven element.

20 34. The invention of claim 32 wherein the handle is moveable between a plurality of angles with respect to the longitudinal axis of the driven element.

35. A ratcheting tool comprising:

a tool body;

25 a driven element;

a ratchet mechanism coupling the driven element to the tool body, wherein the ratchet mechanism is configured for adjustment between a plurality of a forward configuration, a reverse configuration, and a neutral configuration;

30 an adjustable first biasing element coupled to the ratchet mechanism and configured to bias the ratchet mechanism to at least one of the forward, reverse, and neutral configurations; and

-30-

an adjustable second biasing element coupled to the ratchet mechanism and configured to bias the ratchet mechanism to at least one of the forward, reverse, and neutral configurations;

5 wherein at least one of the first biasing element and the second biasing element is configured to bias the ratchet mechanism to the neutral configuration.

36. The invention of claim 35 wherein the ratchet mechanism comprises a pawl and a toothed element, wherein the pawl is configured to engage the
10 toothed element such that

in the forward configuration, the driven element is allowed to rotate freely in a forward direction but is substantially prevented from rotating in a reverse direction; and

15 in the reverse configuration, the driven element is allowed to rotate freely in the reverse direction but is substantially prevented from rotating in the forward direction.

37. The invention of claim 35 wherein the first biasing element comprises a spring configured to bear against a surface of a pawl.
20

38. The invention of claim 36 wherein the toothed element comprises inwardly facing teeth provided on an inner periphery of the tool body, and wherein the pawl is configured to rotate with the driven element.

25 39. The invention of claim 36 wherein the toothed element comprises outwardly facing teeth provided on the driven element, and wherein the pawl is configured to rotate with the tool body.

30 40. The invention of claim 35 wherein the ratcheting tool further comprises a control element coupled to the ratchet mechanism, wherein the control element comprises at least one notch configured to engage with the second

blasing element, such that engagement of the at least one notch biases the ratchet mechanism to the neutral configuration.

41. The invention of claim 35 wherein the ratcheting tool further comprises
5 a control element coupled to the ratchet mechanism, wherein the control
element comprises first, second and third notches, each of which is
configured to engage with the second biasing element, such that engagement
of the first notch biases the ratchet mechanism to the forward configuration,
engagement of the second notch biases the ratchet mechanism to the neutral
10 configuration, and engagement of the third notch biases the ratchet
mechanism to the reverse configuration.

42. The invention of claim 35, 36, 40 or 41 wherein the ratcheting tool
further comprises a control element retainer comprising a recess configured to
15 receive the second biasing element.

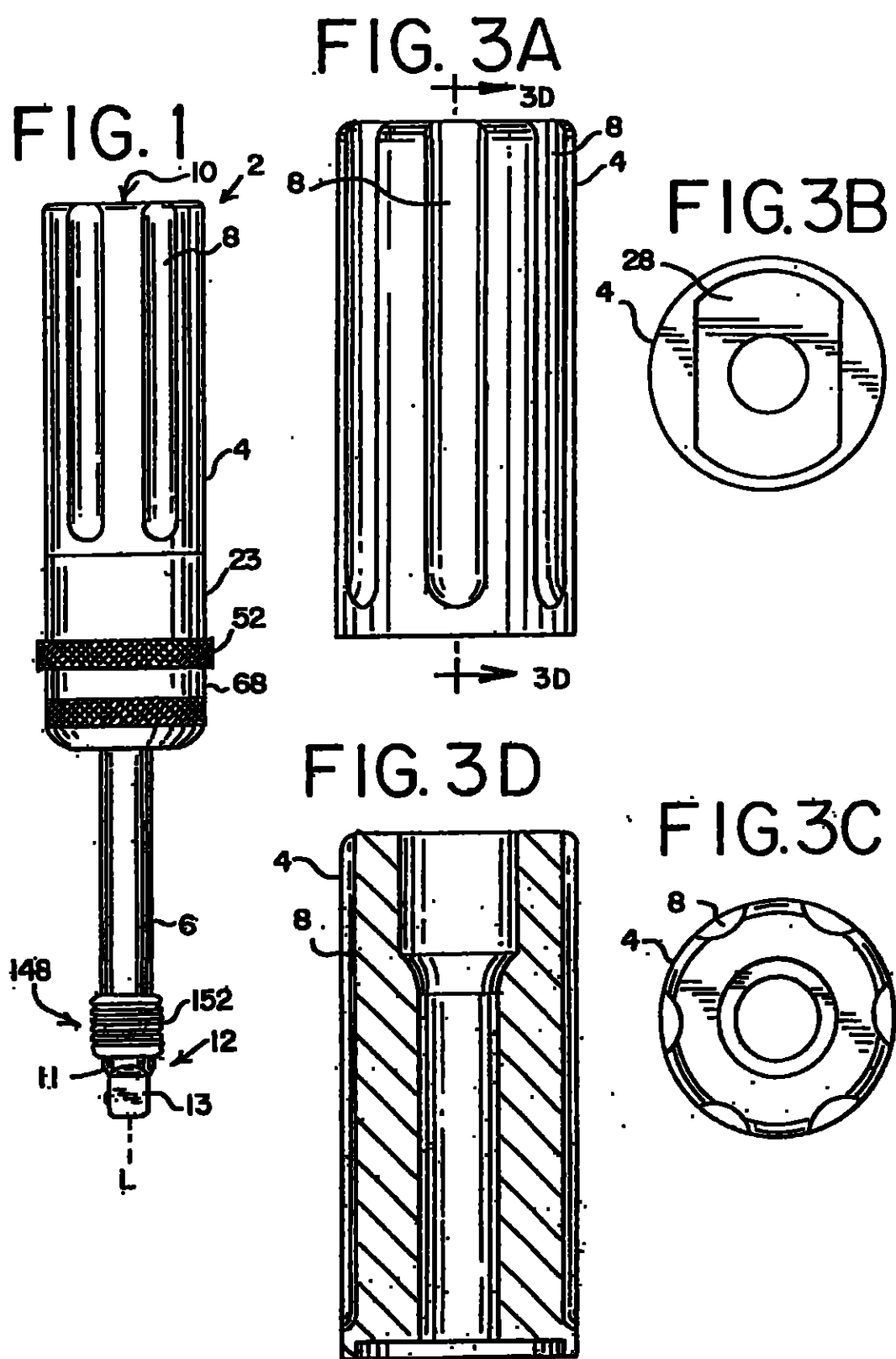
43. The invention of claim 35, 36, 40 or 41 wherein the second biasing
element comprises a spring configured to bear against a surface of a notch.

20 44. The invention of claim 41 wherein the second biasing element
comprises a spring configured to bear against a surface of the first, second,
and third notches.

45. The invention of claim 35 wherein the driven element comprises a first
25 coupling end selected from the group consisting of a drive stud and a socket,
and a second coupling end selected from the group consisting of a drive stud
and a socket.

46. The invention of claim 35 wherein the ratcheting tool further comprises
30 a control element coupled to the ratchet mechanism, wherein the control
element comprises a recess configured to receive the second biasing
element.

47. The invention of claim 35 or 46 wherein the ratcheting tool further comprises a control element retainer comprising at least one notch configured to engage with the second biasing element, such that engagement biases the ratchet mechanism to the neutral configuration.
48. The invention of claim 35 or 46 wherein the ratcheting tool further comprises a control element retainer comprising first, second and third notches, each of which is configured to engage with the second biasing element, such that engagement of the first notch biases the ratchet mechanism to the forward configuration, engagement of the second notch biases the ratchet mechanism to the neutral configuration, and engagement of the third notch biases the ratchet mechanism to the reverse configuration.
49. The invention of claim 48 wherein the second biasing element comprises a spring configured to bear against a surface of the first, second, and third notches.



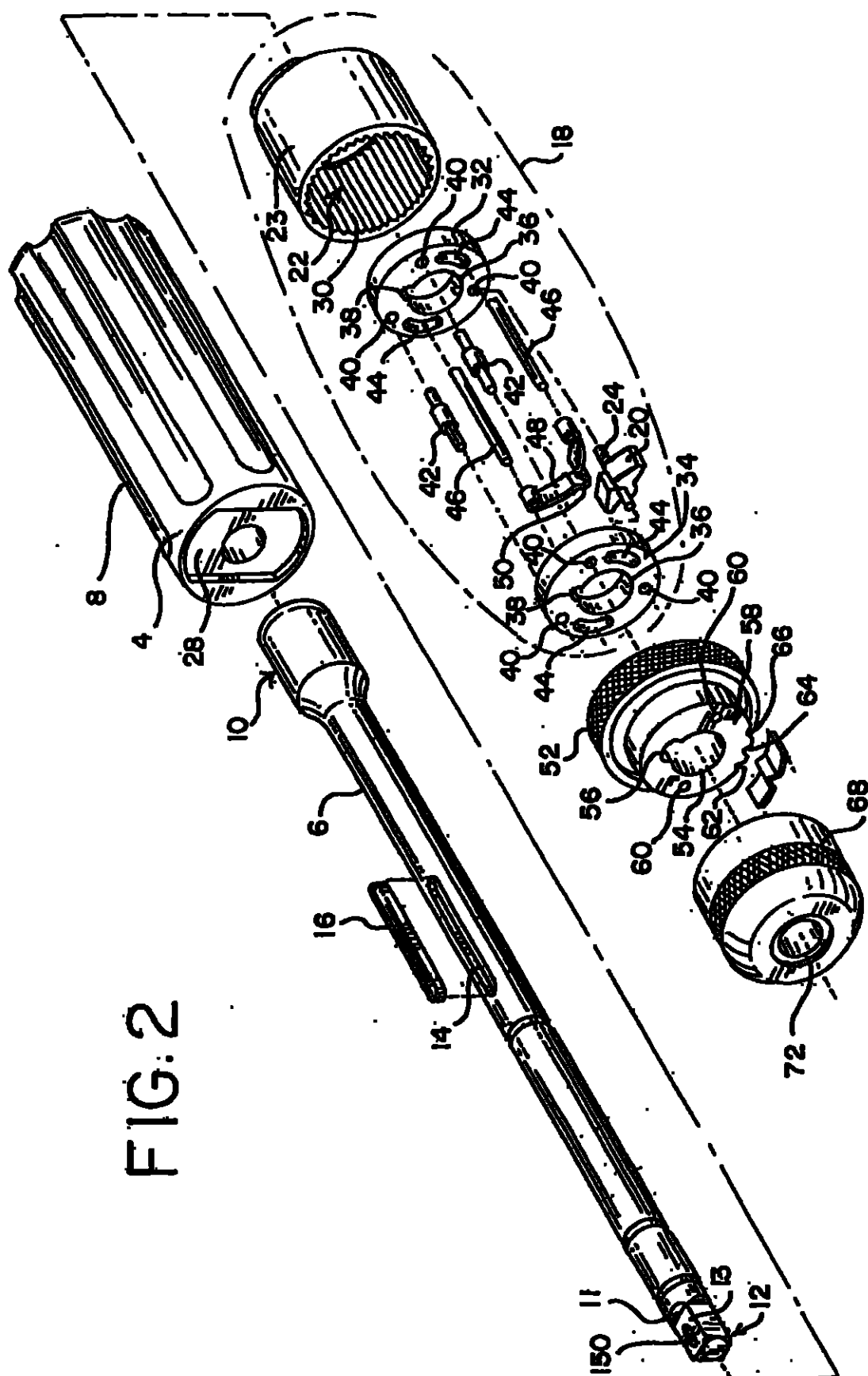


FIG. 4A

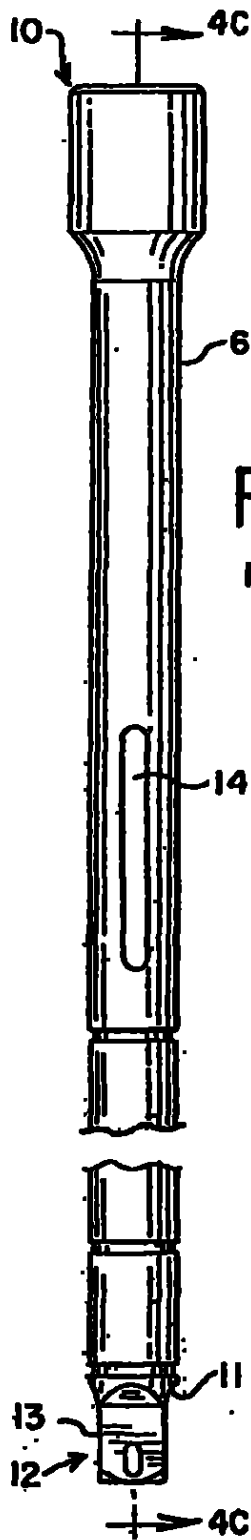


FIG. 4B

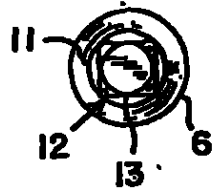


FIG. 4C

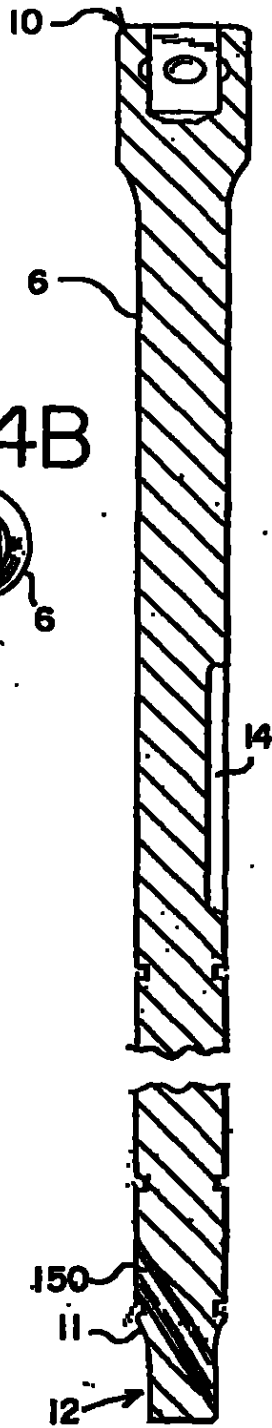


FIG. 5A

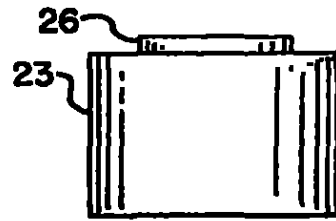


FIG. 5B

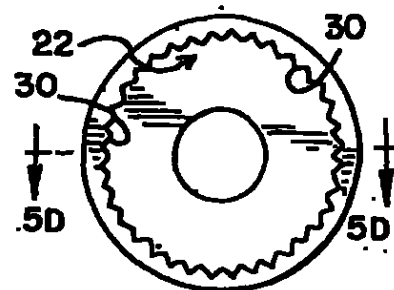


FIG. 5C

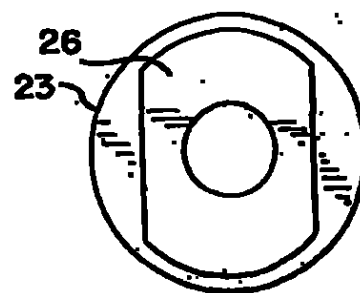


FIG. 5D

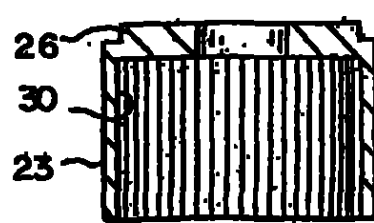


FIG. 6A FIG. 6B

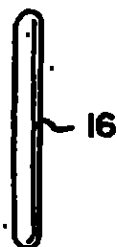


FIG. 6C



FIG. 8A



FIG. 8B



FIG. 7A

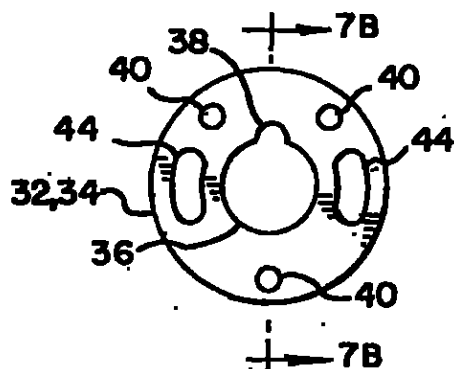


FIG. 7B

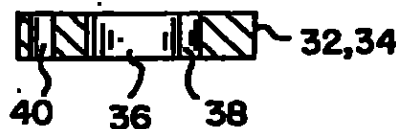


FIG. 9A

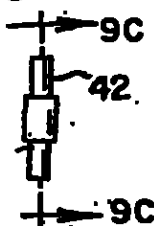


FIG. 9B



FIG. 9C



FIG. 11A



FIG. 10A

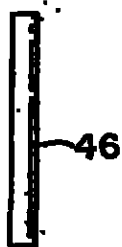


FIG. 10B



FIG. 11B

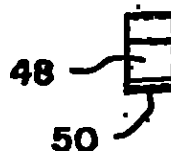


FIG. 12A

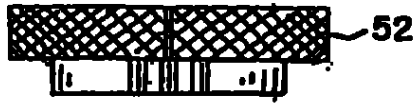


FIG. 12B

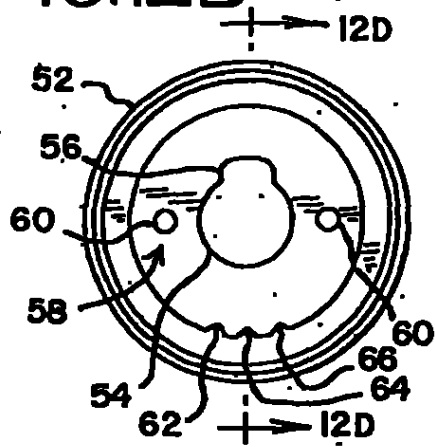


FIG. 12C

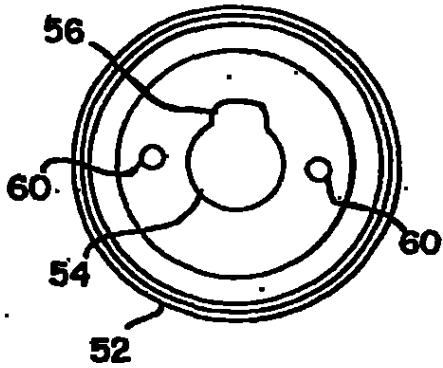


FIG. 12D

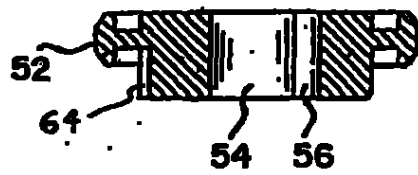


FIG. 13A

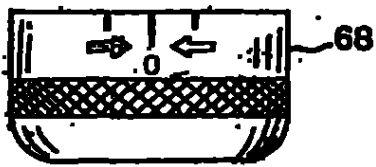


FIG. 13B

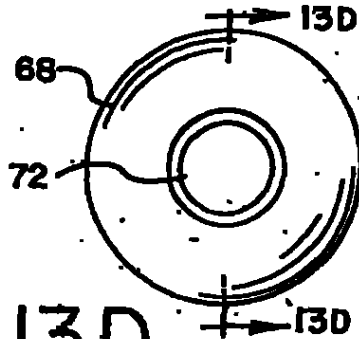


FIG. 13C

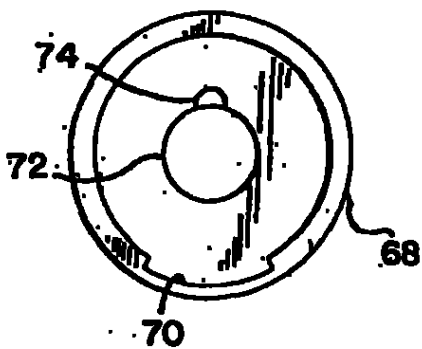


FIG. 13D

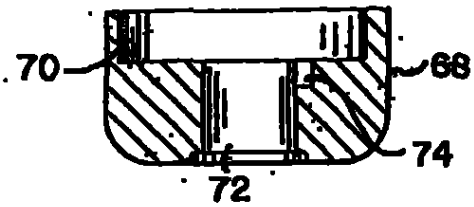


FIG. 14

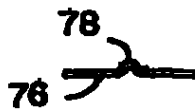


FIG. 15A

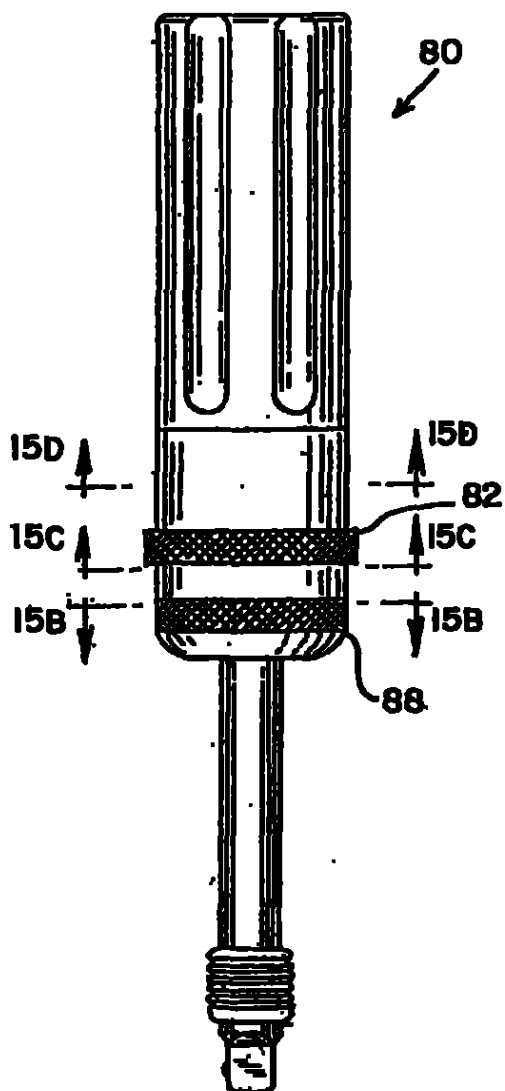


FIG. 15B

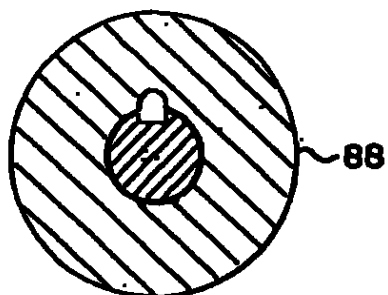


FIG. 15C

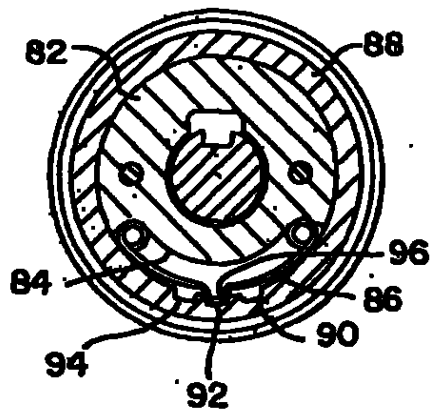


FIG. 15D

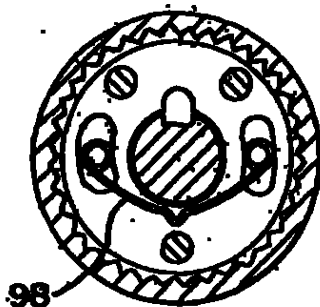


FIG. 16A

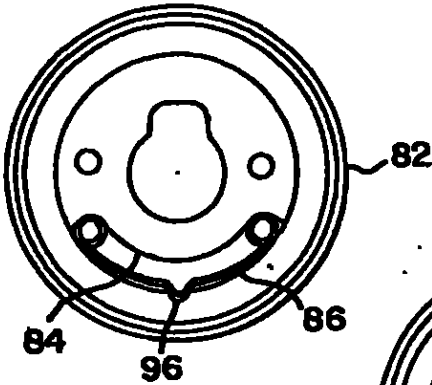


FIG. 16C



FIG. 16B

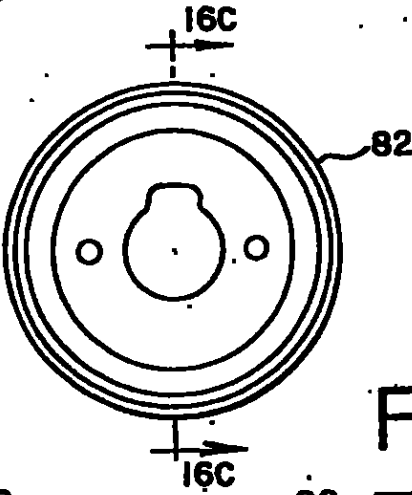


FIG. 17A

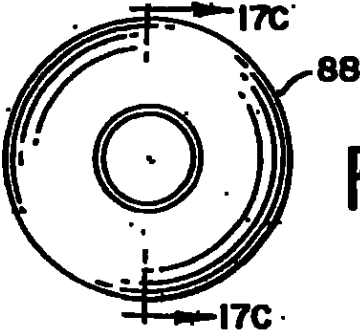


FIG. 17C



FIG. 17B

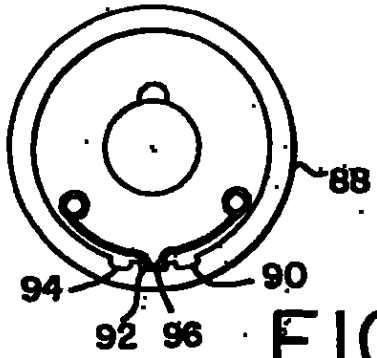


FIG. 18A

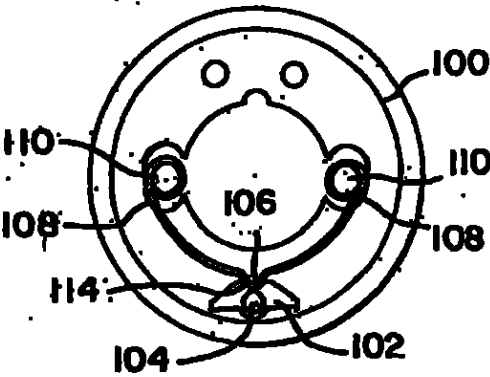


FIG. 18B

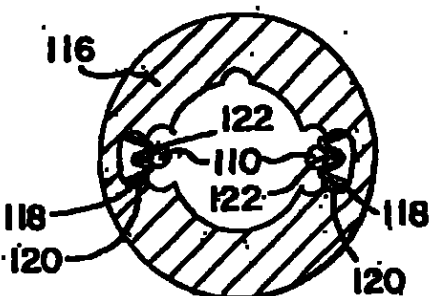


FIG. 19A

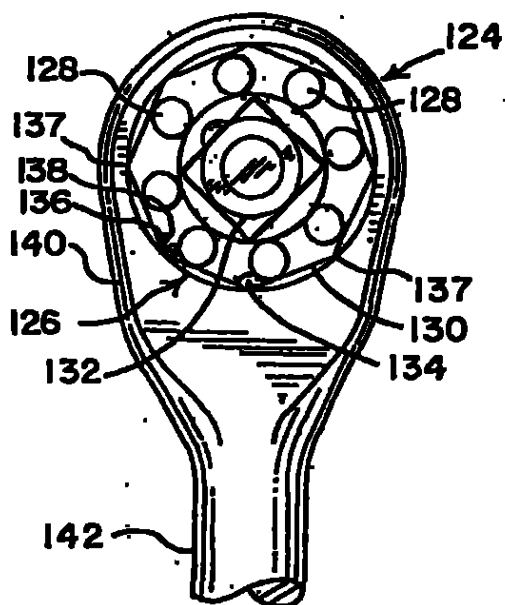


FIG. 19B

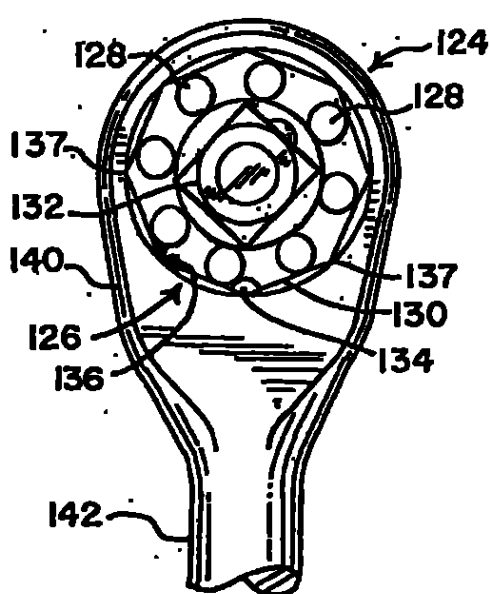


FIG. 19C

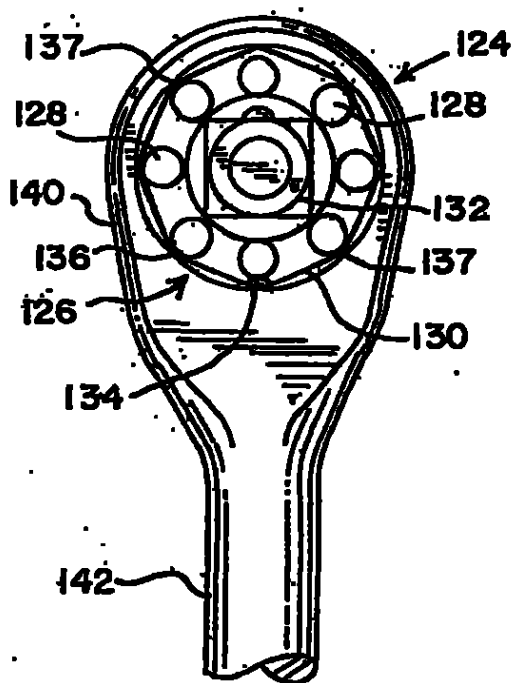
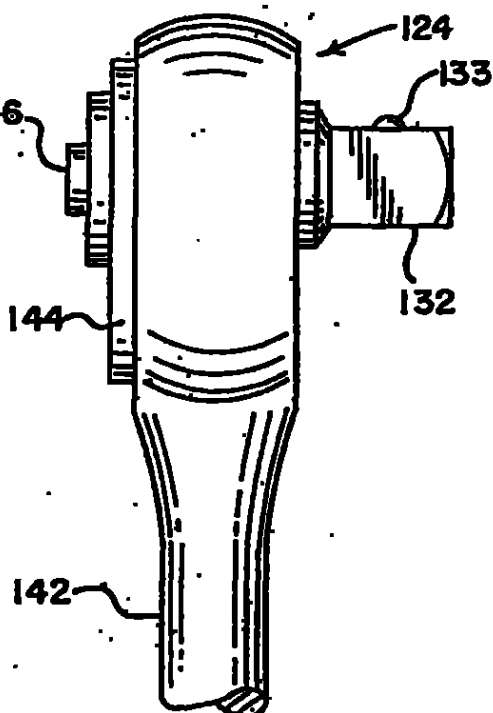


FIG. 19D



INTERNATIONAL SEARCH REPORT

International Application No.
PCT/US2005/031126A. CLASSIFICATION OF SUBJECT MATTER
B25B13/46 B25B15/04

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
B25B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, PAJ, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 100 03 348 A1 (WERA-WERK HERMANN WERNER GMBH & CO; WERA-WERK HERMANN WERNER GMBH & CO) 18 January 2001 (2001-01-18)	1-4, 15-17, 20, 35, 46-48
A	abstract column 5, line 15 - line 24	9, 10, 25, 40, 41
X	US 4 529 071 A (GAGNON ET AL) 16 July 1985 (1985-07-16)	1-3, 5, 6, 8, 11, 14-17, 27, 30-36, 39, 45-48
Y	figures 3, 4, 12 -/-	7

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Date of the actual completion of the international search

13 December 2005

Date of mailing of the international search report

20/12/2005

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Fax. (+31-70) 340-2018

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Carmichael, Guy

INTERNATIONAL SEARCH REPORT

 International Application No.
 PCT/US2005/031725

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 93 18 291 U1 (HUANG, DANIEL, DA LI SHIANG, TAICHUNG, TW) 3 March 1994 (1994-03-03)	1-3,5, 8-11, 14-17, 27, 32-36, 39-42, 45,46
A	figures 6-8	6,30
X	US 6 460 431 B1 (CHEN YU TANG) 8 October 2002 (2002-10-08)	1-3,5,6, 8-11,14, 27,28, 32-36, 39-42,45
A	figures 10,14	12,13, 15-17, 29,30, 46-49
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	figures 3,5,7	
X	US 6 575 060 B1 (TSENG YI CHUAN ET AL) 10 June 2003 (2003-06-10)	1-3,5,6, 8-11, 15-17, 27, 30-33, 35,36, 40-42, 46-48
	column 4, line 18 - line 22; figures 4,7,9	
X	US 4 290 328 A (CLARK ET AL) 22 September 1981 (1981-09-22)	1-3,5,6, 8,9,32, 35-37, 39,40,42
A	figures 2-4	10-13, 19,27,41
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A	column 3, line 71 - column 4, line 2	6,9,27, 30,35
X	US 6 058 812 A (CASEL ET AL) 9 May 2000 (2000-05-09) figures 1,8	1,4,6, 32-34
	-/-	

INTERNATIONAL SEARCH REPORT

International Application No. **UV**
PCT/US2005/031726

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	GB 970 731 A (THOMAS MELDRUM LIMITED) 23 September 1964 (1964-09-23) figures 4,5 _____	7

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
PCT/US2005/031726

44

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US 4529071	A	16-07-1985	NONE
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GB 970731	A	23-09-1964	NONE

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(43) Fecha de Publicación Internacional
6 de abril de 2006 (06.04.2006)

(10) Número de Publicación Internacional
PCT WO 2006/036477 A1

- (51) Clasificación Internacional de Patentes⁷:
B25B 13/48 (2006.01) B25B 15/04 (2006.01)
- (21) No. Solicitud Internacional: PCT/US2005/031726
- (22) Fecha de Presentación Internacional:
30 de agosto de 2005 (30.08.2005)
- (25) Idioma de Presentación: inglés
- (26) Idioma de Publicación: inglés
- (30) Datos relativos a la Prioridad:
10/953,470 28 de septiembre de 2004 (28.09.2004) US
- (71) Solicitante (para todos los países destinatarios con excepción de US): JODA ENTERPRISES, INC. [US/US]; 2440 Lakeview Avenue, Chicago, IL 60614 (US)
- (72) Inventores, e
- (75) Inventores/Solicitantes (para US únicamente):
DAVIDSON, John, B. [US/US]; 2440 Lakeview Avenue, #3A, Chicago, IL 60614 (US). CHARVAT, George, F. [US/US]; 309 Manor Hill Court, Lombard, IL 60148 (US).
- (74) Agente: ZAYIA, Gregory, H.; Brinks Hofer Gilson & Lione, P.O. Box 10087, Chicago, IL 60610 (US).

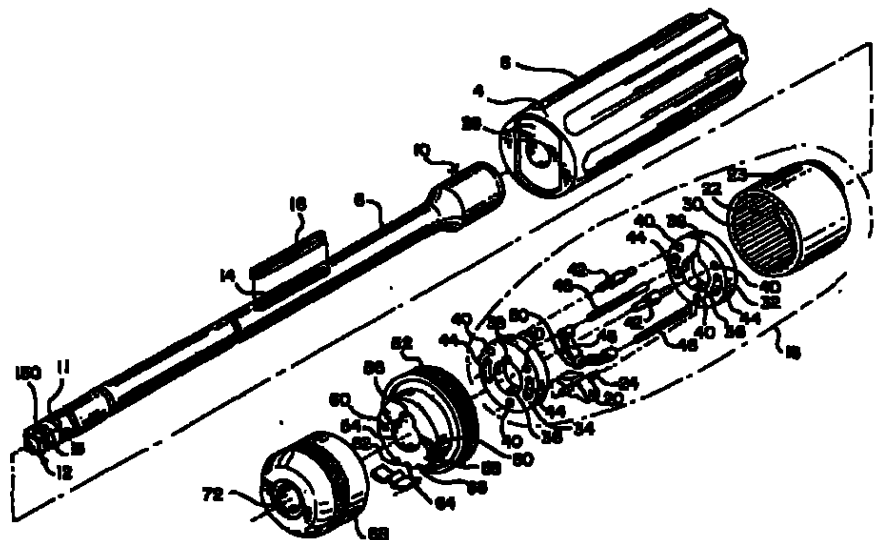
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Publicado:
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(54) Título: HERRAMIENTAS DE TRINQUETE



(57) Extracto: Se describen herramientas de trinquete que incluyen: (a) un cuerpo (4); (b) un extensor (6); (c) un mecanismo de trinquete (15) que acopla el extensor al cuerpo, en donde el mecanismo de trinquete se configura para ajuste entre una pluralidad de una configuración de avance, una configuración de retorno y una configuración neutra; (d) un primer elemento accionador ajustable (48), acoplado al mecanismo de trinquete y configurado para desplazar el mecanismo de trinquete a por lo menos una de las configuraciones de avance, de retorno y neutra; y (e) un segundo elemento accionador ajustable (76), acoplado al mecanismo de trinquete y configurado para desplazar el mecanismo de trinquete a por lo menos una de las configuraciones de avance, retorno y neutra.

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HERRAMIENTAS DE TRINQUETE

CAMPO DE LA INVENCION

[0001] La presente invención se refiere a herramientas manuales y, en particular, a herramientas manuales de trinquete configuradas para facilitar una acción de trinquete de avance, una acción de trinquete de retorno y una acción neutra o sin trinquete.

ANTECEDENTES

[0002] Herramientas manuales capaces de facilitar una acción de trinquete en sentido horario (por ejemplo, de avance), una acción de trinquete en sentido antihorario (por ejemplo, de retorno) y rodamiento libre (por ejemplo, acción neutra o sin trinquete) ofrecen ventajas de uso, porque un usuario no necesita cambiar muchas veces la posición de su mano sobre un mango, con el fin de imprimir una rotación continua en una dirección seleccionada.

[0003] En las herramientas manuales descritas en la Patente de los Estados Unidos No. 6,182,536 a Roberts *et al.*, asignada al cesionario de la presente invención, la posición de una uña montada con pivotamiento 34, que tiene depresiones primera, segunda y tercera practicadas en ella, correspondientes a acciones de trinquete de avance, neutra y retorno de la herramienta manual, respectivamente, se controla por un solo resorte 42. Cualquiera de las tres depresiones, al ser engranada por el resorte 42, determina la dirección de la acción de trinquete.

[0004] En las herramientas manuales descritas en la Patente de los Estados Unidos No. 6,044,730 a Roberts *et al.*, también asignada al cesionario de la presente invención, la posición de una palanca de inversión de marcha 18, desplazable entre posiciones de avance, neutra y de retorno, se controla por un mecanismo de retén, en el cual una sola bola de retén, accionada por resorte, engrana una de una depresión de retén de avance 23,

una depresión de retén de retorno 24 y una depresión de retén sin trinquete 22 en una uña 25.

[0005] Aunque las herramientas de trinquete ya descritas son todas apropiadas para una variedad de aplicaciones, sería deseable en ciertas aplicaciones aumentar la estabilidad de la posición neutra, con el fin de minimizar o impedir el resbalamiento inadvertido en cualquiera de las dos posiciones de trinquete de avance o retorno.

SUMARIO

[0006] El ámbito de la presente invención se define únicamente por las reivindicaciones anexas y no se afecta en ningún grado por las declaraciones contenidas en este sumario.

[0007] A manera de introducción, una primera herramienta de trinquete, que incorpora características de la presente invención, incluye: (a) un cuerpo; (b) un extensor; (c) un mecanismo de trinquete que acopla el extensor al cuerpo, en donde el mecanismo de trinquete se configura para ajuste entre una pluralidad de una configuración de avance, una configuración de retorno y una configuración neutra; (d) un primer elemento accionador ajustable, acoplado al mecanismo de trinquete y configurado para desplazar el mecanismo de trinquete a por lo menos una de las configuraciones de avance, de retorno y neutra; y (e) un segundo elemento accionador ajustable, acoplado al mecanismo de trinquete y configurado para desplazar el mecanismo de trinquete a por lo menos una de las configuraciones de avance, de retorno y neutra.

[0008] Una segunda herramienta de trinquete, que incorpora características de la presente invención, incluye: (a) un cuerpo; (b) un extensor que contiene un espárrago de hincar ("*a drive stud*"); (c) un mecanismo de trinquete que acopla el extensor al cuerpo, en donde el mecanismo de trinquete se configura para ajuste entre una configuración de

avance, una configuración de retorno y una configuración neutra; (d) un primer elemento accionador, acoplado al mecanismo de trinquete y configurado para desplazar el mecanismo de trinquete a por lo menos una de las configuraciones de avance, neutra y de retorno; (e) un segundo elemento accionador, acoplado al mecanismo de trinquete y configurado para desplazar el mecanismo de trinquete a por lo menos una de las configuraciones de avance, neutra y de retorno; (f) un elemento de control acoplado al mecanismo de trinquete y que contiene muescas primera, segunda y tercera que apuntan hacia afuera, cada una de las cuales se configura para engranar con el segundo elemento accionador, de modo que el engrane de la primera muesca desplace el mecanismo de trinquete a la configuración de avance, el engrane de la segunda muesca desplace el mecanismo de trinquete a la configuración neutra y el engrane de la tercera muesca desplace el mecanismo de trinquete a la configuración de retorno; y (g) un retenedor de elemento de control, acoplado al elemento de control, en donde el retenedor de elemento de control contiene una acanaladura arqueada, configurada para alojar el segundo elemento accionador. El mecanismo de trinquete incluye una corona dentada y una uña configurada para engranar la corona dentada.

[0009] Una tercera herramienta de trinquete, que incorpora características de la presente invención, incluye: (a) un cuerpo; (b) un extensor que comprende un espárrago de hincar; (c) un mecanismo de trinquete que acopla el extensor al cuerpo, en donde el mecanismo de trinquete se configura para ajuste entre una configuración de avance, una configuración de retorno y una configuración neutra; (d) un primer elemento accionador acoplado al mecanismo de trinquete y configurado para desplazar el mecanismo de trinquete a por lo menos una de las configuraciones de avance, neutra y de retorno; (e) un segundo elemento accionador acoplado al mecanismo de trinquete y configurado para desplazar el mecanismo de trinquete a por lo menos una de las configuraciones de avance, neutra y de retorno; (f) un elemento de control

acoplado al mecanismo de trinquete, en donde el elemento de control incluye una acanaladura configurada para alojar el segundo elemento accionador; (g) un retenedor de elemento de control, que contiene muescas primera, segunda y tercera, cada una de las cuales se configura para engranar con el segundo elemento accionador, de modo que el engrane de la primera muesca desplace el mecanismo de trinquete a la configuración de avance, el engrane de la segunda muesca desplace el mecanismo de trinquete a la configuración neutra y el engrane de la tercera muesca desplace el mecanismo de trinquete a la configuración de retorno. El mecanismo de trinquete incluye una corona dentada y una uña configurada para engranar la corona dentada.

[0010] Una cuarta herramienta de trinquete, que incorpora características de la presente invención, incluye: (a) un cuerpo; (b) un extensor; (c) un mecanismo de trinquete que acopla el extensor al cuerpo, en donde el mecanismo de trinquete se configura para ajuste entre una pluralidad de una configuración de avance, una configuración de retorno y una configuración neutra; (d) un primer elemento accionador ajustable, acoplado al mecanismo de trinquete y configurado para desplazar el mecanismo de trinquete a por lo menos una de las configuraciones de avance, de retorno y neutra; y (e) un segundo elemento accionador ajustable, acoplado al mecanismo de trinquete y configurado para desplazar el mecanismo de trinquete a por lo menos una de las configuraciones de avance, de retorno y neutra. Por lo menos uno del primer elemento accionador y el segundo elemento accionador se configura para desplazar el mecanismo de trinquete a la configuración neutra.

BREVE DESCRIPCIÓN DE LOS DIBUJOS

[0011] FIG. 1 muestra una vista en alzado de una primera herramienta de trinquete, que incorpora características de la presente invención.

[0012] FIG. 2 muestra una vista en perspectiva explotada de la

herramienta de trinquete representada en FIG. 1.

[0013] FIG. 3A muestra una vista lateral en alzado de un cuerpo.

[0014] FIG. 3B muestra una vista superior en planta del cuerpo de FIG. 3A.

[0015] FIG. 3C muestra una vista inferior del cuerpo de FIG. 3A

[0016] FIG. 3D muestra una vista de sección transversal del cuerpo de FIG. 3A, tomada a través de un plano que contiene la línea 3D — 3D.

[0017] FIG. 4A muestra una vista lateral en alzado de un extensor.

[0018] FIG. 4B muestra una vista superior en planta del extensor de FIG. 4A, mostrada desde un extremo del espárrago de hincar.

[0019] FIG. 4C muestra una vista de sección transversal del extensor de FIG. 4A, tomada a través de un plano que contiene la línea 4C — 4C.

[0020] FIG. 5A muestra una vista lateral en alzado de una extensión del cuerpo.

[0021] FIG. 5B muestra una vista superior en planta de la corona dentada, provista en una superficie interior de la extensión del cuerpo de FIG. 5A.

[0022] FIG. 5C muestra una vista inferior de la extensión del cuerpo de FIG. 5A.

[0023] FIG. 5D muestra una vista de sección transversal de la extensión del cuerpo de FIG. 5A, tomada a través de un plano que contiene

la línea 5D — 5D.

[0024] FIG. 6A muestra una vista en alzado de una cuña.

[0025] FIG. 6B muestra una vista lateral en alzado de la cuña de FIG. 6A.

[0026] FIG. 6C muestra una vista superior en planta de la cuña de FIG. 6A.

[0027] FIG. 7A muestra una vista superior en planta de un porta-uña.

[0028] FIG. 7B muestra una vista de sección transversal del porta-uña de FIG. 7A, tomada a través de un plano que contiene la línea 7B — 7B.

[0029] FIG. 8A muestra una vista superior en planta de una uña.

[0030] FIG. 8B muestra una vista lateral en alzado de la uña de FIG. 8A.

[0031] FIG. 9A muestra una vista lateral en alzado de un pasador.

[0032] FIG. 9B muestra una vista superior en planta del pasador de FIG. 9A.

[0033] FIG. 9C muestra una vista de sección transversal del pasador de FIG. 9A, tomada a través de un plano que contiene la línea 9C — 9C.

[0034] FIG. 10A muestra una vista lateral en alzado de un montante.

[0035] FIG. 10B muestra una vista superior en planta del montante de FIG. 10A.

[0036] FIG. 11 A muestra una vista superior en planta de un resorte.

[0037] FIG. 11 B muestra una vista lateral en alzado del resorte de FIG. 11 A.

[0038] FIG. 12A muestra una vista lateral en alzado de un primer elemento de control.

[0039] FIG. 12B muestra una vista superior en planta del elemento de control de FIG. 12A.

[0040] FIG. 12C muestra una vista inferior del elemento de control de FIG. 12A.

[0041] FIG. 12D muestra una vista de sección transversal del elemento de control de FIG. 12A, tomada a través de un plano que contiene la línea 12D — 12D.

[0042] FIG. 13A muestra una vista lateral en alzado de un primer retenedor de elemento de control.

[0043] FIG. 13B muestra una vista superior en planta del retenedor de elemento de control de FIG. 13A.

[0044] FIG. 13C muestra una vista inferior del retenedor de elemento de control de FIG. 13A.

[0045] FIG. 13D muestra una vista de sección transversal del retenedor de elemento de control de FIG. 13A, tomada a través de un plano que contiene la línea 13D — 13D.

[0046] FIG. 14 muestra una vista superior en planta de un resorte configurado para posicionamiento en el retenedor de elemento de control de FIG. 13A.

[0047] FIG. 15A muestra una vista en alzado de una segunda herramienta de trinquete, que incorpora características de la presente invención.

[0048] FIG. 15B muestra una vista de sección transversal de la herramienta de trinquete de FIG. 15A, tomada en un ángulo recto al eje longitudinal, a través de un plano que contiene la línea 15B — 15B.

[0049] FIG. 15C muestra una vista de sección transversal de la herramienta de trinquete de FIG. 15A, tomada en un ángulo recto al eje longitudinal, a través de un plano que contiene la línea 15C — 15C.

[0050] FIG. 15D muestra una vista de sección transversal de la herramienta de trinquete de FIG. 15A, tomada en un ángulo recto al eje longitudinal, a través de un plano que contiene la línea 15D — 15D.

[0051] FIG. 16A muestra una vista superior en planta de un segundo elemento de control.

[0052] FIG. 16B muestra una vista inferior del elemento de control de FIG. 16A.

[0053] FIG. 16C muestra una vista de sección transversal del elemento de control de FIG. 16A, tomada a través de un plano que contiene la línea 16C — 16C.

[0054] FIG. 17A muestra una vista superior en planta de un segundo retenedor de elemento de control.

[0055] FIG. 17B muestra una vista inferior del retenedor de elemento de control de FIG. 17A.

[0056] FIG. 17C muestra una vista de sección transversal del retenedor de elemento de control de FIG. 17A, tomada a través de un plano que contiene la línea 17C — 17C.

[0057] FIG. 18A muestra una vista superior en planta de un soporte de uña inferior para uso una tercera herramienta de trinquete, que incorpora características de la presente invención.

[0058] FIG. 18B muestra una vista inferior del soporte de uña de FIG. 18A.

[0059] FIG. 19A muestra una vista frontal en perspectiva de una cuarta herramienta de trinquete, que incorpora características de la presente invención, en una primera configuración de trinquete.

[0060] FIG. 19B muestra una vista en perspectiva de la herramienta de trinquete de FIG. 19A en una segunda configuración de trinquete.

[0061] FIG. 19C muestra una vista en perspectiva de la herramienta de trinquete de FIG. 19A en una configuración sin trinquete.

[0062] FIG. 19D muestra una vista lateral en perspectiva de la herramienta de trinquete de FIG. 19C.

DESCRIPCIÓN DETALLADA

[0063] Se han descubierto y se describen a continuación herramientas de trinquete, que posibilitan una acción de trinquete de avance, una acción de trinquete de retorno y una acción neutra (es decir, giro libre o sin

trinquete), en donde la estabilidad de la posición neutra se mejora significativamente, comparada con diseños previos, y en donde fuerzas que actúan en diferentes posiciones de la herramienta pueden ajustarse independientemente, usando mecanismos accionadores separados. En algunas incorporaciones, como se describe con más detalle a continuación, las herramientas de trinquete, que incorporan características de la presente invención, incluyen una pluralidad (es decir, dos o más) de elementos accionadores (por ejemplo, resortes, bolas de retén accionadas por resorte, y similares, y combinaciones de los mismos), uno de los cuales se configura como mínimo para desplazar el mecanismo de trinquete a por lo menos la posición neutra.

[0064] En algunas incorporaciones, un primer elemento accionador impulsa el mecanismo de trinquete hacia la configuración de avance o la configuración de retorno, mientras que un segundo elemento accionador impulsa el mecanismo de trinquete a la posición neutra. En otras incorporaciones, un primer elemento accionador impulsa el mecanismo de trinquete hacia la configuración de avance, neutra o de retorno, mientras que un segundo elemento accionador impulsa el mecanismo de trinquete a la posición neutra. En otras incorporaciones, un primer elemento accionador impulsa el mecanismo de trinquete a la configuración de avance, neutra o de retorno, mientras un segundo elemento accionador actúa en coordinación con el primer elemento accionador para impulsar el mecanismo de trinquete a la configuración deseada.

[0065] A todo lo largo de esta descripción y en las reivindicaciones anexas, hay que entender las siguientes definiciones:

[0066] El término "acoplado" se entiende que engloba ampliamente un acoplamiento directo e indirecto. Por consiguiente, se dice que partes primera y segunda están acopladas entre sí cuando están directamente conectadas y/o funcionalmente engranadas (por ejemplo, por contacto

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directo), así como cuando la primera parte está funcionalmente engranada con una parte intermedia, la cual se engrana de manera funcional, directamente o mediante una o más partes intermedias adicionales, con la segunda parte. Además, se dice que dos elementos están acoplados si se engranan funcionalmente (directa o indirectamente) en algunos momentos y no se engranan funcionalmente en otros momentos.

[0067] La expresión "elemento accionador" se refiere a cualquier dispositivo que puede moverse y/o deformarse reversiblemente, de modo que el movimiento y/o deformación imprima una fuerza accionadora contra un miembro acoplado mecánicamente a él. Elementos accionadores representativos incluyen, pero no se limitan a, resortes (por ejemplo, resortes de torsión elastoméricos, resortes en espiral, resortes de hoja, resortes de tensión, resortes de compresión, resortes helicoidales, resortes de volutas, resortes planos, y similares), retenes (por ejemplo, bolas de retén accionadas por resorte, conos, cuñas, y similares), dispositivos neumáticos, dispositivos hidráulicos, y similares, y combinaciones de los mismos.

[0068] Las designaciones "superior" e "inferior", usadas en referencia a elementos ilustrados en los dibujos, se aplican solamente para conveniencia de la descripción. Estas designaciones no tienen que interpretarse como absolutas o limitantes y pueden invertirse. Para efectos de claridad, a menos que se anote lo contrario, el término "superior" se refiere generalmente al lado de un elemento que apunta alejándose del extremo del cuerpo de una herramienta de trinquete en su estado ensamblado (por ejemplo, hacia el extremo del espárrago de hincar en la ilustración representativa mostrada en FIGS. 1-2). Además, a menos que se anote lo contrario, el término "inferior" se refiere generalmente al lado de un elemento que apunta hacia el extremo de la herramienta de trinquete opuesto al espárrago de hincar.

[0069] Las designaciones "que apunta hacia adentro" y "que apunta

hacia afuera", usadas en referencia a varios elementos (por ejemplo, los dientes de una corona dentada, los lados de una cavidad, incluida una muesca), se aplican igualmente sólo para conveniencia de la descripción. Estas designaciones no tienen que interpretarse como absolutas o limitantes y pueden invertirse. Para efectos de claridad, a menos que se anote lo contrario, la expresión "que apunta hacia adentro" se refiere generalmente a una orientación hacia el eje central de una herramienta de trinquete (tal como, por ejemplo, el eje que recorre la longitud del extensor). Además, a menos que se anote lo contrario, la expresión "que apunta hacia afuera" se refiere generalmente a la orientación que se aleja del eje central de la herramienta de trinquete y hacia la superficie expuesta exterior del cuerpo. Tal como se emplea en referencia a muescas, la orientación hacia y desde el eje central se determina en relación con la abertura cóncava de la muesca.

[0070] El términos "avance" y "retorno", usados en referencia a direcciones de acción de trinquete, se refieren generalmente a direcciones de trinquete opuestas primera y segunda. Técnicamente hablando, estos términos deben entenderse en referencia al extremo del espárrago de hincar de la herramienta de trinquete, de modo que "avance" corresponda a una transmisión de torque, en sentido horario, en el extremo del espárrago de hincar y "retorno" corresponda a una transmisión de torque, en sentido antihorario, en el extremo del espárrago de hincar. Sin embargo, a menos que el contexto indique lo contrario, estos términos se usan indistintamente en esta solicitud, siempre que se entienda que las direcciones absolutas de rotación, a las cuales se refieren, se oponen entre sí.

[0071] La expresión "barra de extensión" pretende incluir en sentido amplio cualquier estructura con un primer elemento de acoplamiento en un extremo (por ejemplo, una copa, un espárrago de hincar, etc.), un segundo elemento de acoplamiento (por ejemplo, una copa, un espárrago de hincar, etc.) en el otro extremo y, por lo menos, un elemento transmisor de torque entre ellos. Barras de extensión representativas pueden incluir elementos

adicionales tales como juntas universales, y similares.

[0072] El término "mango" se refiere a cualquier elemento, acoplado a una herramienta de trinquete y/o integral con ella, que se configura para ser sujetado por un usuario de la misma. En algunas incorporaciones, el cuerpo de la herramienta de trinquete constituye el mango y, en otras incorporaciones, el extensor de la herramienta de trinquete provee el mango. En algunas incorporaciones, el mango se provee por un accesorio separado, acoplado a alguna porción de la herramienta de trinquete (por ejemplo, el cuerpo, cualquiera de los extremos del extensor, etc.) en cualquier ángulo al eje longitudinal de la herramienta de trinquete (por ejemplo, en la misma línea con, en ángulos rectos a, o en ángulos oblicuos al eje longitudinal). Hay que entender que los mangos provistos como accesorios separados pueden usarse con cualquiera de las herramientas de trinquete descritas en esta solicitud.

[0073] Herramientas de trinquete, que incorporan características de la presente invención, incluyen un cuerpo; un extensor; un mecanismo de trinquete que acopla el extensor al cuerpo, en donde el mecanismo de trinquete se configura para ajuste entre una pluralidad de una configuración de avance, una configuración de retorno y una configuración neutra; un primer elemento accionador ajustable, acoplado al mecanismo de trinquete y configurado para desplazar el mecanismo de trinquete a por lo menos una de las configuraciones de avance, de retorno y neutra; y un segundo elemento accionador ajustable, acoplado al mecanismo de trinquete y configurado para desplazar el mecanismo de trinquete a por lo menos una de las configuraciones de avance, de retorno y neutra.

[0074] En algunas incorporaciones descritas con más detalle a continuación, los elementos accionadores primero y segundo se configuran para actuar coordinadamente, con el fin de proporcionar el mismo tipo de accionamiento al mecanismo de trinquete, de modo que los dos elementos

accionadores primero y segundo proveen simultáneamente un accionamiento común hacia por lo menos una de las configuraciones de avance, de retorno y neutra.

[0075] A continuación se describirán incorporaciones representativas de acuerdo con la presente invención, con referencia a los dibujos adjuntos. Hay que entender que elementos y características de las distintas incorporaciones representativas, descritas a continuación, pueden seleccionarse o combinarse en diferentes formas para producir incorporaciones adicionales, que caigan igualmente dentro del ámbito de la presente invención. Por consiguiente, la descripción incluida a continuación, si se provee en referencia con una o más figuras específicas, tiene que entenderse como igualmente aplicable a otras incorporaciones, incluidas, sin limitación, aquellas mostradas en las otras figuras de dibujos, sin importar si se referencian específicamente o no.

[0076] FIGS. 1 y 2 muestran una primera herramienta de trinquete 2, que incorpora características de la presente invención. La herramienta de trinquete 2 incluye un cuerpo 4 y un extensor 6, que se proyecta longitudinalmente. El cuerpo 4, mejor ilustrado por las FIGS. 3A-3D, se monta alrededor del extensor 6 y puede rotar libremente sobre él. En algunas incorporaciones, el cuerpo 4 incluye una o más estrías 8, como se muestra en FIG. 3A, u otras características (por ejemplo, moleteado, materiales de textura anti-deslizante formados alrededor del cuerpo o aplicados por adhesivos u otros medios, y similares) con el fin de proporcionar una superficie cómoda de agarre.

[0077] El extensor 6 puede ser una barra de extensión que contenga un primer extremo de acople (por ejemplo, macho o hembra) y un segundo extremo de acople (por ejemplo, macho o hembra). A modo de ejemplo, el extensor 6 puede ser una barra de extensión que contenga una copa 10 y un espárrago de hincar 12 provistos en extremos opuestos de la misma, como

mejor se ilustra muestra por las FIGS. 4A-4C. No obstante, de acuerdo con la presente invención, se ha contemplado para uso cualquier elemento a rotarse o accionarse por una acción de giro libre o trinquete. En algunas incorporaciones, el extensor 6 es un elemento sólido, continuo de un extremo al otro, mientras que en otros, el extensor 6 es parcial o sustancialmente hueco. En la posición neutra, el cuerpo 4 puede usarse para sostener el extensor 6 mientras se rota el extensor 6 por una herramienta tal como una llave de copa (no indicada) engranada con la copa 10.

[0078] La copa 10 se forma con una sección transversal usualmente no circular que puede, por ejemplo, ser cuadrada, hexagonal o similar. La copa 10 se configura para alojar el espárrago de hincar de una llave de copa (no mostrada) u otra herramienta de hincar, cuando la llave de copa u otra herramienta se utiliza para aplicar torque al extensor 6. El espárrago de hincar 12 incluye usualmente una porción de hincar no circular 13 y una porción adyacente 11. La porción de hincar 13 se configura para encajar en un conector de herramienta (no ilustrado) para aplicar torque al conector de herramienta. La porción de hincar no circular 13 puede proveerse con cualquier forma de sección transversal deseable y puede, por ejemplo, ser generalmente cuadrada o hexagonal en sección transversal. Sustancialmente, el extensor 6 y la porción exterior de la copa 10 pueden ser rotacionalmente simétricos alrededor del eje longitudinal L.

[0079] Como mejor se ilustra por las FIGS. 4A y 4C, el extensor 6 incluye un cuñero 14 en su porción intermedia, el cual se configura para alojar una cuña 16, que tiene la forma y las dimensiones complementarias a aquél. Una cuña representativa 16, mejor ilustrada por las FIGS. 6A-6C, se describe con más detalle a continuación.

[0080] La herramienta de trinquete 2, ilustrada en las FIGS. 1 y 2, incluye además un mecanismo de trinquete 18, que acopla el extensor 6 al cuerpo 4. El mecanismo de trinquete 18 se configura para ajuste entre una

pluralidad (es decir, por lo menos dos) de una configuración de avance, una configuración de retorno y una configuración neutra, en donde al cuerpo 4 se le permite girar libremente con respecto al extensor 6. En algunas incorporaciones, el mecanismo de trinquete 18 incluye una uña montada con pivotamiento 20, mejor ilustrada por las FIGS. 8A y 8B, y una corona dentada 22, mejor ilustrada por las FIGS. 5A-5D. La corona dentada 22 puede proveerse por, y/o soportarse en, una superficie interna de una extensión del cuerpo 23, como mejor se muestra por FIG. 5B. La uña 20 se monta con pivotamiento en un pasador 24 y se configura para engranar la corona dentada 22, de modo que en la configuración de avance, al extensor 6 se le permita rotar libremente en una dirección de avance, pero se le impida sustancialmente rotar en una dirección de retorno; y, en la configuración de retorno, al extensor 6 se le permita rotar libremente en una dirección de retorno, pero se le impida sustancialmente rotar en la dirección de avance.

[0081] Como mejor se ilustra por las FIGS. 5C y 3B, la superficie inferior de la extensión del cuerpo 23 incluye un escalón en forma de reborde 26, configurado para alojarse en una depresión complementaria en forma de caja 28 en la superficie superior del cuerpo 4. Cuando la cuña 16 se posiciona en el cuñero 14, se impide sustancialmente la desconexión de la unión en forma de caja, formada entre la superficie del escalón 26 y la depresión 28, y la corona dentada 22 se configura para moverse a la par con el cuerpo 4. Cuando la cuña 16 se encuentra ubicada en el cuñero 14, se impide igualmente en forma sustancial la separación longitudinal del cuerpo 4 de la extensión del cuerpo 23, debido al empotramiento de un borde inferior de la cuña 16 contra una superficie interior superior de la corona dentada 22. En configuraciones alternativas, el cuerpo 4 puede estar integralmente formado con la extensión del cuerpo 23 y, de manera opcional, con la corona dentada 22. El cuerpo 4 y la extensión del cuerpo 23 pueden configurarse como se desee y pueden incluir formas cilíndricas y no cilíndricas.

[0082] La corona dentada 22 incluye una pluralidad de dientes 30 configurados para engranar con la uña 20. En algunas incorporaciones, como mejor se ilustra por la FIG. 5B, se proveen dientes que apuntan hacia adentro 30 en una periferia interior de la corona dentada 22. En esta configuración, la uña 20 se diseña para rotar con el extensor 6. En otras incorporaciones, pueden proveerse dientes que apunten hacia afuera (por ejemplo, en el extensor 6), de modo que la uña 20 se configura para rotar con el cuerpo 4. Tales arreglos son bien conocidos en el arte y se emplean comúnmente en mecanismos de trinquete, incluidos, sin limitación, los trinquetes de cabeza redonda.

[0083] La herramienta de trinquete 2 mostrada en las FIGS. 1 y 2 incluye asimismo soportes de uña primero y segundo 32 y 34, respectivamente, mejor ilustrados por las FIGS- 7A y 7B, entre los cuales se intercalan la uña montada con pivotamiento 20 y un primer elemento accionador, descrito con más detalle a continuación. Como se describe más detalladamente a continuación, los soportes de uña 32 y 34 se configuran para rotar a la par con el extensor 6. Como mejor se ilustra por la FIG. 7A, los soportes de uña 32 y 34 incluyen un agujero central 36, configurado para alojar el extensor 6, y un cuñero semicircular 38, configurado para alojar la cuña 16. Los soportes de uña 32 y 34 incluyen además tres orificios circulares 40, dispuestos como se ilustra en FIG. 7A. El orificio 40, más alejado del cuñero semicircular 38, se configura para alojar el pasador 24, sobre el cual se encuentra montada con pivotamiento la uña 20. Los dos orificios circulares restantes 40, adyacentes al cuñero semicircular 38, se configuran para alojar un par de pasadores cilíndricos 42, mejor ilustrados en las FIGS. 9A-9C, que tienen una porción central de diámetro mayor, relativo a los diámetros de los extremos. En algunas incorporaciones, los pasadores 42 son elementos sólidos continuos, mientras que, en otras, los pasadores 42 son parcial o sustancialmente huecos. Los soportes de uña 32 y 34 incluyen además un par de ranuras

arqueadas 44, dispuestas a lados opuestos del agujero central 36, las cuales se configuran para alojar un par de montantes 46, mejor ilustrados por las FIGS. 10A y 10B.

[0084] La uña 20 puede pivotar sobre el pasador 24, de modo que engrane o no engrane los dientes 30 de la corona dentada 22. La uña 20 se controla, como se describe con mayor detalle a continuación.

[0085] La herramienta de trinquete 2 mostrada en las FIGS. 1 y 2 incluye además un primer elemento accionador acoplado al mecanismo de trinquete 18, que se configura para desplazar el mecanismo de trinquete 18 a por lo menos una de las posiciones de avance, retorno y neutra. En algunas incorporaciones, como se muestra en las FIGS. 11A-11B, el primer elemento accionador se provee por un resorte apical 48, cuyos extremos se enrollan alrededor de los montantes 46 y se mantienen sobre ellos. La posición de la uña 20 sobre el pasador 24 se controla por el resorte 48, el cual incluye una porción central 50, mejor ilustrada por la FIG. 11 A, configurada para apoyarse directamente sobre una superficie posterior de la uña 20. Cuando el resorte 48 se rota en una primera dirección en relación con la uña, un extremo de la uña 20 se obliga a entrar en contacto con la corona dentada 22 para proporcionar una acción de trinquete, en la cual se le permite al cuerpo 4 rotar libremente en una primera dirección, pero se le impide sustancialmente rotar en la dirección opuesta en la carrera de retorno. Recíprocamente, cuando el resorte 48 se rota en una segunda dirección en relación con la uña, el otro extremo de la uña 20 se obliga a engranar con la corona dentada 22, permitiéndole en esa forma al cuerpo 4 rotar libremente en una segunda dirección, pero impidiéndole sustancialmente rotar en la dirección opuesta en la carrera de retorno. Cuando la porción central 50 del resorte 48 está centrada con respecto a la superficie posterior de la uña 20, el resorte 48 opera para mantener la uña 20 en una posición neutra, en donde la uña 20 se mantiene fuera de contacto con la corona dentada 22 y al cuerpo 4 se le permite girar libremente sobre

el eje longitudinal L con respecto al extensor 6.

[0086] La herramienta de trinquete 2 mostrada en las FIGS. 1 y 2 incluye además un elemento de control 52, mejor ilustrado por las FIGS. 12A-12D. El elemento de control 52 incluye un agujero central 54 configurado para alojar el extensor 6, y un cuñero rectangular con extremos semicirculares 56 configurado para alojar la cuña 16. Cuando está ensamblada, la cuña 16 sobresale ligeramente del cuñero 56 en la cara superior 58 del elemento de control 52, de modo que se configura para engranar con un retenedor de elemento de control, como se describe con más detalle a continuación. Como mejor se muestra por las FIGS. 12B y 12C, el elemento de control 52 incluye además un par de orificios circulares 60 dispuestos a cada lado del agujero central 54, los cuales se configuran para alojar los montantes 46, en cuya periferia se enrollan los extremos del resorte 48. En consecuencia, cuando el elemento de control 52, el primer soporte de uña 32 y el segundo soporte de uña 34 se ensamblan entre sí con la cuña 16, la porción central 50 del resorte 48 estará posicionada para descansar contra una superficie posterior de la uña 20, accionando en esa forma la uña 20 hacia acciones de trinquete de avance, retorno o neutra.

[0087] El elemento de control 52 puede rotar con respecto al extensor 6 en un arco limitado. Cuando el elemento de control 52 se rota, los montantes 46 se deslizan en las ranuras arqueadas 44 de los soportes de uña 32 y 34, lo cual limita el rango de desplazamiento disponible para los montantes 46 durante la rotación del elemento de control 52. En algunas incorporaciones, las ranuras arqueadas 44 se dimensionan para mantener los montantes 46 fuera de un contacto sustancial de apoyo de carga con el soporte 32 y proteger así los montantes 46 de cargas excesivas de corte.

[0088] En algunas incorporaciones, el elemento de control 52 incluye igualmente por lo menos una y, en algunas incorporaciones, tales como las ilustradas en FIG. 12B, una pluralidad de muescas que apuntan hacia

afuera. Tal como se muestra en la FIG. 12B, el elemento de control 52 incluye muescas primera, segunda y tercera, que apuntan hacia afuera, 62, 64, y 66, respectivamente, cada una de las cuales se configura para engranar con una región de contacto de un segundo elemento accionador descrito a continuación.

[0089] La herramienta de trinquete 2 mostrada en las FIGS. 1 y 2 incluye también un retenedor de elemento de control 68, mejor mostrado por las FIGS. 13A-13D. El retenedor de elemento de control 68 encaja a presión en su sitio en el extensor 6, de manera que sustancialmente no hay movimiento de rotación entre ellos o, por ejemplo, se mantiene en su sitio con un anillo de presión. El retenedor del elemento de control 68 incluye una acanaladura arqueada 70 en una pared lateral inferior del mismo, que se configura para alojar un segundo elemento accionador, descrito con más detalle a continuación. Este segundo elemento accionador se configura para engranar con las muescas primera, segunda y tercera, 62, 64, y 66, respectivamente. Como mejor se ilustra por la FIG. 13C, el retenedor de elemento de control 68 incluye un agujero central 72, configurado para alojar el extensor 6, y un cuñeto semicircular 74 configurado para alojar la porción de cuña 16 que sobresale del cuñero rectangular con extremos redondeados 56.

[0090] La herramienta de trinquete 2 ilustrada en las FIGS. 1 y 2 incluye asimismo un segundo elemento accionador acoplado al mecanismo de trinquete 18, que se configura para accionar el mecanismo de trinquete 18 a por lo menos una de las configuraciones de avance, de retorno y neutra. En algunas incorporaciones, como se muestra en FIG. 14, el segundo elemento accionador se provee por un resorte 76 encajado a presión en la acanaladura arqueada 70, en el retenedor de elemento de control 68. El resorte 76 incluye una porción central 78 configurada para apoyarse en una de las muescas primera, segunda y tercera, que apuntan hacia afuera, 62, 64, y 66, respectivamente. En esta configuración, el

engrane de la primera muesca 62 desplaza el mecanismo de trinquete 18 a una primera configuración de trinquete; el engrane de la segunda muesca 64 desplaza el mecanismo de trinquete 18 a la configuración neutra; y el engrane de la tercera muesca 66 desplaza el mecanismo de trinquete 18 a la segunda configuración de trinquete.

[0091] La configuración ya descrita de la herramienta de trinquete 2 se diseña de modo que la rotación del cuerpo 4 haga girar la uña 20, la cual gira el pasador 24, sobre el cual se monta la uña 20, lo que hace rotar al mismo tiempo los soportes de uña primero y segundo 32 y 34, respectivamente. Al rotar el elemento de control 52, puede controlarse la dirección de la acción de trinquete de la herramienta de trinquete 2. Como se muestra en la FIG. 13A, pueden proveerse opcionalmente marcaciones indicadoras en una superficie exterior del retenedor de elemento de control 68 para indicar las posiciones a las cuales debe moverse el elemento de control 52, con el fin de engranar una de las posiciones de trinquete de avance, neutra y de retorno. El elemento de control 52 puede proveerse igualmente con una marcación indicadora, como se ilustra en la FIG. 12A, de modo que la alineación de la marca en el elemento de control 52 con una de las marcas en el retenedor de elemento de control 68 le permita a un usuario localizar fácilmente una posición de trinquete deseada.

[0092] En la herramienta de trinquete 2 ya descrita con referencia a las FIGS. 1-14, el elemento de control 52 incluye una pluralidad de muescas que apuntan hacia afuera, mientras que el retenedor de elemento de control 68 incluye un resorte 76, el cual sirve como un segundo elemento accionador. Sin embargo, en incorporaciones alternativas, tales como el ejemplo representativo mostrado en las FIGS. 15-17, las posiciones de las muescas y el segundo elemento accionador pueden invertirse.

[0093] A manera de ejemplo, una herramienta de trinquete 80 ilustrada en la FIG. 15A incluye un elemento de control 82, que tiene una

acanaladura arqueada 84, configurada para alojar un segundo elemento accionador, acoplado al mecanismo de trinquete, y para desplazar el mecanismo de trinquete a por lo menos una de las configuraciones de avance, de retorno y neutra. En algunas incorporaciones, como se ilustra en las FIGS. 15C y 16A, el segundo elemento accionador puede proveerse por un resorte apical 86 encajado a presión en la acanaladura arqueada 84. Para complementar esta configuración, la herramienta de trinquete 80 incluye además un retenedor de elemento de control 88, ilustrado en las FIGS. 15C y 17A, que tiene muescas primera, segunda y tercera, que apuntan hacia afuera, 90, 92, y 94, respectivamente, cada una de las cuales está configurada para engranar con una región de contacto 96 del resorte 86.

[0094] FIG. 17 B ilustra una vista inferior del retenedor de elemento de control 88 con el resorte 86 insertado para describir la manera de engranar la muesca que apunta hacia adentro 92, de acuerdo con esta incorporación. La manera de retención del resorte 86, no ilustrada en la FIG. 17B, se ilustra mejor por la FIG. 16A como ya se describió. Como se ilustra en FIG. 15D, el primer elemento accionador, configurado para engranar una uña (no mostrada) de un mecanismo de trinquete, en una manera análoga a la ya descrita con referencia a las FIGS. 1-14, se provee igualmente por un resorte apical 98. Por lo tanto, en la incorporación ilustrada en las FIGS. 15-17, los dos elementos accionadores primero y segundo, 98 y 86, respectivamente, se proveen por resortes apicales.

[0095] En otras herramientas de trinquete alternativas de acuerdo con la presente invención, puede proveerse un segundo elemento accionador que actúa para desplazar el mecanismo de trinquete a sólo una de las tres posiciones de trinquete – en una configuración actualmente preferida, a la posición neutra. Herramientas de trinquete de este tipo pueden proveerse modificando los diseños de un solo resorte, descritos en la Patente de los Estados Unidos No. 6,182,536 para incluir un segundo elemento accionador. Todo el contenido de la Patente de los Estados Unidos No.

6,182,536 se incorpora en esta solicitud por referencia, excepto que en el caso de cualquier divulgación o definición inconsistente, que se aparte de la presente solicitud, se considerará que prevalece la divulgación o definición en esta solicitud.

[0096] A modo de ejemplo, las FIGS. 18A y 18B muestran un soporte de uña inferior 100 que contiene un segundo elemento accionador y, en este ejemplo representativo, un par de tales elementos accionadores, configurados para desplazar una uña 102, montada con pivotamiento en un pasador 104, a la posición neutra. Una depresión central 106 en la superficie posterior de la uña 102 corresponde a la posición neutra del mecanismo de trinquete. Como se muestra en la FIG. 18A, el soporte de uña 100 incluye ranuras arqueadas 108 configuradas para alojar montantes 110, que pueden deslizarse en ellas en una manera análoga a la ya descrita con referencia a las FIGS. 1-14. El primer elemento accionador se provee por un resorte apical 112, cuyos extremos se enrollan alrededor de los montantes 110 y se mantienen allí. La posición de la uña 102 sobre el pasador 104 se controla por el resorte 112, el cual incluye una porción central 114, mejor ilustrada por la FIG. 18A, configurada para apoyarse directamente en una superficie posterior de la uña 102. En esta incorporación, la uña 102 y el resorte apical 112 se proveen al mismo lado del soporte de uña 100.

[0097] Como se muestra en la FIG. 18B, la superficie inferior 116 del soporte de uña 100 incluye cavidades escotadas 118 configuradas para alojar un segundo elemento accionador. En algunas incorporaciones, como se ilustra en la FIG. 18B, el segundo elemento accionador se provee por un par de resortes en forma de M 120 encajados a presión en las cavidades escotadas 118. En la configuración neutra, cuando la porción central 114 del resorte apical 112 se alinea y engrana con la depresión central 106 de la uña 102, los montantes 110 se posicionarán de manera sustancial centralmente en las ranuras arqueadas 108, de modo que porciones valle

centrales 122 de los resortes en forma de M 120 se configuren para engranar y retener los montantes 110.

[0098] Como ya se describió y se muestra en la FIG. 18A, la uña 102 incluye una depresión central 106 configurada para engranar con el resorte 112. En incorporaciones alternativas, la uña se provee con muescas primera, segunda y tercera, análogas a las uñas descritas en la Patente de los Estados Unidos No. 6,182,536, que corresponden a las posiciones de avance, neutra y de retroceso. Una herramienta de trinquete representativa, que incorpora estas uñas alternativas, incluye (a) un cuerpo; (b) un extensor, que contiene opcionalmente un espárrago de hincar y/o copa; (c) un mecanismo de trinquete que acopla el extensor al cuerpo, en donde el mecanismo de trinquete se configura para ajuste entre una pluralidad de una configuración de avance, una configuración de retorno y una configuración neutra, y en donde el mecanismo de trinquete incluye: una uña y una rueda dentada, en donde la uña se configura para engranar la rueda dentada, y en donde la uña comprende regiones de contacto primera, segunda y tercera; (d) un primer elemento accionador acoplado al mecanismo de trinquete y que comprende una cuarta región de contacto, en donde la cuarta región de contacto se configura para engranar por lo menos una de las regiones de contacto primera, segunda y tercera en la uña, desplazando en esa forma el mecanismo de trinquete a por lo menos una de las configuraciones de avance, neutra y de retorno, respectivamente; y (e) un segundo elemento accionador acoplado al mecanismo de trinquete y que comprende una quinta región de contacto, en donde el segundo elemento accionador se configura para engranar el mecanismo de trinquete con la quinta región de contacto y desplazar el mecanismo de trinquete a la configuración neutra, cuando el primer elemento accionador se engrana con la segunda región de contacto de la uña.

[0099] En la diferentes incorporaciones ya descritas, los mecanismos de trinquete para acoplar el extensor al cuerpo incluyen una uña y una

corona dentada. Sin embargo, la presente invención no se limita a ello. Igualmente pueden emplearse toda forma de mecanismos de trinquete alternativos y todos sus equivalentes. Mecanismos de trinquete alternativos representativos para uso, de acuerdo con la presente invención, incluyen aquellos que emplean embragues (por ejemplo, sólidos o fluidos).

[00100] Las FIGS. 19A-19D muestran una cuarta herramienta de trinquete 124, que incorpora características de la presente invención. La herramienta de trinquete 124 incluye un mecanismo de trinquete de fricción o tipo embrague 126. El mecanismo de trinquete 126 contiene una pluralidad de elementos de fricción 128, por ejemplo, aunque no necesariamente, pasadores sustancialmente cilíndricos, como se muestra en las FIGS. 19A-19C, y un collarín no circular 130, que puede tener forma octagonal como se ilustra además en las FIGS. 19A-19C. Los elementos de fricción 128 se interponen entre un extensor 132 y el collarín no circular 130. En igual manera pueden emplearse formas alternativas para el collarín no circular 130, incluidas, sin limitación, formas hexagonales, formas heptagonales, y similares.

[00101] Los elementos de fricción 128 se configuran para engranar el extensor 132, el cual puede incluir un espárrago de hincar como se indica en las FIGS. 19A-19D. Como mejor se ilustra por la FIG. 19D, el extensor 132 puede proveerse con un mecanismo de retén 133 para engranar en forma desenganchable una pieza de trabajo (no indicada), tal como una copa. En la configuración de avance, al extensor 132 se le permite rotar libremente en una dirección de avance, pero se le impide sustancialmente rotar en una dirección de retorno. En la configuración de retorno, al extensor 132 se le permite rotar libremente en la dirección de retorno, pero se le impide sustancialmente rotar en la dirección de avance.

[00102] La herramienta de trinquete 124 incluye además por lo menos un primer elemento accionador, el cual puede proveerse por un elemento de

retén 134, como mejor se ilustra por las FIGS. 19A-19C. El elemento de retén 134 se configura para apoyarse contra por lo menos uno de los elementos de fricción 128 y, en algunas incorporaciones, el elemento de retén 134 o tiene una forma sustancialmente cónica.

[00103] La herramienta de trinquete 124 incluye asimismo por lo menos un segundo elemento accionador, el cual puede proveerse por un resorte 136 montado en una acanaladura (no indicada) en el cabezal de la herramienta 140, en donde el resorte 136 tiene una región de contacto 138 configurada para alojar por lo menos uno de la pluralidad de elementos de fricción 128. Como mejor se ilustra por las FIGS. 19A y 19B, el resorte 136 puede tener forma de M, con el valle central de la M alineado con un vértice 137 del collarín no circular 130. En una posición neutra, el resorte 136 se configura para alojar un elemento de fricción adyacente 128 en su porción de valle central y para retener este elemento de fricción en una manera análoga a la ya descrita con referencia al resorte en forma de M 120. Cuando el elemento de fricción 128, adyacente al resorte 136, se mueve de un lado de su vértice correspondiente al otro lado (por ejemplo, cuando se cambia la dirección de trinquete de avance a retorno o viceversa), el resorte 136 se configura para retroceder y/o deformarse en la acanaladura (no indicada) en el cabezal de la herramienta 140, con el fin de no impedir sustancialmente el movimiento del elemento de fricción 128.

[00104] La dirección de trinquete de la herramienta de trinquete 124 puede controlarse moviendo una palanca de retroceso 144 localizada en la superficie posterior del cabezal de la herramienta 140 de un lado al otro. El mecanismo de retén 133 en el extensor 132 puede controlarse por un botón pulsador 146 adyacente a la palanca de retroceso 144.

[00105] Como se muestra en las FIGS. 19A-19C, el collarín no circular 130 incluye una pluralidad de vértices 137 por lo menos iguales en número a la pluralidad de elementos de fricción 128. Los elementos de fricción 128

están localizados ligeramente a un lado de sus respectivos vértices 137 en una configuración de avance, como se ilustra en la FIG. 19A, ligeramente al otro lado de sus respectivos vértices 137 en la configuración de retorno, como se muestra en la FIG. 19B y, sustancialmente, en línea con sus respectivos vértices 137 en la configuración neutra, como se muestra en la FIG. 19C.

[00106] Los elementos de fricción 128 se desplazan de un lado de sus respectivos vértices 137 al otro, cuando la palanca de retorno 144, acoplada a ellos, se mueve de conformidad. Como se muestra en la FIG. 19C, el elemento de retén 134 es forzado dentro del cuerpo 142 por un elemento de fricción adyacente 128, cuando la herramienta de trinquete 124 está en la posición neutra, de modo que al extensor 132 se le permite girar libremente con respecto al cabezal 140 del cuerpo 142. La estabilidad de esta posición neutra se incrementa mediante el resorte en forma de M 136, que aloja y retiene un elemento de fricción adyacente 128 en su porción de valle central. En incorporaciones alternativas al ejemplo representativo ilustrado en las FIGS. 19A-19C, la herramienta de trinquete 124 puede proveerse opcionalmente con una pluralidad (es decir, dos o más) resortes 136 configurados para alojar elementos de fricción separados 128, y/o con dos o más elementos de retén 134 configurados igualmente para desplazar elementos de fricción separados 128. En otras incorporaciones, el elemento de retén 134 puede omitirse y reemplazarse por uno o más resortes 136.

[00107] Las herramientas de trinquete de acuerdo con la presente invención pueden incluir además un mecanismo de liberación rápida, tal como el descrito en la Patente de los Estados Unidos No. 6,182,536, incorporada por referencia en su integridad más arriba. Por ejemplo, como se muestra en FIG. 1, la herramienta de trinquete 2 incluye un mecanismo de liberación rápida 148, que es particularmente simple y económico de ensamblar. El mecanismo ilustrado de liberación rápida 148 incluye un pasador (no mostrado), que se desliza en un pasaje oblicuo, como se ilustra

y se describe en la patente ya referenciada. Como se describe con más detalle en ese documento, el pasador se desplaza a una dirección seleccionada por un resorte, que descansa en un anillo que, a su vez, se apoya en el pasador. El anillo (no ilustrado) es simétrico sobre su propio plano y, por lo tanto, el anillo puede ensamblarse en cualquier orientación y realizar todavía su función en forma apropiada. Esto elimina la necesidad de orientar el anillo en una dirección seleccionada en el momento del ensamble y, por lo tanto, simplifica el ensamble.

[00108] El mecanismo de liberación rápida 148 es en muchos aspectos similar al mecanismo de liberación rápida descrito en la Patente de los Estados Unidos No. 5,644,958, asignada al cesionario de la presente invención, cuyo contenido total se incorpora aquí por referencia, excepto que en el caso de cualquier divulgación o definición inconsistente que se aparte de la presente solicitud, se considerará que prevalece la divulgación o definición en esta solicitud. Como se ilustra y describe con mayor detalle en la Patente de los Estados Unidos No. 5,644,958, el mecanismo de liberación rápida 148 puede incluir un elemento de bloqueo, el cual en algunas incorporaciones adopta la forma de un pasador. El pasador se desliza en un pasaje 150 en el extensor 6, mejor ilustrado por la FIG. 4C, que se orienta oblicuamente con respecto al eje longitudinal L y se proyecta entre orificios en la porción de hincar no circular 13 y la porción adyacente 11 del extensor 6. Como se describe con más detalle en las patentes ya referenciadas, el pasador puede incluir un primer extremo en la porción de hincar no circular 13 y un segundo extremo en la porción adyacente 11. El pasador se puede desplazar en el pasaje 150 entre una posición de engrane del conector de la herramienta, en donde el primer extremo del pasador se posiciona para engranar un conector de la herramienta, tal como una copa, mantener el conector de la herramienta en su sitio en la porción de hincar 13. La posición alterna es una posición de liberación del conector de la herramienta, análoga a la ilustrada en la Patente de los Estados Unidos No. 5,644,958, en donde el primer extremo del pasador se aloja sustancialmente

en el pasaje 150 y el conector de la herramienta se libera de la porción de hincar 13. En la incorporación descrita, el pasador se desplaza de la porción de mando no circular 13 por un resorte de liberación. No obstante, pueden emplearse con igual facilidad mecanismos alternativos de liberación rápida.

[00109] La posición del pasador en el pasaje 150 se controla por un actuador 152, ilustrado en la FIG. 1. En algunas incorporaciones, el actuador 152 incluye un resorte accionado contra el pasador por un resorte de engrane, como se describe en las patentes ya referenciadas. El anillo puede sacarse de la porción de hincar 13 (por ejemplo, verticalmente en la orientación indicada en la FIG. 1) por un collarín que define un escalón que engrana el anillo. Cuando no se aplican fuerzas externas al actuador 152, el resorte presiona el anillo contra el pasador con fuerza suficiente para comprimir un segundo resorte montado sobre el pasador para mover el primer extremo del pasador hacia afuera a posición de engrane del conector de la herramienta.

[00110] Con base en lo anterior, será fácilmente evidente que se ha descubierto una herramienta de trinquete que posee una mejor estabilidad en su posición neutra, comparada con herramientas que contienen únicamente un solo elemento accionador multi-funcional. Puede emplearse un elemento de control, una palanca de retroceso o similar, para ajustar el mecanismo de trinquete de herramientas, de acuerdo con la presente invención, para una acción de trinquete en sentido horario, acción de trinquete en sentido antihorario, o giro libre. Cuando se selecciona la acción de trinquete en sentido horario o antihorario, el cuerpo puede usarse manualmente para apretar o aflojar un elemento de fijación con un conector de herramienta, tal como una herramienta hexagonal, una herramienta torx, un destornillador, una punta de destornillador montada en una copa (por ejemplo, ranurada, Phillips o torx) o una copa acoplada a un espárrago de hincar. Cuando el mecanismo de trinquete se sitúa en la posición de giro

libre, el cuerpo que gira libremente puede usarse como guía para sostener el extensor a medida que se rota por una herramienta convencional (por ejemplo, una llave de copa), engranada con uno de los extremos de acople (por ejemplo, una copa de hincar).

[00111] La anterior descripción detallada y los dibujos acompañantes se han provisto únicamente a modo de explicación e ilustración, y su finalidad no es limitar el ámbito de las reivindicaciones adjuntas. Muchas variaciones en las incorporaciones actualmente preferidas en esta solicitud serán obvias a una persona de habilidad ordinaria en el arte, y permanecerán dentro del ámbito de las reivindicaciones adjuntas y sus equivalentes.

REIVINDICACIONES

1. Una herramienta de trinquete que comprende:

un cuerpo;

un extensor;

un mecanismo de trinquete que acopla el extensor al cuerpo, en donde el mecanismo de trinquete se configura para ajuste entre una pluralidad de una configuración de avance, una configuración de retorno y una configuración neutra;

un primer elemento accionador ajustable, acoplado al mecanismo de trinquete y configurado para desplazar el mecanismo de trinquete a por lo menos una de las configuraciones de avance, de retorno y neutra; y

un segundo elemento accionador ajustable, acoplado al mecanismo de trinquete y configurado para desplazar el mecanismo de trinquete a por lo menos una de las configuraciones de avance, de retorno y neutra.

2. La invención de la reivindicación 1 en donde el primer elemento accionador se configura para desplazar el mecanismo de trinquete a una pluralidad de las configuraciones de avance, de retorno y neutra.

3. La invención de la reivindicación 1 ó 2 en donde los elementos accionadores primero y segundo desplazan concertadamente el mecanismo de trinquete a por lo menos una de las configuraciones de avance, de retorno y neutra.

4. La invención de la reivindicación 1 ó 2 en donde los elementos accionadores primero y segundo no desplazan concertadamente el mecanismo de trinquete a por lo menos una de las configuraciones de avance, de retorno y neutra.

5. La invención de la reivindicación 1 ó 2 en donde el mecanismo de trinquete comprende una uña y una corona dentada, en donde la uña se configura para engranar la corona dentada de modo que:

en la configuración de avance, al extensor se le permita rotar libremente en una dirección de avance, pero se le impida sustancialmente rotar en una dirección de retorno; y

en la configuración de retorno, al extensor se le permita rotar libremente en la dirección de retorno, pero se le impida sustancialmente rotar en una dirección de avance.

6. La invención de la reivindicación 1 ó 2 en donde el primer elemento accionador comprende un resorte configurado para apoyarse contra la superficie de una uña.

7. La invención de la reivindicación 5 en donde la corona dentada comprende dientes que apuntan hacia adentro, provistos en una periferia interna del cuerpo, y en donde la uña se configura para rotar con el extensor.

8. La invención de la reivindicación 5 en donde la corona dentada comprende dientes que apuntan hacia afuera, provistos en el extensor, y en donde la uña se configura para rotar con el cuerpo.

9. La invención de la reivindicación 1 ó 2 en donde la herramienta de trinquete comprende además un elemento de control acoplado al mecanismo de trinquete, en donde el elemento de control comprende por lo menos una muesca configurada para engranar con el segundo elemento accionador, de modo que el engrane desplace el mecanismo de trinquete a por lo menos una de las configuraciones de avance, neutra y de retorno.

10. La invención de la reivindicación 1 ó 2 en donde la herramienta de trinquete comprende además un elemento de control acoplado al mecanismo de trinquete, en donde el elemento de control comprende muescas primera, segunda y tercera, cada una de las cuales se configura para engranar con el segundo elemento accionador, de modo que el engrane

de la primera muesca desplace el mecanismo de trinquete a la configuración de avance, el engrane de la segunda muesca desplace el mecanismo de trinquete a la configuración neutra, y el engrane de la tercera muesca desplace el mecanismo de trinquete a la configuración de retorno.

11. La invención de la reivindicación 1 ó 2 en donde la herramienta de trinquete comprende además un retenedor de elemento de control que comprende una acanaladura configurada para alojar el segundo elemento accionador.

12. La invención de la reivindicación 1 ó 2 en donde el segundo elemento accionador comprende un resorte configurado para apoyarse contra una superficie de una muesca.

13. La invención de la reivindicación 10 en donde el segundo elemento accionador comprende un resorte configurado para apoyarse contra una superficie de las muescas primera, segunda y tercera.

14. La invención de la reivindicación 1 ó 2 en donde el extensor comprende un primer extremo de acoplamiento, seleccionado del grupo conformado por un espárrago de hincar y una copa, y un segundo extremo de acoplamiento seleccionado del grupo conformado por un espárrago de hincar y una copa.

15. La invención de la reivindicación 1 ó 2 en donde la herramienta de trinquete comprende además un elemento de control acoplado al mecanismo de trinquete, en donde el elemento de control comprende una acanaladura configurada para alojar el segundo elemento accionador.

16. La invención de la reivindicación 15 en donde la herramienta de trinquete comprende además un retenedor de elemento de control, que incluye por lo menos una muesca configurada para engranar con el segundo

elemento accionador, de modo que el engrane desplace el mecanismo de trinquete a la configuración neutra.

17. La invención de la reivindicación 15 en donde la herramienta de trinquete comprende además un retenedor de elemento de control, que incluye muescas primera, segunda y tercera, cada una de las cuales se configura para engranar con el segundo elemento accionador, de modo que el engrane de la primera muesca desplace el mecanismo de trinquete a la configuración de avance, el engrane de la segunda muesca desplace el mecanismo de trinquete a la configuración neutra, y el engrane de la tercera muesca desplace el mecanismo de trinquete a la configuración de retorno.

18. La invención de la reivindicación 17 en donde el segundo elemento accionador comprende un resorte configurado para apoyarse contra una superficie de las muescas primera, segunda y tercera.

19. La invención de la reivindicación 1 ó 2 en donde el segundo elemento accionador comprende un resorte en forma de M, de modo que una porción de valle de la misma proporciona una región de contacto.

20. La invención de la reivindicación 1 ó 2 en donde el mecanismo de trinquete comprende una pluralidad de elementos de fricción y un collarín no circular, en donde los elementos de fricción se configura para engranar el extensor, de modo que:

en la configuración de avance, al extensor se le permita rotar libremente en una dirección de avance, pero se le impida sustancialmente rotar en una dirección de retorno; y

en la configuración de retorno, al extensor se le permita rotar libremente en la dirección de retorno, pero se le impida sustancialmente rotar en la dirección de avance.

21. La invención de la reivindicación 20 en donde el primer elemento

accionador comprende un elemento de retén configurado para desplazar por lo menos uno de los elementos de fricción.

22. La invención de la reivindicación 21 en donde el elemento de retén tiene una forma sustancialmente cónica.

23. La invención de la reivindicación 21 en donde cada uno de los elementos de fricción comprende un pasador sustancialmente cilíndrico.

24. La invención de la reivindicación 20 en donde el segundo elemento accionador comprende un resorte, configurado para engranar una de la pluralidad de elementos de fricción, de modo que en la configuración neutra, al extensor se le permita girar libremente con respecto al cuerpo.

25. La invención de la reivindicación 20 en donde los elementos de fricción se interponen entre el extensor y el collarín no circular.

26. La invención de la reivindicación 20 en donde el collarín no circular comprende una pluralidad de vértices por lo menos iguales en número con la pluralidad de elementos de fricción, y en donde la pluralidad de elementos de fricción se ubica a un lado de los vértices respectivos en la configuración de avance, al otro lado de los vértices respectivos en la configuración de retorno y, sustancialmente, en línea con los vértices respectivos en la configuración neutra.

27. Una herramienta de trinquete, que comprende:

un cuerpo;

un extensor que comprende un espárrago de hincar;

un mecanismo de trinquete que acopla el extensor al cuerpo, en donde el mecanismo de trinquete se configura para ajuste entre una configuración de avance, una configuración de retorno y una configuración neutra, y en donde el mecanismo de trinquete comprende:

una corona dentada y una uña configurada para engranar la corona dentada;

un primer elemento accionador acoplado al mecanismo de trinquete y configurado para desplazar el mecanismo de trinquete a por lo menos una de las configuraciones de avance, neutra y de retorno;

un segundo elemento accionador acoplado al mecanismo de trinquete y configurado para desplazar el mecanismo de trinquete a por lo menos una de las configuraciones de avance, neutra y de retorno;

un elemento de control acoplado al mecanismo de trinquete y que comprende muescas primera, segunda y tercera, cada una de las cuales se configura para engranar con el segundo elemento accionador, de modo que el engrane de la primera muesca desplace el mecanismo de trinquete a la configuración de avance, el engrane de la segunda muesca desplace el mecanismo de trinquete a la configuración neutra, y el engrane de la tercera muesca desplace el mecanismo de trinquete a la configuración de retorno; y

un retenedor de elemento de control acoplado al elemento de control, en donde el retenedor de elemento de control comprende una acanaladura configurada para alojar el segundo elemento accionador.

28. La invención de la reivindicación 27 en donde el primer elemento accionador comprende un resorte que incluye una porción central configurada para apoyarse contra una superficie de la uña.

29. La invención de la reivindicación 28 en donde el segundo elemento accionador comprende un resorte, que incluye una porción central configurada para apoyarse contra una superficie de las muescas primera, segunda y tercera.

30. Una herramienta de trinquete, que comprende:

un cuerpo;

un extensor que comprende un espárrago de hincar;

un mecanismo de trinquete que acopla el extensor al cuerpo, en

donde el mecanismo de trinquete se configura para ajuste entre una configuración de avance, una configuración de retorno y una configuración neutra, y en donde el mecanismo de trinquete comprende:

una corona dentada y una uña configurada para engranar la corona dentada;

un primer elemento accionador acoplado al mecanismo de trinquete y configurado para desplazar el mecanismo de trinquete a por lo menos una de las configuraciones de avance, neutra, y de retorno;

un segundo elemento accionador acoplado al mecanismo de trinquete y configurado para desplazar el mecanismo de trinquete a por lo menos una de las configuraciones de avance, neutra, y de retorno;

un elemento de control acoplado al mecanismo de trinquete, en donde el elemento de control comprende una acanaladura configurada para alojar el segundo elemento accionador; y

un retenedor de elemento de control que comprende muescas primera, segunda y tercera, cada una de las cuales se configura para engranar con el segundo elemento accionador, de modo que el engrane de la primera muesca desplace el mecanismo de trinquete a la configuración de avance, el engrane de la segunda muesca desplace el mecanismo de trinquete a la configuración neutra, y el engrane de la tercera muesca desplace el mecanismo de trinquete a la configuración de retorno.

31. La invención de la reivindicación 27 ó 30 en donde las muescas primera, segunda y tercera corresponden, respectivamente, a configuraciones de trinquete de avance, neutra y de retorno.

32. La invención de la reivindicación 1 ó 2 que comprende además un mango.

33. La invención de la reivindicación 32 en donde el mango está en ángulo recto a un eje longitudinal del extensor.

34. La invención de la reivindicación 32 en donde es mango puede moverse entre una pluralidad de ángulos con respecto al eje longitudinal del extensor.

35. Una herramienta de trinquete, que comprende:

un cuerpo;

un extensor;

un mecanismo de trinquete que acopla el extensor al cuerpo, en donde el mecanismo de trinquete se configura para ajuste entre una pluralidad de una configuración de avance, una configuración de retorno y una configuración neutra;

un primer elemento accionador ajustable acoplado al mecanismo de trinquete y configurado para desplazar el mecanismo de trinquete a por lo menos una de las configuraciones de avance, de retorno y neutra; y

un segundo elemento accionador ajustable acoplado al mecanismo de trinquete y configurado para desplazar el mecanismo de trinquete a por lo menos una de las configuraciones de avance, de retorno y neutra;

en donde por lo menos uno del primer elemento accionador y el segundo elemento accionador se configuran para desplazar el mecanismo de trinquete a la configuración neutra.

36. La invención de la reivindicación 35 en donde el mecanismo de trinquete comprende una uña y una corona dentada, en donde la uña se configura para engranar la corona dentada, de modo que:

en la configuración de avance, al extensor se le permita rotar libremente en una dirección de avance, pero se le impida sustancialmente rotar en una dirección de retorno; y

en la configuración de retorno, al extensor se le permita rotar libremente en la dirección de retorno, pero se le impida sustancialmente rotar en la dirección de avance.

37. La invención de la reivindicación 35 en donde el primer elemento

accionador comprende un resorte configurado para apoyarse contra una superficie de una uña.

38. La invención de la reivindicación 36 en donde la corona dentada comprende dientes que apuntan hacia adentro, provistos en una periferia interna del cuerpo, y en donde la uña se configura para rotar con el extensor.

39. La invención de la reivindicación 36 en donde la corona dentada comprende dientes que apuntan hacia afuera, provistos en el extensor, y en donde la uña se configura para rotar con el cuerpo.

40. La invención de la reivindicación 35 en donde la herramienta de trinquete comprende además un elemento de control acoplado al mecanismo de trinquete, en donde el elemento de control comprende por lo menos una muesca configurada para engranar con el segundo elemento accionador, de modo que el engrane de la por lo menos una muesca desplace el mecanismo de trinquete a la configuración neutra.

41. La invención de la reivindicación 35 en donde la herramienta de trinquete comprende además un elemento de control acoplado al mecanismo de trinquete, en donde el elemento de control comprende muescas primera, segunda y tercera, cada una de las cuales se configura para engranar con el segundo elemento accionador, de modo que el engrane de la primera muesca desplace el mecanismo de trinquete a la configuración de avance, el engrane de la segunda muesca desplace el mecanismo de trinquete a la configuración neutra, y el engrane de la tercera muesca desplace el mecanismo de trinquete a la configuración de retorno.

42. La invención de la reivindicación 35, 36, 40 ó 41 en donde la herramienta de trinquete comprende además un retenedor de elemento de control que comprende una acanaladura configurada para alojar el segundo

elemento accionador.

43. La invención de la reivindicación 35, 36, 40 ó 41 en donde el segundo elemento accionador comprende un resorte configurado para apoyarse contra una superficie de una muesca.

44. La invención de la reivindicación 41 en donde el segundo elemento accionador comprende un resorte configurado para apoyarse contra la superficie de las muescas primera, segunda y tercera.

45. La invención de la reivindicación 35 en donde el extensor comprende un primer extremo de acople seleccionado del grupo conformado por un espárrago de hincar y una copa, y un segundo extremo de acople seleccionado del grupo conformado por un espárrago de hincar y una copa.

46. La invención de la reivindicación 35 en donde la herramienta de trinquete comprende además un elemento de control acoplado al mecanismo de trinquete, en donde el elemento de control comprende una acanaladura configurada para alojar el segundo elemento accionador.

47. La invención de la reivindicación 35 ó 46 en donde la herramienta de trinquete comprende además un retenedor de elemento de control, que incluye por lo menos una muesca configurada para engranar con el segundo elemento accionador, de modo que el engrane desplace el mecanismo de trinquete a la configuración neutra.

48. La invención de la reivindicación 35 ó 46 en donde la herramienta de trinquete comprende además un retenedor de elemento de control, que incluye muescas primera, segunda y tercera, cada una de las cuales se configura para engranar con el segundo elemento accionador, de modo que el engrane de la primera muesca desplace el mecanismo de trinquete a la configuración de avance, el engrane de la segunda muesca desplace el

mecanismo de trinquete a la configuración neutra, y el engrane de la tercera muesca desplace el mecanismo de trinquete a la configuración de retorno.

49. La invención de la reivindicación 48 en donde el segundo elemento accionador comprende un resorte configurado para apoyarse contra una superficie de las muescas primera, segunda y tercera.

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FIG. 1

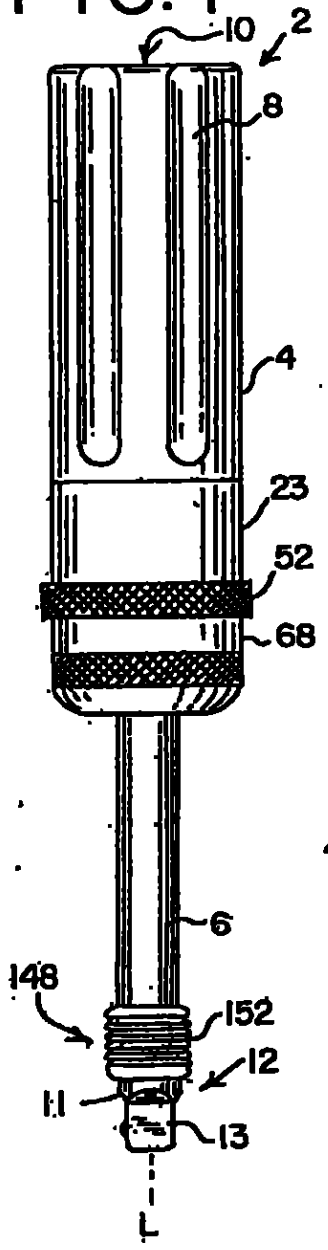


FIG. 3A

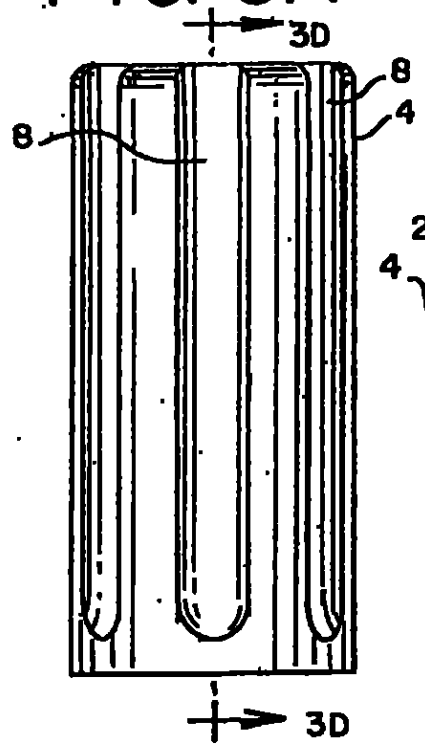


FIG. 3B

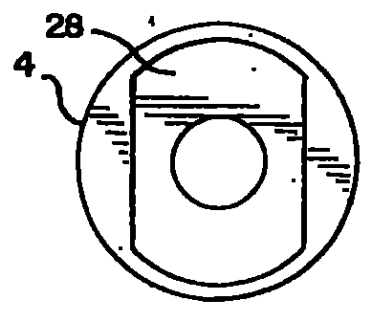


FIG. 3D

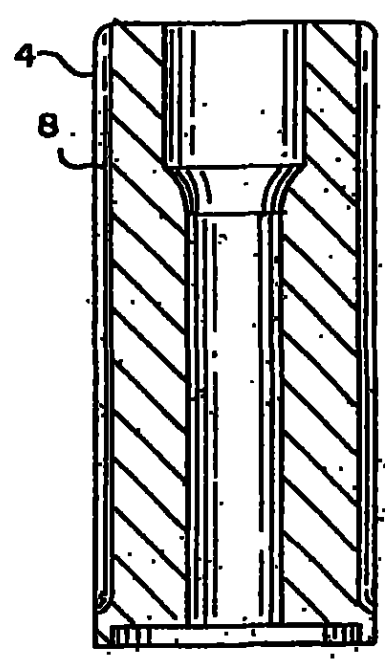


FIG. 3C

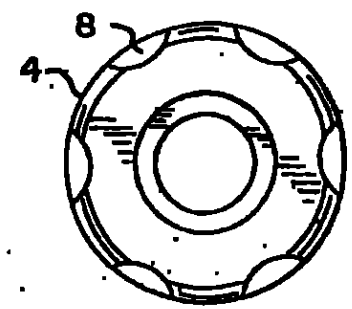


FIG. 2

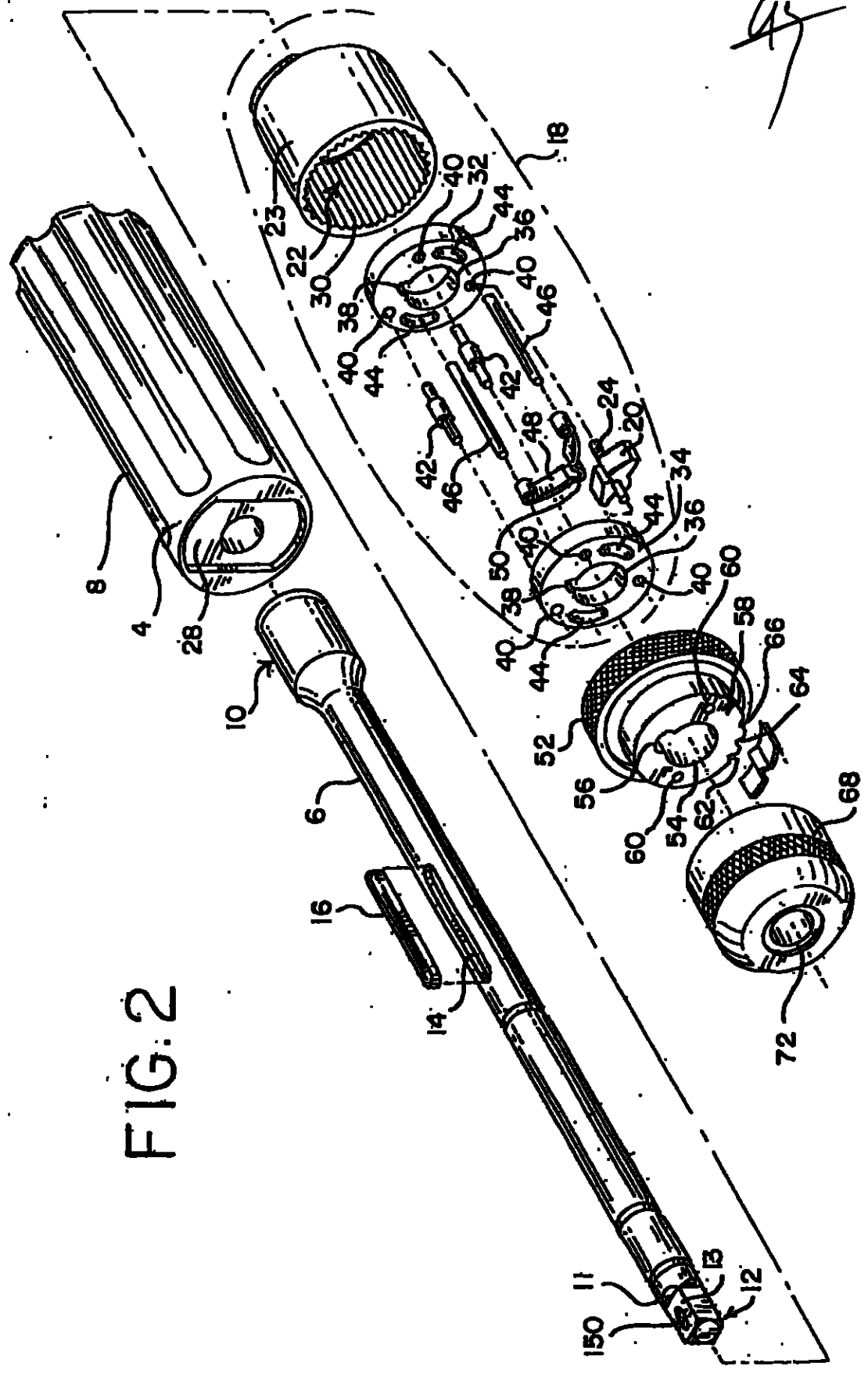


FIG. 4A

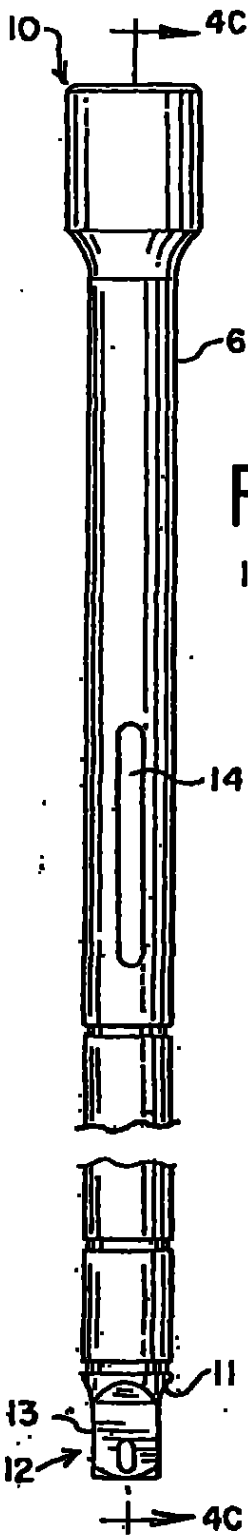


FIG. 4C

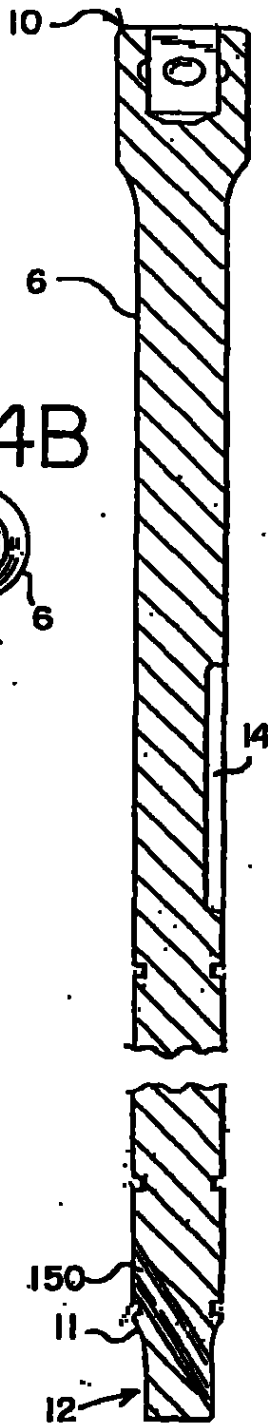


FIG. 4B

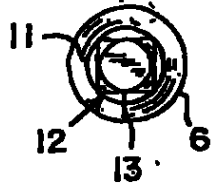


FIG. 5A

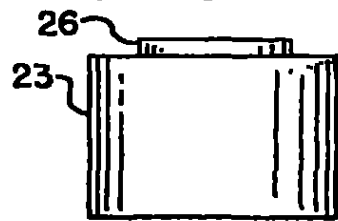


FIG. 5B

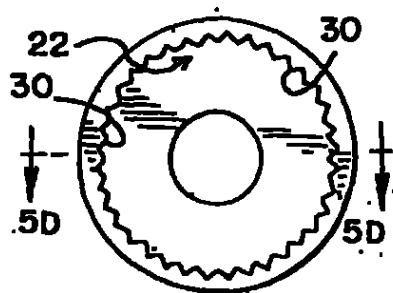


FIG. 5C

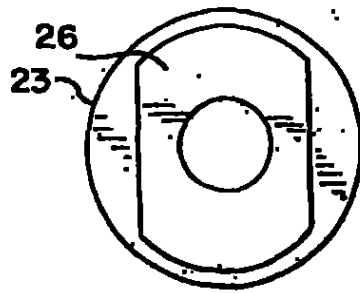


FIG. 5D

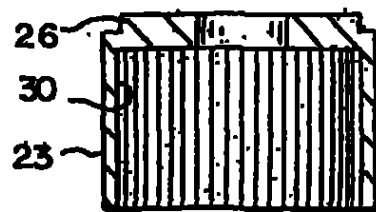


FIG. 6A FIG. 6B

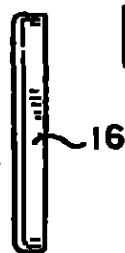
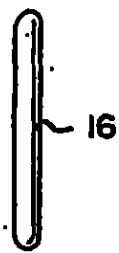


FIG. 6C



FIG. 8A



FIG. 8B



FIG. 7A

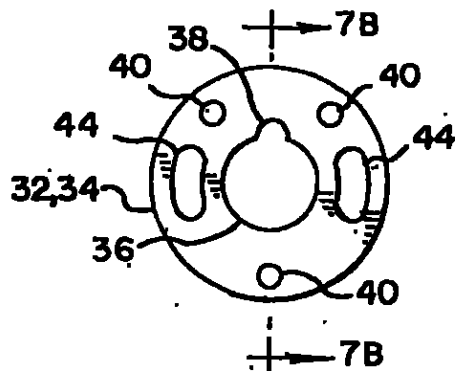


FIG. 7B

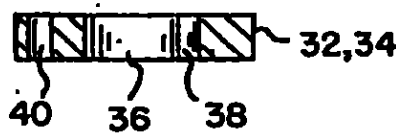


FIG. 9A

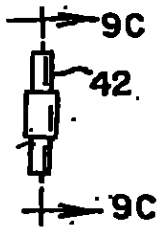


FIG. 9B



FIG. 9C



FIG. 11A



FIG. 10A

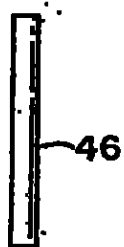


FIG. 10B



FIG. 11B

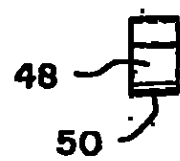


FIG. 12A

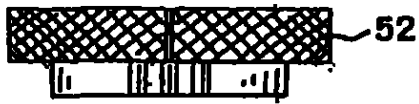


FIG. 12B

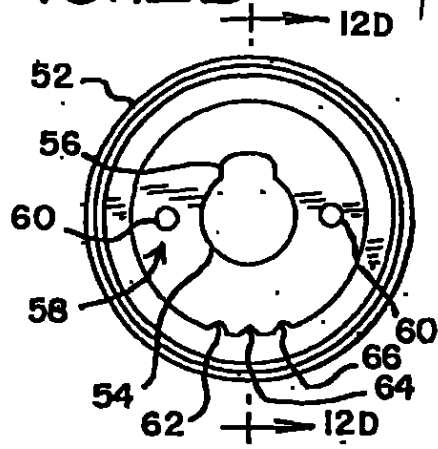


FIG. 12C

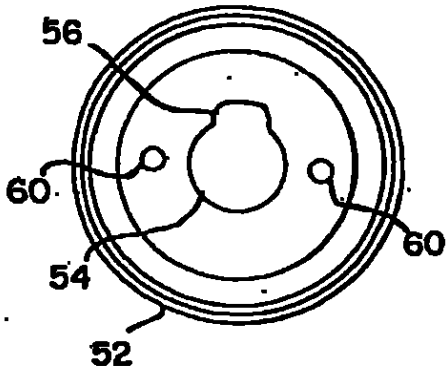


FIG. 12D

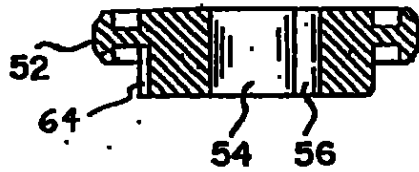


FIG. 13A



FIG. 13B

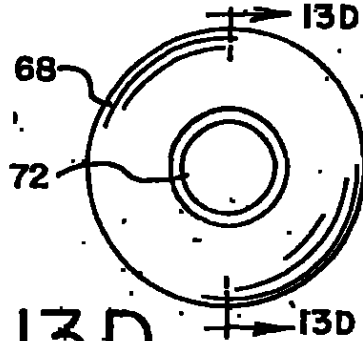


FIG. 13C

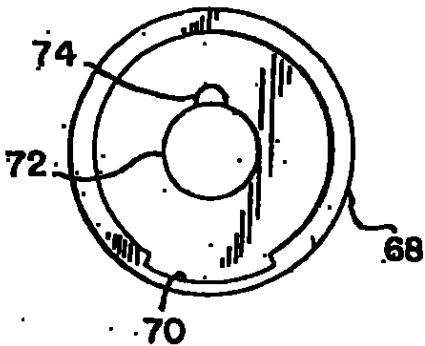


FIG. 13D

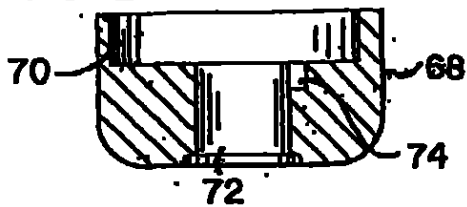
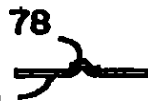


FIG. 14



ax

FIG. 15A

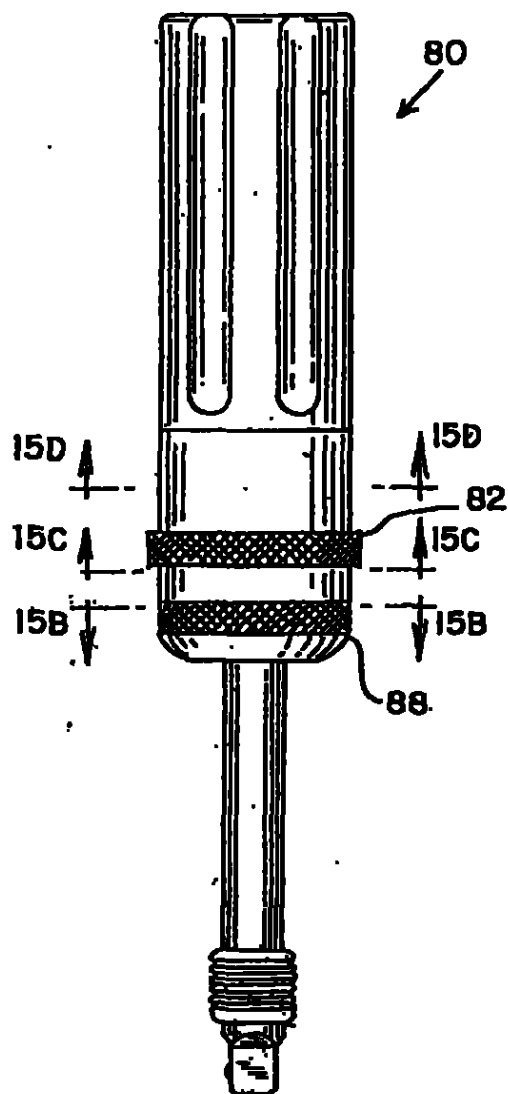


FIG. 15B

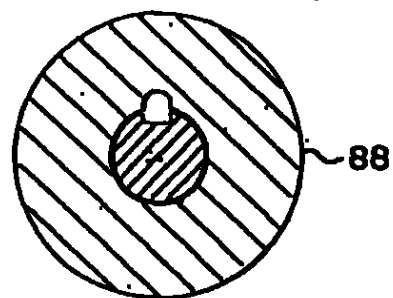


FIG. 15C

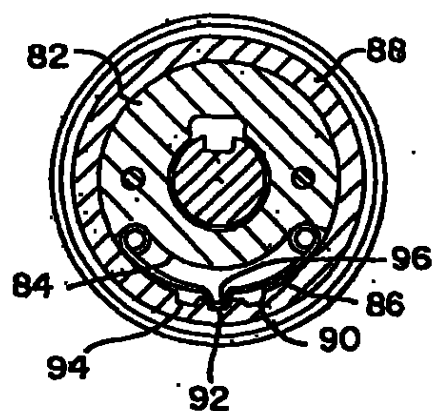


FIG. 15D

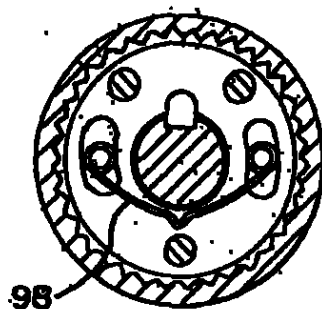


FIG. 16A

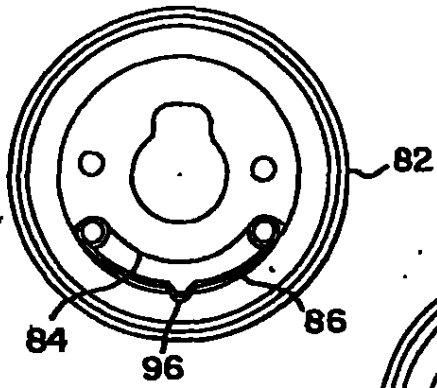


FIG. 16C

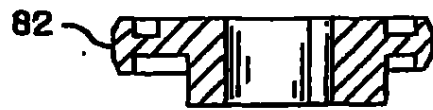


FIG. 16B

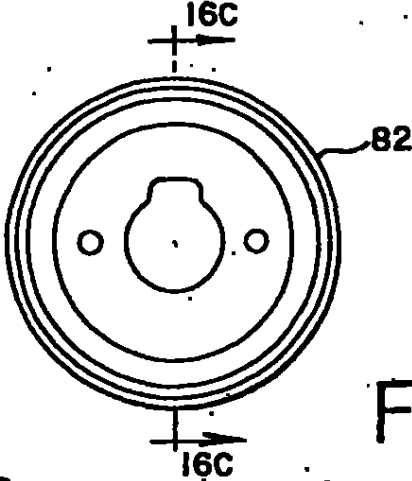


FIG. 17A

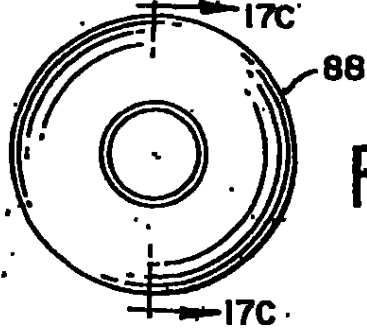


FIG. 17C

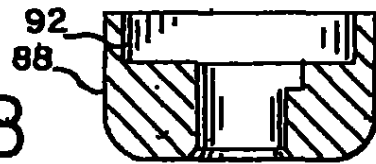


FIG. 17B

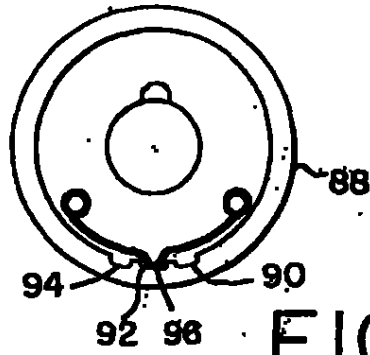


FIG. 18A

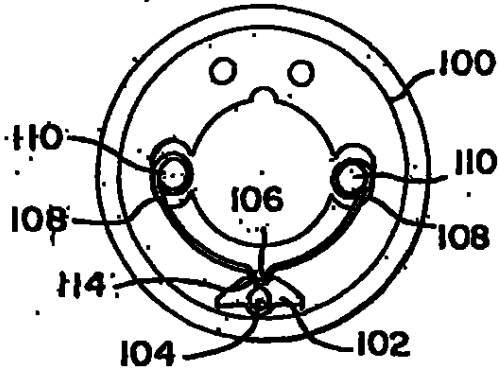
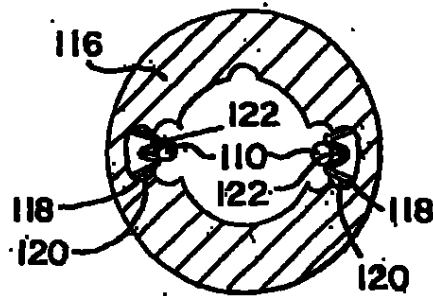


FIG. 18B



cm

FIG. 19A

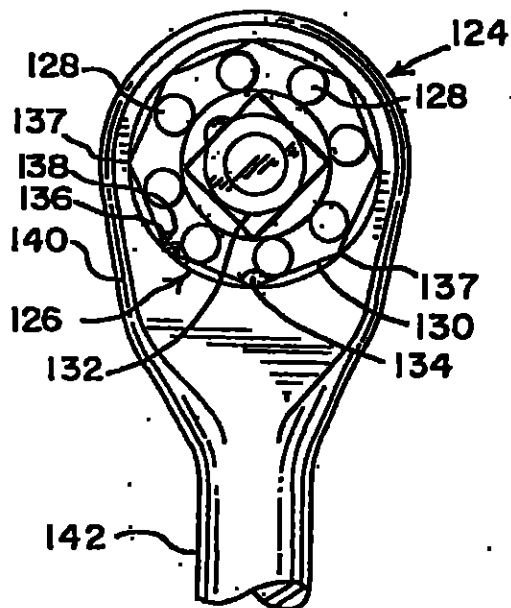


FIG. 19B

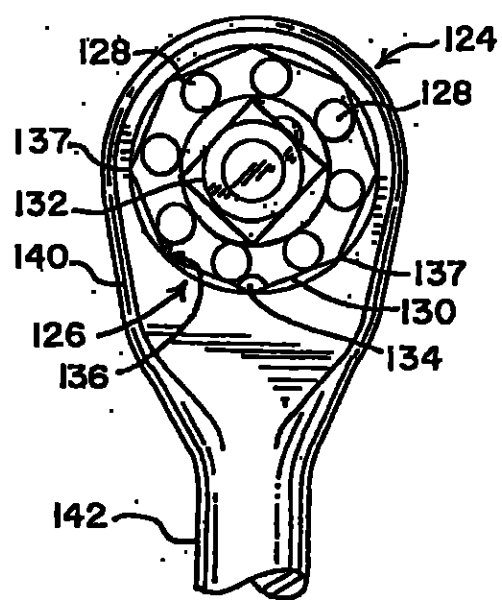


FIG. 19C

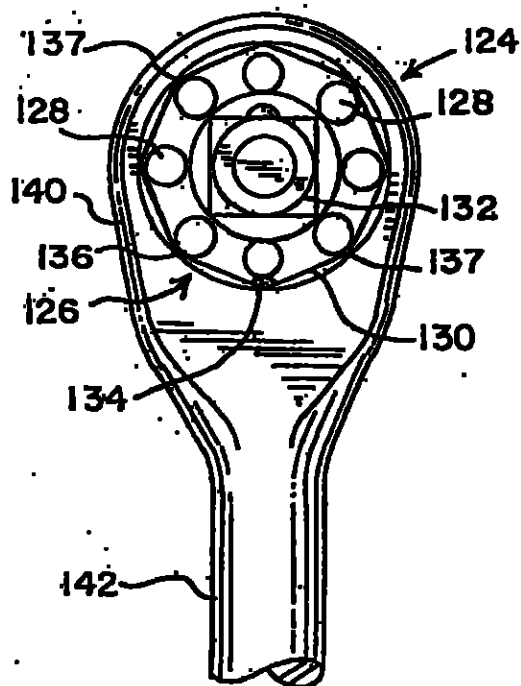
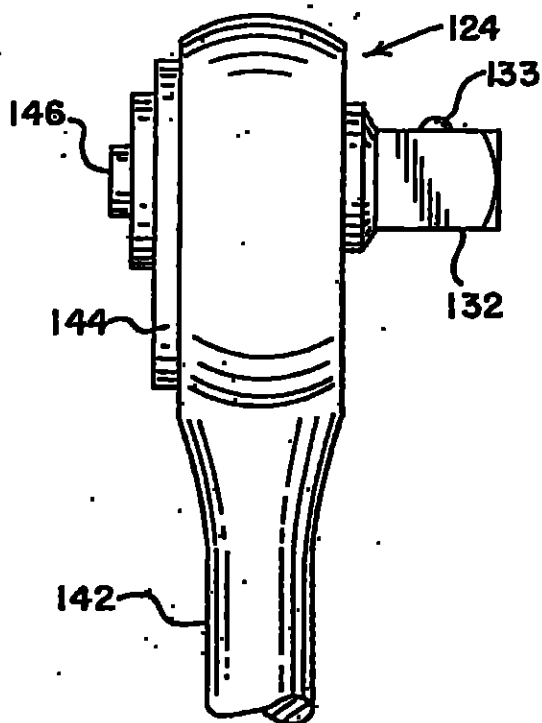


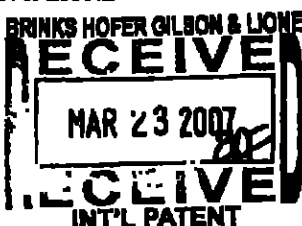
FIG. 19D



PATENT COOPERATION TREATY

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:
GREGORY H. ZAYIA
BRINKS HOFER GILSON & LIONE
P.O. BOX 10087
CHICAGO, IL 60610



PCT

NOTIFICATION OF TRANSMITTAL OF
INTERNATIONAL PRELIMINARY
REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)

(PCT Rule 71.1)

Date of mailing
(day/month/year) **16 MAR 2007**

Applicant's or agent's file reference

742-290

IMPORTANT NOTIFICATION

International application No.

PCT/US05/31726

International filing date (day/month/year)

30 August 2005 (30.08.2005)

Priority date (day/month/year)

28 September 2004 (28.09.2004)

Applicant

JODA ENTERPRISES, INC.

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary report on patentability and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

4. REMINDER

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary report on patentability. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the *PCT Applicant's Guide*.

The applicant's attention is drawn to Article 33(5), which provides that the criteria of novelty, inventive step and industrial applicability described in Article 33(2) to (4) merely serve the purposes of international preliminary examination and that "any Contracting State may apply additional or different criteria for the purposes of deciding whether, in that State, the claimed invention is patentable or not" (see also Article 27(5)). Such additional criteria may relate, for example, to exemptions from patentability, requirements for enabling disclosure, clarity and support for the claims.

Name and mailing address of the IPEA/ US

Mail Stop PCT/Amr IPEA/US

Commissioner for Patents

P.O. Box 1450

Alexandria, Virginia 22313-1450

Facsimile No. (571) 273-3201

Form PCT/IPEA/416 (January 2004)

Authorized officer

Herb Shakerl

Telephone No. 703-308-1148

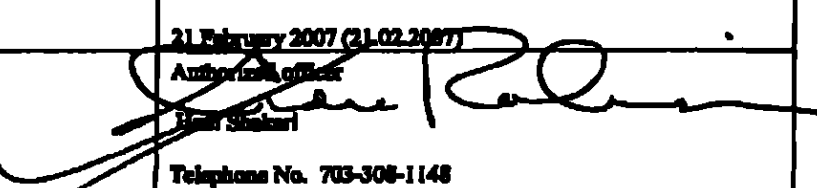
PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference	FOR FURTHER ACTION		See Form PCT/PEA/416
International application No. PCT/US03/31726	International filing date (day/month/year) 30 August 2005 (30.08.2005)	Priority date (day/month/year) 28 September 2004 (28.09.2004)	
International Patent Classification (IPC) or national classification and IPC IPC: B25B 13/46 (2006.01), 15/04 (2006.01) USPC: 81/63			
Applicant JODA ENTERPRISES, INC.			
1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36. 2. This REPORT consists of a total of <u>4</u> sheets, including this cover sheet. 3. This report is also accompanied by ANNEXES, comprising: a. ☐ (sent to the applicant and to the International Bureau) a total of ___ sheets, as follows: ☐ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions). ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box. b. ☐ (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) _____, containing a sequence listing and/or tables related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions). 4. This report contains indications relating to the following items: ☒ Box No. I Basis of the report ☐ Box No. II Priority ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability ☐ Box No. IV Lack of unity of invention ☒ Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement ☐ Box No. VI Certain documents cited ☐ Box No. VII Certain defects in the international application ☐ Box No. VIII Certain observations on the international application			
Date of submission of the demand 12 April 2006 (12.04.2006)		Date of completion of this report 21 February 2007 (21.02.2007)	
Name and mailing address of the IPER/US Mail Stop PCT, Attn: IPER/US Consultation for Patents P.O. Box 1430 Alexandria, Virginia 22313-1430 Facsimile No. (571) 273-3201		 Authority official [Name] Telephone No. 703-308-1148	

Form PCT/PEA/409 (cover sheet)(April 2005)

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/US05/31726

Box No. 1 Basis of the report

1. With regard to the language, this report is based on:

- ☒ the international application in the language in which it was filed.
- ☐ a translation of the international application into English, which is the language of a translation furnished for the purposes of:
- ☐ international search (under Rules 12.3 and 23.1(b))
- ☐ publication of the international application (under Rule 12.4(a))
- ☐ international preliminary examination (under Rules 55.2(a) and/or 55.3(a))

2. With regard to the elements of the international application, this report is based on (replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):

- ☒ the international application as originally filed/furnished
- ☒ the description:
- pages 1-22 as originally filed/furnished
- pages* NONE received by this Authority on _____
- pages* NONE received by this Authority on _____
- ☒ the claims:
- pages 23-32 as originally filed/furnished
- pages* NONE as amended (together with any statement) under Article 19
- pages* NONE received by this Authority on _____
- pages* NONE received by this Authority on _____
- ☒ the drawings:
- pages 1-8 as originally filed/furnished
- pages* NONE received by this Authority on _____
- pages* NONE received by this Authority on _____

☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing.

3. ☒ The amendments have resulted in the cancellation of:

- ☒ the description, pages NONE
- ☒ the claims, Nos. NONE
- ☒ the drawings, sheets/figs NONE
- ☒ the sequence listing (specify): NONE
- ☒ any table(s) related to the sequence listing (specify): NONE

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(e)).

- ☐ the description, pages _____
- ☐ the claims, Nos. _____
- ☐ the drawings, sheets/figs _____
- ☐ the sequence listing (specify): _____
- ☐ any table(s) related to the sequence listing (specify): _____

* If item 4 applies, some or all of those sheets may be marked "superseded."

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/US05/31726

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting each statement

1. Statement

Novelty (N)	Claims Please See Continuation Sheet	YES
	Claims Please See Continuation Sheet	NO
Inventive Step (IS)	Claims Please See Continuation Sheet	YES
	Claims Please See Continuation Sheet	NO
Industrial Applicability (IA)	Claims Please See Continuation Sheet	YES
	Claims Please See Continuation Sheet	NO

2. Citations and Explanations (Rule 70.7)

Claims 1-3, 5, 6, 8-11, 15-17, 27, 30-33, 35, 36, 40-42, and 46-48 lack novelty under PCT Article 33(2) as being anticipated by Tseng et al. US 6 575 060. Tseng et al. discloses all of the limitations of the above claims, i.e., a tool body (24), a driven element (32), a ratchet mechanism (40) coupling the driven element to the tool body, wherein the ratchet mechanism is configured for adjustment between a plurality of a forward configuration, a reverse configuration, and a neutral configuration (04:18-22), an adjustable first biasing element (44) coupled to the ratchet mechanism and configured to bias the ratchet mechanism to at least one of forward, reverse and neutral positions, and an adjustable second biasing element (56) coupled to the ratchet mechanism and configured to bias the ratchet mechanism to at least one of forward, reverse and neutral configurations. Wherein the body and the rotatable element (54) or the sliding element (96) being considered to be the control element and control element retainer according to different embodiments of Tseng et al., the definition depending on which contains the recess for the biasing element and which contains the notches. Wherein the control element (24, 96) coupled to the ratchet mechanism and comprising first, second and third notches (04:18-22), each of which is configured to engage with the second biasing element for forward, reverse and neutral configurations, and a control element retainer coupled to the control element comprising a recess receiving the second biasing element 956; 112).

Claims 1, 4, 6, and 32-34 lack novelty under PCT Article 33(2) as being anticipated by Casel et al. (US 6 058 812).

Claims 1-3, 5, 7, 12, 14, and 32-34 lack novelty under PCT Article 33(2) as being anticipated by McDonald (US 3 222 943).

Claims 1-4, 15-17, 20, 35, and 46-48 lack novelty under PCT Article 33(2) as being anticipated by Wern-Werk (DE 100 03 348).

Claims 1-3, 5, 6, 8-11, 14, 27, 28, 32-36, 39-42, and 45 lack novelty under PCT Article 33(2) as being anticipated by Chen (US 6460 431).

These documents cited also show tools having the features of the independent claims but operating in different manners such that they are relevant for further dependent claims, this resulting from the broad terminology used in the independence claims, for example Casel et al., wherein as per one embodiment of current application, the biasing elements (18) are acting in parallel rather in series and subsequently disclose the features of depending claim 4, and the handle is adjustable as per claim 34. McDonald, e.g., embodiments wherein there are two biasing elements (76) acting on pawls (58) which are internal to a toothed wheel (12) as per dependent claim 7, the spring (77) bears indirectly against notches 978) as per claim 12 and has studs and/or sockets as per claim 14, and DE 431 discloses embodiments wherein the control means (3) shifts longitudinally to contact the driven element 92) with one of two ratchet means (4, 5) in one of three configurations, which control means has a second biasing means (05:15-24). DE 431 also shows the arrangement according to dependent claim 20 such that this subject matter is not new. Chen discloses the embodiment wherein a spring (30) acts against a pawl (30) as per claim 28 and the tool has studs and/or sockets as per claim 45.

Claims 13, 18, 19, 21-26, 29, 37, 38, 43, 44 and 49 lack an inventive step under PCT Article 33(3) as being obvious over the documents cited above. The plurality of embodiments and independent claims is such that it is not possible to identify which combination of features would involve an inventive step which unites all embodiments. As such no inventive step can be recognized in the features of these claims which appear merely to be normal design options within the knowledge of one of ordinary skill in the art.

Claims 1-49 meet the criteria set out in PCT Article 33(4), and thus have industrial applicability because the subject matter claimed can be made or used in industry.

NEW CITATIONS

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

104
International application No.
PCT/US05/31726

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of:

V.1. Reasoned Statements:

The opinion as to Novelty was positive (Yes) with respect to claims 13, 18, 19, 21-26, 29, 37, 38, 43, 44, 49

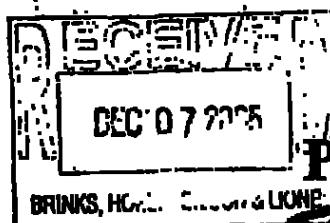
The opinion as to Novelty was negative (No) with respect to claims 1-12, 14-17, 20, 27, 28, 30-36, 39-42 AND 45-48

The opinion as to Inventive Step was positive (Yes) with respect to claims NONE

The opinion as to Inventive Step was negative (NO) with respect to claims 1-49

The opinion as to Industrial Applicability was positive (YES) with respect to claims 1-49

The opinion as to Industrial Applicability was negative (NO) with respect to claims NONE



PCT

**NOTIFICATION CONCERNING
SUBMISSION OR TRANSMITTAL
OF PRIORITY DOCUMENT**

From the INTERNATIONAL BUREAU

To:

ZAYIA, Gregory, H.
Brinks Hofer Gleason & Lione
P.O. Box 10087
Chicago, IL 60610
ETATS-UNIS D'AMERIQUE

(PCT Administrative Instructions, Section 411)

Date of mailing (day/month/year) 28 November 2005 (28.11.2005)	
Applicant's or agent's file reference 742-290	
International application No. PCT/US2005/031728	International filing date (day/month/year) 30 August 2005 (30.08.2005)
International publication date (day/month/year)	Priority date (day/month/year) 28 September 2004 (28.09.2004)
Applicant JODA ENTERPRISES, INC. et al	

IMPORTANT NOTIFICATION

1. By means of this Form, which replaces any previously issued notification concerning submission or transmittal of priority documents, the applicant is hereby notified of the date of receipt by the International Bureau of the priority document(s) relating to all earlier application(s) whose priority is claimed. Unless otherwise indicated by the letters "NR", in the right-hand column or by an asterisk appearing next to a date of receipt, the priority document concerned was submitted or transmitted to the International Bureau in compliance with Rule 17.1(a) or (b).

2. (If applicable) The letters "NR" appearing in the right-hand column denote a priority document which, on the date of mailing of this Form, had not yet been received by the International Bureau under Rule 17.1(a) or (b). Where, under Rule 17.1(a), the priority document must be submitted by the applicant to the receiving Office or the International Bureau, but the applicant fails to submit the priority document within the applicable time limit under that Rule, the attention of the applicant is directed to Rule 17.1(c) which provides that no designated Office may disregard the priority claim concerned before giving the applicant an opportunity, upon entry into the national phase, to furnish the priority document within a time limit which is reasonable under the circumstances.

3. (If applicable) An asterisk (*) appearing next to a date of receipt, in the right-hand column, denotes a priority document submitted or transmitted to the International Bureau but not in compliance with Rule 17.1(a) or (b) (the priority document was received after the time limit prescribed in Rule 17.1(a) or the request to prepare and transmit the priority document was submitted to the receiving Office after the applicable time limit under Rule 17.1(b)). Even though the priority document was not furnished in compliance with Rule 17.1(a) or (b), the International Bureau will nevertheless transmit a copy of the document to the designated Offices, for their consideration. In case such a copy is not accepted by the designated Office as the priority document, Rule 17.1(c) provides that no designated Office may disregard the priority claim concerned before giving the applicant an opportunity, upon entry into the national phase, to furnish the priority document within a time limit which is reasonable under the circumstances.

Priority date	Priority application No.	Country or regional Office or PCT receiving Office	Date of receipt of priority document
28 September 2004 (28.09.2004)	10/853,470	US	07 November 2005 (07.11.2005)

The International Bureau of WIPO
34, chemin des Colombettes
1211 Geneva 20, Switzerland

Authorized officer

Soumia SAADALLAH

Facsimile No. +41 22 338 82 70

Facsimile No. (41-22) 338.70.80

Form PCT/IB/304 (January 2004)

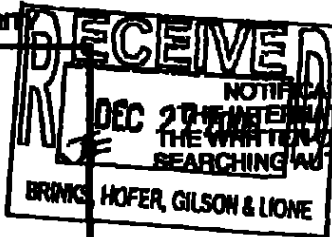
Telephone No. +41 22 338 8421

CNYQ7MSI

PATENT COOPERATION TREATY

From the INTERNATIONAL SEARCHING AUTHORITY

To:
BRINKS HOFER GILSON & LIONE
Attn. Zayia, Gregory H.
P.O. Box 10087
Chicago, IL 60610
UNITED STATES OF AMERICA



PCT

NOTIFICATION OF TRANSMITTAL OF
THE INTERNATIONAL SEARCH REPORT AND
THE WRITTEN OPINION OF THE INTERNATIONAL
SEARCHING AUTHORITY OR THE DESIGNATION

**COPY TO ATTY
W/OUT FILE**

(PCT Rule 44.1)

Date of mailing (day/month/year) 20/12/2005	
Applicant's or agent's file reference 742-290	FOR FURTHER ACTION See paragraphs 1 and 4 below
International application No. PCT/US2005/031726	International filing date (day/month/year) 30/08/2005
Applicant JODA ENTERPRISES, INC.	

1. ☒ The applicant is hereby notified that the international search report and the written opinion of the International Searching Authority have been established and are transmitted herewith.

Filing of amendments and statement under Article 19:
The applicant is entitled, if he so wishes, to amend the claims of the International Application (see Rule 48):
When? The time limit for filing such amendments is normally two months from the date of transmittal of the International Search Report.
Where? Directly to the International Bureau of WIPO, 34 chemin des Colombettes
1211 Geneva 20, Switzerland, Facsimile No.: (41-22) 338.62.70
For more detailed instructions, see the notes on the accompanying sheet.

2. ☐ The applicant is hereby notified that no international search report will be established and that the declaration under Article 17(2)(a) to that effect and the written opinion of the International Searching Authority are transmitted herewith.

3. ☐ With regard to the protest against payment of (an) additional fee(s) under Rule 40.2, the applicant is notified that:

☐ the protest together with the decision thereon has been transmitted to the International Bureau together with the applicant's request to forward the texts of both the protest and the decision thereon to the designated Office.

☐ no decision has been made yet on the protest; the applicant will be notified as soon as a decision is made.

4. Reminders

Shortly after the expiration of 18 months from the priority date, the international application will be published by the International Bureau. If the applicant wishes to avoid or postpone publication, a notice of withdrawal of the international application, or of the priority claim, must reach the International Bureau as provided in Rules 90bis.1 and 90bis.3, respectively, before the completion of the technical preparations for international publication.

The applicant may submit comments on an informal basis on the written opinion of the International Searching Authority to the International Bureau. The International Bureau will send a copy of such comments to all designated Offices unless an international preliminary examination report has been or is to be established. These comments would also be made available to the public but not before the expiration of 30 months from the priority date.

Within 18 months from the priority date, but only in respect of some designated Offices, a demand for international preliminary examination must be filed if the applicant wishes to postpone the entry into the national phase until 30 months from the priority date (in some Offices even later); otherwise, the applicant must, within 30 months from the priority date, perform the prescribed acts for entry into the national phase before those designated Offices.

In respect of other designated Offices, the time limit of 30 months (or later) will apply even if no demand is filed within 18 months.

See the Annex to Form PCT/IS/301 and, for details about the applicable time limits, Office by Office, see the PCT Applicant's Guide, Volume II, National Chapters and the WIPO Internet site.

Name and mailing address of the International Searching Authority  European Patent Office, P.B. 5518 Patentkanal 2 NL-2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 551 apo nl, Fax: (+31-70) 340-3016	Authorized officer Antonio Teixeira
---	--

These Notes are intended to give the basic instructions concerning the filing of amendments under Article 19. The Notes are based on the requirements of the Patent Cooperation Treaty, the Regulations and the Administrative Instructions under that Treaty. In case of discrepancy between these Notes and these requirements, the latter are applicable. For more detailed information, see also the POT Applicant's Guide, a publication of WIPO.

In these Notes, "Article", "Rule", and "Section" refer to the provisions of the PCT, the POT Regulations and the PGT Administrative Instructions respectively.

INSTRUCTIONS CONCERNING AMENDMENTS UNDER ARTICLE 19

The applicant has, after having received the international search report, one opportunity to amend the claims of the international application. It should however be emphasized that, since all parts of the international application (claims, description and drawings) may be amended during the international preliminary examination procedure, there is usually no need to file amendments of the claims under Article 19 except where, e.g. the applicant wants the latter to be published for the purposes of provisional protection or has another reason for amending the claims before international publication. Furthermore, it should be emphasized that provisional protection is available in some States only.

What parts of the international application may be amended?

Under Article 19, only the claims may be amended.

During the international phase, the claims may also be amended (or further amended) under Article 34 before the International Preliminary Examining Authority. The description and drawings may only be amended under Article 34 before the International Examining Authority.

Upon entry into the national phase, all parts of the international application may be amended under Article 28 or, where applicable, Article 41.

When?

Within 2 months from the date of transmittal of the international search report or 18 months from the priority date, whichever time limit expires later. It should be noted, however, that the amendments will be considered as having been received on time if they are received by the International Bureau after the expiration of the applicable time limit but before the completion of the technical preparations for international publication (Rule 46.1).

Where not to file the amendments?

The amendments may only be filed with the International Bureau and not with the receiving Office or the International Searching Authority (Rule 46.2).

Where a demand for international preliminary examination has been/is filed, see below.

How?

Either by cancelling one or more entire claims, by adding one or more new claims or by amending the text of one or more of the claims as filed.

A replacement sheet must be submitted for each sheet of the claims which, on account of an amendment or amendments, differs from the sheet originally filed.

All the claims appearing on a replacement sheet must be numbered in Arabic numerals. Where a claim is cancelled, no renumbering of the other claims is required. In all cases where claims are renumbered, they must be renumbered consecutively (Administrative Instructions, Section 205(b)).

The amendments must be made in the language in which the international application is to be published.

What documents must accompany the amendments?

Letter (Section 205(b)):

The amendments must be submitted with a letter.

The letter will not be published with the international application and the amended claims. It should not be confused with the "Statement under Article 19(1)" (see below, under "Statement under Article 19(1)").

The letter must be in English or French, at the choice of the applicant. However, if the language of the international application is English, the letter must be in English; if the language of the international application is French, the letter must be in French.

The letter must indicate the differences between the claims as filed and the claims as amended. It must, in particular, indicate, in connection with each claim appearing in the international application (it being understood that identical indications concerning several claims may be grouped), whether

- (i) the claim is unchanged;
- (ii) the claim is cancelled;
- (iii) the claim is new;
- (iv) the claim replaces one or more claims as filed;
- (v) the claim is the result of the division of a claim as filed.

The following examples illustrate the manner in which amendments must be explained in the accompanying letter:

1. [Where originally there were 48 claims and after amendment of some claims there are 51]:
"Claims 1 to 29, 31, 32, 34, 36, 37 to 48 replaced by amended claims bearing the same numbers; claims 30, 33 and 35 unchanged; new claims 49 to 51 added."
2. [Where originally there were 16 claims and after amendment of all claims there are 11]:
"Claims 1 to 16 replaced by amended claims 1 to 11."
3. [Where originally there were 14 claims and the amendments consist in cancelling some claims and in adding new claims]:
"Claims 1 to 6 and 14 unchanged; claims 7 to 13 cancelled; new claims 15, 16 and 17 added." or
"Claims 7 to 13 cancelled; new claims 15, 16 and 17 added; all other claims unchanged."
4. [Where various kinds of amendments are made]:
"Claims 1-10 unchanged; claims 11 to 13, 16 and 19 cancelled; claims 14, 15 and 18 replaced by amended claims 14; claim 17 subdivided into amended claims 15, 16 and 17; new claims 20 and 21 added."

"Statement under Article 19(1)" (Rule 46.4)

The amendments may be accompanied by a statement explaining the amendments and indicating any impact that such amendments might have on the description and the drawings (which cannot be amended under Article 19(1)).

The statement will be published with the international application and the amended claims.

It must be in the language in which the international application is to be published.

It must be brief, not exceeding 500 words if in English or if translated into English.

It should not be confused with and does not replace the letter indicating the differences between the claims as filed and as amended. It must be filed on a separate sheet and must be identified as such by a heading, preferably by using the words "Statement under Article 19(1)".

It may not contain any disparaging comments on the international search report or the relevance of citations contained in that report. References to citations, relevant to a given claim, contained in the international search report may be made only in connection with an amendment of that claim.

Consequence if a demand for international preliminary examination has already been filed

If, at the time of filing any amendments under Article 19, a demand for international preliminary examination has already been submitted, the applicant must, preferably, at the same time of filing the amendments with the International Bureau, also file a copy of such amendments with the International Preliminary Examining Authority (see Rule 62.2(a), first sentence).

Consequence with regard to translation of the international application for entry into the national phase

The applicant's attention is drawn to the fact that, where upon entry into the national phase, a translation of the claims as amended under Article 19 may have to be furnished to the designated/selected Office, instead of, or in addition to, the translation of the claims as filed.

For further details on the requirements of each designated/selected Office, see Volume II of the PCT Applicant's Guide.



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INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference 742-290	FOR FURTHER ACTION see Form PCT/ISA/220 as well as, where applicable, Item 5 below.	
International application No. PCT/US2005/031726	International filing date (day/month/year) 30/08/2005	(Earliest) Priority Date (day/month/year) 28/09/2004
Applicant JODA ENTERPRISES, INC.		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 6 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

1. Scope of the report

a. With regard to the language, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ The international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

b. ☐ With regard to any nucleotide and/or amino acid sequence disclosed in the international application, see Box No. I.

2. ☐ Certain claims were found unsearchable (See Box II).

3. ☐ Unity of invention is lacking (see Box II).

4. With regard to the title,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows:

5. With regard to the abstract,

☐ the text is approved as submitted by the applicant.

☒ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box No. IV. The applicant may, upon request, be provided with a copy of the abstract as established by the Authority.

6. With regard to the drawings,

a. The figure of the drawings to be published with the abstract is Figure No. 2

☐ as suggested by the applicant.

☐ as selected by this Authority, because the applicant failed to suggest a figure.

☒ as selected by this Authority, because this figure better characterizes the invention.

b. ☐ none of the figures is to be published with the abstract.

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US2005/031726

Box No. IV Text of the abstract (Continuation of item 5 of the first sheet)

Ratcheting tools are described that include: (a) a tool body (4); (b) a driven element (6); (c) a ratchet mechanism (18) coupling the driven element to the tool body, wherein the ratchet mechanism is configured for adjustment between a plurality of a forward configuration, a reverse configuration, and a neutral configuration; (d) an adjustable first biasing element (48) coupled to the ratchet mechanism and configured to bias the ratchet mechanism to at least one of the forward, reverse, and neutral configurations; and (e) an adjustable second biasing element (76) coupled to the ratchet mechanism and configured to bias the ratchet mechanism to at least one of the forward, reverse, and neutral configurations.

INTERNATIONAL SEARCH REPORT

International Application No.
PCT/US2005/031726A. CLASSIFICATION OF SUBJECT MATTER
B25B13/46 B25B15/04

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
B25B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-internal, PAJ, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 100 03 348 A1 (WERA-WERK HERMANN WERNER GMBH & CO; WERA-WERK HERMANN WERNER GMBH & CO) 18 January 2001 (2001-01-18)	1-4, 15-17, 20, 35, 46-48
A	abstract column 5, line 15 - line 24	9, 10, 25, 40, 41
X	US 4 529 071 A (GAGNON ET AL.) 16 July 1985 (1985-07-16)	1-3, 5, 6, 8, 11, 14-17, 27, 30-36, 39, 45-48
Y	figures 3, 4, 12 -/-	7

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

* Special categories of cited documents:

- "A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier document but published on or after the international filing date
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
"O" document relating to an oral disclosure, use, exhibition or other means
"P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"Z" document member of the same patent family

Date of the actual completion of the international search

13 December 2005

Date of mailing of the international search report

20/12/2005

Name and mailing address of the ISA

European Patent Office, P.O. Box 5010 Patentamt 2
NL - 2280 HV Rijswijk
Tel: (+31-70) 340-2040, Tx: 31 851 apo nl,
Fax: (+31-70) 340-3010

Authorized officer

Carmichael, Guy

INTERNATIONAL SEARCH REPORT

International Application No.
PCT/US2005/031726

O.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	DE 93 18 291 U1 (HUANG, DANIEL, DA LI - SHIANG, TAICHUNG, TW) 3 March 1994 (1994-03-03)	1-3,5, 8-11, 14-17, 27, 32-36, 39-42, 45,46 6,30
A	figures 6-8	
X	US 6 460 431 B1 (CHEN YU TANG) 8 October 2002 (2002-10-08)	1-3,5,6, 8-11,14, 27,28, 32-36, 39-42,45
A	figures 10,14	12,13, 15-17, 29,30, 46-49
X	US 2002/079181 A1 (HSIAO CHIEH-JEN) 27 June 2002 (2002-06-27)	1-3,5,6, 8-11, 15-17, 27,28, 30-32, 35-37, 39-42, 46-48
	figures 3,5,7	
X	US 6 575 060 B1 (TSENG YI CHUAN ET AL) 10 June 2003 (2003-06-10)	1-3,5,6, 8-11, 15-17, 27, 30-33, 35,36, 40-42, 46-48
	column 4, line 18 - line 22; figures 4,7,9	
X	US 4 290 328 A (CLARK ET AL) 22 September 1981 (1981-09-22)	1-3,5,6, 8,9,32, 35-37, 39,40,42
A	figures 2-4	10-13, 19,27,41
X	US 3 222 943 A (MCDONALD RUSSELL H) 14 December 1965 (1965-12-14)	1-3,5,7, 12,14, 32-34
A	column 3, line 71 - column 4, line 2	6,9,27, 30,35
X	US 6 058 812 A (CASEL ET AL) 9 May 2000 (2000-05-09) figures 1,8	1,4,6, 32-34
	-/-	

Form PCT/ISA/210 (continuation of second sheet) (January 2004)

INTERNATIONAL SEARCH REPORT

International Application No.
PCT/US2005/031726

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	GB 970 731 A (THOMAS MELDRUM LIMITED) 23 September 1964 (1964-09-23) figures 4,5	7

Form PCT/ISA/210 (continuation of second sheet) (January 2004)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No. **PCT/US2005/031726**

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 10003348	A1	18-01-2001	NONE
US 4529071	A	16-07-1985	NONE
DE 9318291	U1	03-03-1994	NONE
US 6460431	B1	08-10-2002	DE 20112619 U1 15-11-2001
US 2002079181	A1	27-06-2002	TW 447373 Y 21-07-2001
US 6575060	B1	10-06-2003	NONE
US 4290328	A	22-09-1981	NONE
US 3222943	A	14-12-1965	NONE
US 6058812	A	09-05-2000	NONE
GB 970731	A	23-09-1964	NONE

PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

PCT

To:

see form PCT/ISA/220

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY (PCT Rule 43bis.1)

Date of mailing
(day/month/year) see form PCT/ISA/210 (second sheet)

Applicant's or agent's file reference
see form PCT/ISA/220

FOR FURTHER ACTION
See paragraph 2 below

International application No.
PCT/US2005/031728

International filing date (day/month/year)
30.08.2005

Priority date (day/month/year)
28.09.2004

International Patent Classification (IPC) or both national classification and IPC
B25B13/48, B25B15/04

Applicant
JODA ENTERPRISES, INC.

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☐ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will usually be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA"). However, this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 88.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of three months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA:



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Fax: +31 70 340 - 3016

Authorized Officer

Carmichael, Guy

Telephone No. +31 70 340-3279



**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY**

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International application No.
PCT/US2005/031726

Box No. I Basis of the opinion

1. With regard to the language, this opinion has been established on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.
 - ☐ This opinion has been established on the basis of a translation from the original language into the following language , which is the language of a translation furnished for the purposes of international search (under Rules 12.3 and 23.1(b)).
2. With regard to any nucleotide and/or amino acid sequence disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:
 - a. type of material:
 - ☐ a sequence listing
 - ☐ table(s) related to the sequence listing
 - b. format of material:
 - ☐ in written format
 - ☐ in computer readable form
 - c. time of filing/furnishing:
 - ☐ contained in the international application as filed.
 - ☐ filed together with the international application in computer readable form.
 - ☐ furnished subsequently to this Authority for the purposes of search.
3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
4. Additional comments:

Box No. V Reasoned statement under Rule 43b/a.1(a)(i) with regard to novelty, inventive step or
Industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	13, 18, 19, 21-26, 29, 37, 38, 40, 41, 43, 44, 49
	No: Claims	1-12, 14-17, 20, 27, 28, 30-36, 39, 42, 45-48
Inventive step (IS)	Yes: Claims	
	No: Claims	1-49
Industrial applicability (IA)	Yes: Claims	1-49
	No: Claims	

2. Citations and explanations

see separate sheet

Re Item V

**Reasoned statement with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement**

1. In the following analysis, attention has been paid to the vague terms used in the claims, the plurality of embodiments which give rise to lack of clarity in the limits of the terms used in the claims and the lack of clarity as to which features are considered by the applicant to be essential for the invention.

1.1. In particular, it is noted that:

the term "adjustable (...) biasing element" can be considered to be any spring,

the term "neutral" can be considered to be any configuration which is neither forward or reverse,

the relationship between the first and second biasing elements is unclear since, in the embodiment described in the last sentence of paragraph [00106] of the description, the two elements can be simply two elements performing the same task in parallel, and the four independent product claims variously describe a plurality of configurations i.e. at least two (claims 1 and 35) or three configurations (claims 27 and 30).

2. Reference is made to the following documents:

D1: US 6 575 060 B (Tsang et al) 10.06.2003

D2: US 6 058 812 A (Casal et al) 05.09.2000

D3: US 3 222 943 A (McDonald) 14.12.1965

D4: DE 100 03 348 A (Wera-Werk) 27.01.2000

D5: US 6 460 431 B (Chen) 08.10.2002

3. The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claims 1 to 12, 14 to 17, 20, 27, 28, 30 to 36, 39 to 42 and 45 to 48 is not new in the sense of Article 33(2) PCT. Additionally, The present application does not meet the criteria of Article 33(1) PCT, because the subject-matter of claims 13, 18, 19, 21 to 26, 29, 38, 43, 44 and 49 does not involve an inventive step in the sense of Article 33(3) PCT.

3.1. The document D1 discloses (the references in parentheses applying to this document) a ratcheting tool comprising:

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a tool body (24);
a driven element (32);
a ratchet mechanism (40) coupling the driven element to the tool body, wherein the ratchet mechanism is configured for adjustment between a plurality of a forward configuration, a reverse configuration, and a neutral configuration (see column 4, lines 18 to 22 wherein neutral means no rotation prevention);
an adjustable first biasing element (44) coupled to the ratchet mechanism and configured to bias the ratchet mechanism to at least one of the forward, reverse, and neutral configurations; and
an adjustable second biasing element (56) coupled to the ratchet mechanism and configured to bias the ratchet mechanism to at least one of the forward, reverse, and neutral configurations.

3.1.1. The subject matter of independent claim 1 is therefore not new.

3.1.2. D1 also discloses the subject matter of dependent claims 2, 3, 5, 6, 8 to 11, 15 to 17, 32 and 33, with the body of the tool and the rotatable element (54) or the sliding element (96) being considered to be the control element and control element retainer according to different embodiments of D1, the definition depending on which contains the recess for the biasing element and which contains the notches.

3.2. D1 also discloses a ratcheting tool comprising:

a tool body (24);
a driven element (32) comprising a drive stud (36);
a ratchet mechanism (40) coupling the driven element to the tool body, wherein the ratchet mechanism is configured for adjustment between a forward configuration, a reverse configuration, and a neutral configuration, and wherein the ratchet mechanism comprises:
a toothed (34) element and a pawl (40) configured to engage the toothed element;
a first biasing element (44) coupled to the ratchet mechanism and configured to bias the ratchet mechanism to at least one of the forward, neutral, and reverse configurations;
a second biasing element (56; 112) coupled to the ratchet mechanism and configured to bias the ratchet mechanism to at least one of the forward, neutral, and reverse configurations;
a control element (24; 96) coupled to the ratchet mechanism and comprising first, second

and third notches (column 4, lines 18 to 22), each of which is configured to engage with the second biasing element, such that engagement of the first notch biases the ratchet mechanism to the forward configuration, engagement of the second notch biases the ratchet mechanism to the neutral configuration, and engagement of the third notch biases the ratchet mechanism to the reverse configuration; and
a control element retainer coupled to the control element, wherein the control element retainer comprises a recess configured to receive the second biasing element (56;112).

3.2.1. The subject matter of Independent claim 27 is therefore not new.

3.3. D1 further discloses a ratcheting tool comprising:
a tool body (24);
a driven element (32) comprising a drive stud (36);
a ratchet mechanism (40) coupling the driven element to the tool body, wherein the ratchet mechanism is configured for adjustment between a forward configuration, a reverse configuration, and a neutral configuration, and wherein the ratchet mechanism comprises:
a toothed (34) element and a pawl (40) configured to engage the toothed element;
a first biasing element (44) coupled to the ratchet mechanism and configured to bias the ratchet mechanism to at least one of the forward, neutral, and reverse configurations;
a second biasing element (56;112) coupled to the ratchet mechanism and configured to bias the ratchet mechanism to at least one of the forward, neutral, and reverse configurations;
a control element (54) coupled to the ratchet mechanism, wherein the control element comprises a recess configured to receive the second biasing element (56); and
a control element retainer comprising first, second and third notches, each of which is configured to engage with the second biasing element, such that engagement of the first notch biases the ratchet mechanism to the forward configuration, engagement of the second notch biases the ratchet mechanism to the neutral configuration, and engagement of the third notch biases the ratchet mechanism to the reverse configuration.

3.3.1. The subject matter of Independent claim 30 is therefore not new.

3.3.2. D1 also discloses the subject matter of dependent claim 31.

3.4. D1 additionally discloses a ratcheting tool comprising:

a tool body (24);

a driven element (32);

a ratchet mechanism (40) coupling the driven element to the tool body, wherein the ratchet mechanism is configured for adjustment between a plurality of a forward configuration, a reverse configuration, and a neutral configuration;

an adjustable first biasing element (44) coupled to the ratchet mechanism and configured to bias the ratchet mechanism to at least one of the forward, reverse, and neutral configurations; and

an adjustable second biasing element (56;112) coupled to the ratchet mechanism and configured to bias the ratchet mechanism to at least one of the forward, reverse, and neutral configurations;

wherein at least one of the first biasing element (44) and the second biasing element (56;112) is configured to bias the ratchet mechanism to the neutral configuration.

3.4.1. The subject matter of Independent claim 35 is therefore not new.

3.4.2. D1 also discloses the subject matter of dependent claims 36, 39 to 42 and 46 to 48.

3.5. In summary, D1 discloses the features of claims 1 to 3, 5, 6, 8 to 11, 15 to 17, 27, 30 to 33, 35, 36, 39 to 42 and 46 to 48.

4. Other documents cited in the search report also show tools having the features of the independent claims but operating in different manners such that they are relevant for further dependent claims, this resulting from the broad terminology used in the independent claims.

4.1. The applicant's attention is drawn therefore inter alia to:

D2, wherein as per one embodiment of the current application, the biasing elements (18) are acting in parallel rather than in series and subsequently disclose the features of dependent claim 4 and the handle is adjustable as per claim 34

D3, wherein there are two biasing elements (76) which act on pawls (58) which are internal to a toothed wheel (12) as per dependent claim 7, the spring (77) bears indirectly against

**WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING
AUTHORITY (SEPARATE SHEET)**

International application No.

PGT/US2005/031726

notches (78) as per claim 12 and has studs and/or sockets as per claim 14, D4, wherein the control means (3) shifts longitudinally to contact the driven element (2) with one of two ratchet means (4,5) in one of three configurations, which control means has a second biasing means (col. 5, lines 15 to 24). This document also shows the arrangement according to dependent claim 20 such that this subject matter is not new. D5, wherein a spring (50) acts against a pawl (30) as per claim 28 and the tool has studs and/or sockets as per claim 45

5. The plurality of embodiments and independent claims is such that it is not possible to identify which combination of features would involve an inventive step which unites all embodiments. As such no inventive step can be recognised in the features of the remaining dependent claims (13, 18, 19, 21 to 26, 29, 38, 43, 44 and 49) which appear merely to be normal design options which the skilled person would employ when appropriate.

Industria y Comercio
SUPERINTENDENCIA

REQUISITOS MINIMOS PARA ADMISION A TRAMITE

PCT

PATENTE DE INVENCION

☒

MODELO DE UTILIDAD

☐

- ◆ Indicación de que se solicita la concesión de una patente ☒
- ◆ Datos de identificación del solicitante o de la persona que presenta la solicitud ☒
- ◆ Descripción de la invención ☒
- ◆ Dibujos de ser estos pertinentes ☒
- ◆ Comprobante de pago de las tasas establecidas ☒

COMPLETA

☒

INCOMPLETA

☐

DISEÑO INDUSTRIAL

☐

- ◆ Indicación de que se solicita el registro de Diseño Industrial ☐
- ◆ Datos de identificación del solicitante o de la persona que presenta la solicitud ☐
- ◆ Representación gráfica y fotográfica del Diseño Industrial o muestra del material que incorpora el diseño ☐
- ◆ Comprobante de pago de las tasas establecidas ☐

COMPLETA

☐

INCOMPLETA

☐

ESQUEMA DE TRAZADO

☐

- ◆ Indicación de que se solicita el registro de un Esquema de Trazado ☐
- ◆ Datos de identificación del solicitante o de la persona que presenta la solicitud ☐
- ◆ Representación gráfica del esquema trazado ☐
- ◆ Comprobante de pago de las tasas establecidas ☐

COMPLETA

☐

INCOMPLETA

☐

Firma Responsable

Fecha

Carrera 13 No. 27-00 Piso 5, 7 y 10
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REPUBLICA DE COLOMBIA
SUPERINTENDENCIA DE INDUSTRIA Y COMERCIO

Bogotá,
2020

Doctor(a)
CADENA SARMIENTO JUAN PABLO

REFERENCIA	Radicación No.	7 30616
	Solicitud internacional	PCT/US2005/031726
	Fecha inicio fase nacional	28/04/2007
	Trámite	11
	Evento	379
	Actuación	430
	Oficio No.	5771

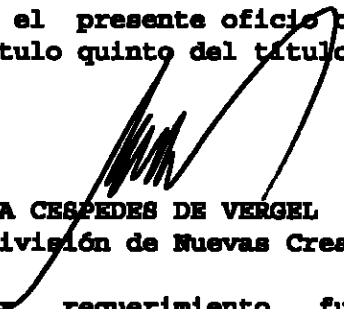
Como resultado del examen de forma, realizado con fundamento en el artículo 38 de la Decisión 486 de la Comisión de la Comunidad Andina, artículo 27 del Tratado de Cooperación en Materia de Patentes (PCT), regla 51 bis del Reglamento y Circular Única de la Superintendencia de Industria y Comercio, se le comunica que:

1. La solicitud no contiene la copia del documento en que consta la cesión del derecho a la patente del inventor al solicitante o a su causante. (Art. 26-k) Decisión 486.

2. La solicitud no contiene el poder debidamente otorgado, con el lleno de los requisitos exigidos por los artículos 63 y subsiguientes del Código de Procedimiento Civil. Adicionalmente, deberá presentar el documento que acredita la existencia y representación legal de la sociedad solicitante, cuando ésta fuere persona jurídica.

En cumplimiento de lo dispuesto por el artículo 39 de la Decisión 486, se le requiere para que dentro del término de dos meses siguientes a la fecha de notificación del presente oficio, complete los requisitos anteriormente enunciados. En caso de no dar cumplimiento al presente requerimiento, la solicitud se considerará abandonada y perderá su prelación.

Notifíquese el presente oficio conforme a lo dispuesto en el numeral 5.2, literal e), del capítulo quinto del título primero de la Circular Única No.10 de 2001.


ALIX CARMONA CESPÉDES DE VERGEL
Jefe de la división de Nuevas Creaciones

El anterior requerimiento fue notificado por fijación en lista de fecha 11 MAYO 2007
adpall