

PATENT COOPERATION TREATY

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

PCT

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(PCT Rule 71.1)

To:

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Date of mailing
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29.06.2023

Applicant's or agent's file reference
302095

IMPORTANT NOTIFICATION

International application No.
PCT/EP2022/057545

International filing date (day/month/year)
22.03.2022

Priority date (day/month/year)
22.03.2021

Applicant
Metalogenia Research & Technologies S.L.

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 inventions 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 international
preliminary examining authority:

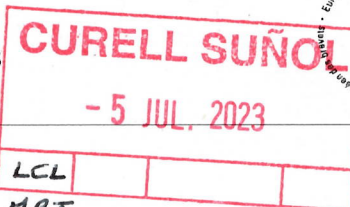


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PATENT COOPERATION TREATY

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 302095	FOR FURTHER ACTION		See Form PCT/IPEA/416
International application No. PCT/EP2022/057545	International filing date (day/month/year) 22.03.2022	Priority date (day/month/year) 22.03.2021	
International Patent Classification (IPC) or national classification and IPC INV. E02F9/28			
Applicant Metalogenia Research & Technologies S.L.			
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>7</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 <u>30</u> sheets, as follows: ☒ sheets of the description, claims and/or drawings which have been amended and/or sheets containing rectifications authorized by this Authority, unless those sheets were superseded or cancelled, and any accompanying letters (see Rules 46.5, 66.8, 70.16, 91.2, and Section 607 of the Administrative Instructions). ☐ sheets containing rectifications, where the decision was made by this Authority not to take them into account because they were not authorized by or notified to this Authority at the time when this Authority began to draw up this report, and any accompanying letters (Rules 66.4bis, 70.2(e), 70.16 and 91.2). ☐ superseded sheets and any accompanying letters, where this Authority either considers that the superseding sheets contain an amendment that goes beyond the disclosure in the international application as filed, or the superseding sheets were not accompanied by a letter indicating the basis for the amendments in the application as filed, as indicated in item 4 of Box No. I and the Supplemental Box (see Rule 70.16(b)). b. ☐ (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing, in the form of an Annex C/ST.25 text file, as indicated in the Supplemental Box Relating to Sequence Listing (see paragraph 3ter of Annex C 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 17.01.2023		Date of completion of this report 29.06.2023	
Name and mailing address of the international preliminary examining authority:  European Patent Office P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Fax: +31 70 340 - 3016		Authorized officer Lantsheer, Martijn Telephone No. +31 70 340-4098	



INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.
PCT/EP2022/057545

Box No. I 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 , which is the language of a translation furnished for the purposes of:
 - ☐ international search (under Rules 12.3(a) 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) and (b))
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*):

Description, Pages

1-42 as originally filed

Claims, Numbers

1-93 filed in electronic form on

28-04-2023

Drawings, Sheets

1/10-10/10 as originally filed

- ☐ a sequence listing - see Supplemental Box Relating to Sequence Listing.
3. ☐ The amendments have resulted in the cancellation of:
- ☐ the description, pages
 - ☐ the claims, Nos.
 - ☐ the drawings, sheets/figs
 - ☐ the sequence listing (*specify*):
4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since either they are considered to go beyond the disclosure as filed, or they were not accompanied by a letter indicating the basis for the amendments in the application as filed, as indicated in the Supplemental Box (Rules 70.2(c) and (c-bis)):
- ☐ the description, pages
 - ☐ the claims, Nos.
 - ☐ the drawings, sheets/figs
 - ☐ the sequence listing (*specify*):
5. ☐ This report has been established:
- ☐ taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rules 66.1(d-bis) and 70.2(e)).
 - ☐ without taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91(Rules 66.4bis and 70.2(e)).

**INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY**

International application No.
PCT/EP2022/057545

6. ☒ With regard to top-up searches (Rules 66.1 *ter* and 70.2(f)):
- ☒ A top-up search was carried out by this Authority on 25.05.2023 (all discovered documents are listed in the Supplemental Box Relating to Top-up Search).
 - ☐ Additional relevant documents have been discovered during the top-up search.
 - ☐ No top-up search was carried out by this Authority because it would serve no useful purpose.
7. ☐ Supplementary international search report(s) from Authority(ies) has/have been received and taken into account in establishing this report (Rule 45bis.8(b) and (c)).

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

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

1. Statement

Novelty (N)	Yes: Claims	<u>1-93</u>
	No: Claims	
Inventive step (IS)	Yes: Claims	<u>1-93</u>
	No: Claims	
Industrial applicability (IA)	Yes: Claims	<u>1-93</u>
	No: Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

Re Item V

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

1 Reference is made to the following documents:

D1 EP 1 630 426 A2 (NEWFREY LLC [US]) 1 March 2006
(2006-03-01)

D2 US 3 997 989 A (STEPE VISVALDIS A) 21 December 1976
(1976-12-21)

1.1 The present application meets the criteria of Article 33(2) PCT, because the subject-matter of claim 1 is considered new and inventive.

D2 discloses:

a wear assembly of an earth moving machine comprising a wear element (3) and a pin (10), said wear element comprising a cavity (7) where, in an assembled position in which said wear element is assembled on a support element, a nose (Fig. 3) present in said support element is housed in said cavity, where said cavity is demarcated by side walls with two openings (5/6) arranged in two of said side walls opposite one another (Fig. 3), and are aligned with one another and aligned, in said assembled position, with a through nose opening arranged in said nose (Figs.), where said openings and said nose opening are suitable for housing therein said pin (Fig. 3) fixing said wear element in said nose (4) in the assembled position, where the openings define a longitudinal axis, where said longitudinal axis has a direction of insertion corresponding to the direction in which said pin is introduced in the openings to achieve said assembled position (Fig. 3), where said pin defines a longitudinal axis of the pin and has a first end (Fig. 3) with actuation means (tapered end of the pin) suitable for rotating said pin according to its longitudinal axis, and a second end, opposite said first end, where, in said assembled position, said first end is housed in one of said openings, referred to as inlet opening (e.g. 6, Fig. 3), which is a through opening, and said second end is housed in the other one of said through openings (Fig. 3), referred to as outlet opening (e.g. 5, Fig. 3), ~~characterized in that:~~

wherein said wear element comprises a retainer (20/22) fixed to the inner face of the side wall comprising said outlet opening (Fig. 3), said retainer being formed from a sheet material (22 is a washer) comprising a perimeter segment fixed to said inner face in a perimeter region of the outlet opening (Fig. 3), ~~and a~~

~~flexible flange joined at one end to said perimeter segment (2) and extending towards said outlet opening (21), where the free end (4) of said flexible flange (3) is inside said outlet opening (21),~~

and in that

said pin has a fixing region (8/9/14, Fig. 2), where said fixing region coincides, in the direction of the longitudinal axis, with said outlet opening (e.g. Fig. 3) in said assembled position, where said fixing region has a blocking segment (14)

having a step,

where the riser of said step is oriented towards said first end (Fig. 2) ~~and houses said free end of said flexible flange~~, thereby blocking the axial movement of said pin in the direction opposite the direction of insertion (via retainer 20),

said fixing region also comprising an unblocking segment (rounded part between ridges 14) arranged at the same distance as the blocking segment, in the direction of said longitudinal axis of the pin, with respect to said first end, said unblocking segment being displaced angularly, according to a rotation of said longitudinal axis of the pin, with respect to said blocking segment, where said unblocking segment does not have said step but rather has a smooth segment, in which the side surface of the pin extends continuously to the end of the second end (turning the pin onto the rounded section such that retainer does not prevent pin from coming out).

- 1.1.1 Claim 1 distinguishes over D2 in that it comprises a flexible flange joined at one end to said perimeter segment and extending towards said outlet opening, where the free end of said flexible flange is inside said outlet opening and the free end is housed in the step.
- 1.1.2 The problem to be solved can be considered to provide an alternative pin retention.
- 1.1.3 From a general working principle D2 is very close to the invention, however, the use a sheet material with flexible flange in the opening does not seem evident to apply when starting from D2. D2 based on different principle, in essence a sort of paper clip retainer. As a result the claimed invention is considered to be inventive alternative to D2.
- 1.1.4 For a similar reason as claim 1, mutatis mutandis, the subject matter of independent claim **13, 25, 35** is also considered to involve an inventive step over D2

- 2 The present application further meets the criteria of Article 33(1) PCT, because the subject-matter of claim 47 is considered new and inventive in the sense of Article 33(2) PCT.

D1 discloses:

a retainer (2, Figs. 1-5) suitable for blocking a pin (1), <said pin being suitable (suitable for indeed) for fixing a wear element in a support element of an earth moving machine, said wear element comprising a cavity where, in an assembled position in which said wear element is assembled on said support element, a nose present in said support element is housed in said cavity, where said cavity is demarcated by side walls with at least one through opening arranged in one of said side walls, where said nose has a nose opening which, in said assembled position, is aligned with said through opening of said wear element, where, in said assembled position said pin is housed in said through opening (Fig. 1/2) and said nose opening, where said through opening defines a longitudinal axis, said longitudinal axis having a direction of insertion corresponding to the direction in which said pin is introduced in said through opening to achieve said assembled position>,*
said retainer is formed from a sheet material (Fig. 5) comprising a perimeter segment (17), where said perimeter segment extends forming a closed perimeter frame (square base frame Figs. 1-5), <suitable for being fixed to a perimeter region of said through opening or of said nose opening>, and a flexible flange (18) joined at one end to said perimeter segment, ~~where said flange extends towards the inside of said frame~~ and is <suitable for extending towards said through opening or said nose opening>*, where the free end of the flexible flange is <suitable for staying shifted forward (Figs. 1-5), according to said direction of insertion, with respect to said perimeter segment>*,*
~~*characterized in that, wherein said perimeter segment (17) has first snap-fitting means (15 one side) suitable for being assembled on second snap-fitting means (15 other side) present in said perimeter region of said opening, thereby fixing said retainer to said perimeter region in the longitudinal direction of the longitudinal axis and in that said retainer has two flanges, arranged in opposite regions of said closed perimeter frame, said flanges being joined to said closed perimeter frame and extending towards the inside of said closed perimeter frame, where the free ends of both flexible flanges are suitable for staying shifted forward, according to said direction of insertion, with respect to said closed perimeter frame.*~~

<>*: It is noted that none of the technical features mentioned are not part of the scope of the claims, they are just to be suitable for this arrangement, being a common arrangement e.g. as seen in D2. Hence it is considered that the retainer in D1 is suitable for this arrangement in D2.

- 2.1 Claim 1 distinguishes over D1 in that said flange extends towards the inside of said frame in combination with the snap-fitting means being present in the opposite perimeter region to fix the retainer to the perimeter region.
- 2.2 The problem to be solved can be considered to allow for better mounting properties in the application area of earth moving machines.
- 2.3 The retainer of D1 has the snap fitting on the inside and uses the flanges on the outer edged flanges as a sort of leaf spring. Hence, compared to the invention, these two are switched around. In view of its intended use of the retainer of the invention, it appears the retainer of D1 is therefore not suited for this application, such that claim 1 is considered to be novel and inventive over D1.
- 3 The further remaining claims are considered novel and inventive as already set out in the first opinion in the chapter II phase issued by this authority.

NOTE OF COMMENTS

In reply to the Written Opinion of the International Preliminary Examining Authority of international application PCT/EP2022/057545, of past 2.03.2023, applicant's reference 302095, the applicant wishes to make the following comments:

1 – NEW SET OF CLAIMS

The applicant files a new set of claims (in two versions, one marked and one clean) in which the following changes have been made (basis for the amendment: the set of claims as on file):

1.1 – In independent claim 47, directed to a pin, the technical features of dependent claims 48 and 49 have been added. Therefore, claims 48 and 49 have been deleted.

1.2 – Additionally, in claim 47, the expression “...*in the direction of the longitudinal axis*,...” has been added (lines 28-29 of page 56). Basis for this amendment can be found in page 12, lines 13-15. There it is stated that:

“Preferably, the snap-fitting means fix the retainer not only in the direction of the longitudinal axis but also in two transverse directions, thereby achieving the complete fixing of the retainer.”

Being this a “preferred solution”, it means that in the “basic solution” of the invention the snap-fitting means fix the retainer only in the direction of the longitudinal axis. Therefore, claim 47 (that encompasses all the possible solutions) recites that the snap-fitting means fix the retainer (at least) in the direction of the longitudinal axis. As the claim recites the technical features present in the invention (i.e., it does not exclude the possibility that additional features are present, simply saying that the snap-fitting means fix the retainer in the direction of the longitudinal axis (without the expression “at least”) does not exclude the possibility that it also fix the retained in other directions.

1.3 – Independent claim 89 (new independent claim 87) has been merged with dependent claim 90, so that it now directly refers to the retainer of new claim 47.

1.4 – The remaining claims have been renumbered and the dependencies have been formally adjusted.

2 – NOVELTY AND INVENTIVE STEP

2.1 – The applicant has amended claim 47 so that it includes the features represented in the embodiment of Figs. 2-4 of the application. The applicant understands that now new claim is novel and inventive.

2.2 – Claims 75 and 79 refer directly to the retainer of new claim 47.

2.3 – Claim 89 (new claim 87) now refers also directly to the retainer of new claim 47.

3 - The applicant understands that, with these arguments and the new set of claims, present international application deserves a favourable opinion in the preliminary examination. Failing such, the Examiner is requested, pursuant to Rule 66.4-b, to authorise the applicant to file additional amendments or arguments.

4 - If the Examiner deems it desirable, he can call the applicant's attorney, Mr. Santiago Jordá, on the telephone number 34-93-487-5166 (or by email: mail@curell.com) in order to have an informal interview, should further clarifications be deemed necessary.

CLAIMS

1. A wear assembly of an earth moving machine comprising a wear element (16) and a pin (7), said wear element (16) comprising a cavity (17) where, in an assembled position in which said wear element (16) is assembled on a support element, a nose (19) present in said support element is housed in said cavity (17), where said cavity (17) is demarcated by side walls (18) with two openings arranged in two of said side walls (18) opposite one another, and are aligned with one another and aligned, in said assembled position, with a through nose opening (25) arranged in said nose (19), where said openings and said nose opening (25) are suitable for housing therein said pin (7) fixing said wear element (16) in said nose (19) in the assembled position, where the openings define a longitudinal axis, where said longitudinal axis has a direction of insertion corresponding to the direction in which said pin (7) is introduced in the openings to achieve said assembled position, where said pin (7) defines a longitudinal axis of the pin (7) and has a first end (8) with actuation means (11) suitable for rotating said pin (7) according to its longitudinal axis, and a second end (10), opposite said first end (8), where, in said assembled position, said first end (8) is housed in one of said openings, referred to as inlet opening (20), which is a through opening, and said second end (10) is housed in the other one of said through openings, referred to as outlet opening (21),

characterized in that:

said wear element (16) comprises a retainer (1) fixed to the inner face of the side wall comprising said outlet opening (21), said retainer (1) being formed from a sheet material comprising a perimeter segment (2) fixed to said inner face in a perimeter region of the outlet opening (21), and a flexible flange (3) joined at one end to said perimeter segment (2) and extending towards said outlet opening (21), where the free end (4) of said flexible flange (3) is inside said outlet opening (21),

and in that

said pin (7) has a fixing region (12), where said fixing region (12) coincides, in the direction of the longitudinal axis, with said outlet opening (21) in said assembled position, where said fixing region (12) has a blocking segment (13) having a step, where the riser (15) of said step is oriented towards said first end (8) and houses said free end (4) of said flexible flange (3), thereby blocking the axial movement of said pin (7) in the direction opposite the direction of insertion,

said fixing region (12) also comprising an unblocking segment arranged (14) at the same distance as the blocking segment, in the direction of said longitudinal axis of the pin (7), with respect to said first end (8), said unblocking segment (14) being displaced angularly, according to a rotation of said longitudinal axis of the pin (7), with respect to said blocking segment (13), where said unblocking segment (14) does not have said step but rather has a smooth segment, in which the side surface of the pin (7) extends continuously to the end of the second end (10).

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2. The wear assembly according to claim 1, characterized in that said perimeter segment (2) of said retainer (1) extends forming a closed perimeter frame (5) completely bordering said outlet opening (21).

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3. The assembly according to claim 2, characterized in that said retainer (1) has two flexible flanges (3) arranged in opposite regions of said closed perimeter frame (5) and joined to said closed perimeter frame (5) and extending towards said outlet opening (21), where the free end (4) of both flexible flanges (3) is inside said outlet opening (21), and in that said fixing region (12) of said pin (7) has two blocking segments (13) arranged at the same distance, in the direction of the longitudinal axis of the pin (7), with respect to said first end (8) and arranged on circumferentially opposite sides, where each blocking segment (13) has a step, where the riser (15) of each step is oriented towards said first end (8) and is suitable for housing the free end (4) of one of said flexible flanges (3) of the retainer (1), thereby blocking the axial movement of the second end (10) in the direction opposite said direction of insertion, said fixing region (12) also comprising two unblocking segments (14) arranged at the same distance as said blocking segments (13), in the direction of said longitudinal axis of the pin (7), with respect to said first end (8), said unblocking segments (14)

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being displaced angularly, according to a rotation of said longitudinal axis of the pin (7), with respect to said blocking segments (13), where said unblocking segments (14) do not have said step but rather have a smooth segment, in which the side surface of the pin (7) extends continuously to the end of the second end (10).

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4. The assembly according to any one of claims 1 to 3, characterized in that said retainer (1) is metallic and is preferably made of austenitic stainless steel.

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5. The assembly according to any one of claims 1 to 4, characterized in that said retainer (1) is attached to said wear element (16) by means of welding.

6. The assembly according to any one of claims 1 to 3, characterized in that said retainer (1) is made of plastic.

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7. The assembly according to any one of claims 1 to 4 or 6, characterized in that said perimeter segment (2) has first snap-fitting means (6) and said inner face of the side wall has second corresponding snap-fitting means (22), where said first snap-fitting means (6) are suitable for being assembled on said second snap-fitting means (22), thereby fixing said retainer (1) to said inner face.

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8. The assembly according to any one of claims 1 to 7, characterized in that said inner face of said side wall has a recess (23) in which said perimeter segment (2) is housed.

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9. The assembly according to claim 8, characterized in that that said flange (3) defines a flange axis that extends from said end through which the flange (3) is joined to said perimeter segment (2) to said free end (4), the projection of said flange axis in a plane comprising said perimeter segment (2) defines a flange direction, said perimeter segment (2) has an outer perimeter segment edge, said recess (23) has a recess edge, and in that there is a gap, in said flange direction, between said outer perimeter segment edge and said recess edge, so that said flange (3) is able to be moved according to said flange direction within said recess (23).

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10. The assembly according to any one of claims 1 to 9, characterized in that the side wall with the inlet opening (20) has, on its outer face, a recess extending to said inlet opening (20), suitable for housing therein a stop (9) arranged at the first end (8) of said pin (7).

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11. The assembly according to any one of claims 1 to 10, characterized in that said flange (3) defines a flange axis that extends from said end through which the flange (3) is joined to said perimeter segment (2) to said free end (4), the projection of said flange axis in a plane comprising said perimeter segment (2) defines a flange direction, where, in said assembled position, the distance, in direction of said flange direction, between said free end (4) and said pin (7) is greater than the distance, in direction of said flange direction, between said pin (7) and a contact point (27) present in said perimeter segment (2), so that, in a relative movement between said pin (7) and said retainer (1) according to said flange direction, the pin (7) contacts said contact point (27) before contacting said free end (4).

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12. The assembly according to claim 11, characterized in that, in said assembled position, said perimeter segment (2) and said pin (7) are in contact through at least two pairs of blocking points (28), where one of said pair of blocking points (28) blocks the relative movement between said retainer (1) and said pin (7) in one sense according to a direction in said plane comprising said perimeter segment (2) and perpendicular to said flange direction, and the other pair of blocking points (28) blocks the relative movement between said retainer (1) and said pin (7) in the opposite sense.

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13. An earth moving machine comprising a support element with a nose (19) suitable for having a wear element (16) assembled thereon by means of a pin (7), said wear element (16) comprising a cavity (17) where, in an assembled position in which said wear element (16) is assembled on said support element, said nose (19) is housed in said cavity (17), where said cavity (17) is demarcated by side walls (18) with at least one through opening arranged in one of said side walls (18), where said nose (19) has a nose opening (25) which, in said assembled position, is aligned with said through opening of said wear element (16), where, in said assembled position said

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pin (7) is housed in said through opening and said nose opening (25), where said nose opening (25) defines a longitudinal axis, said longitudinal axis having a direction of insertion corresponding to the direction in which said pin (7) is introduced in said through opening to achieve said assembled position,

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characterized in that:

it comprises a retainer (1) which is formed from a sheet material comprising a perimeter segment (2), fixed to a perimeter region of said nose opening (25) and a flexible flange (3) joined at one end to said perimeter segment (2) and extending
10 towards the inside of said nose opening (25).

14. The machine according to claim 13, characterized in that said perimeter segment (2) of said retainer (1) extends forming a closed perimeter frame (5) completely
15 bordering said nose opening (25).

15. The machine according to claim 14, characterized in that said retainer (1) has two flexible flanges (3) arranged in opposite regions of said closed perimeter frame (5), said flanges being joined to said closed perimeter frame (5) and both extending
20 towards said nose opening (25), where the free ends (4) of both flexible flanges (3) are inside said nose opening (25).

16. The machine according to any one of claims 13 to 15, characterized in that said retainer (1) is metallic and is preferably made of austenitic stainless steel.
25

17. The machine according to any one of claims 13 to 15, characterized in that said retainer (1) is made of plastic.

18. The machine according to any one of claims 13 to 17, characterized in that said perimeter segment (2) of said retainer (1) has first snap-fitting means (6) suitable for
30 being assembled on second snap-fitting means (22) present in said perimeter region of said nose opening (25), thereby fixing said retainer (1) to said perimeter region.

19. The machine according to any one of claims 13 to 18, characterized in that said perimeter region of said nose opening (25) has a recess (23) in which said perimeter segment (2) is housed.

5 20. The machine according to claim 19, characterized in that that said flange (3) defines a flange axis that extends from said end through which the flange (3) is joined to said perimeter segment (2) to said free end (4), the projection of said flange axis in a plane comprising said perimeter segment (2) defines a flange direction, said perimeter segment (2) has an outer perimeter segment edge, said recess (23) has a
10 recess edge, and in that there is a gap, in said flange direction, between said outer perimeter segment edge and said recess edge, so that said flange (3) is able to be moved according to said flange direction within said recess (23).

21. The machine according to any one of claims 13 to 20, characterized in that it
15 comprises said pin (7), where said pin (7) defines a longitudinal axis of the pin (7) and has a first end (8) with actuation means (11) suitable for rotating said pin (7) according to its longitudinal axis, and a second end (10), opposite said first end (8), where, in said assembled position, said first end (8) is housed in said through opening and said second end (10) is housed in said nose opening (25), where said pin (25) has a fixing
20 region (12), where said fixing region (12) coincides, in the direction of said longitudinal axis, with the beginning of said nose opening (25) in said assembled position, where said fixing region (12) has a blocking segment (13) having a step, where the riser (15) of said step is oriented towards the first end (8) and houses the free end (4) of said flexible flange (3) of said retainer (1), thereby blocking the axial movement of said pin
25 (7) in the direction opposite the direction of insertion, said fixing region (12) also comprising an unblocking segment (14) arranged at the same distance as said blocking segment (13), in the direction of said longitudinal axis of the pin (7), with respect to said first end (8), said unblocking segment (14) being displaced angularly, according to a rotation of said longitudinal axis of the pin (7), with respect to said
30 blocking segment (13), where said unblocking segment (14) does not have said step but rather has a smooth segment, in which the side surface of the pin (7) extends continuously to the end of the second end (10).

22. The machine according to claim 21, characterized in that said retainer (1) has two flexible flanges (3) arranged in opposite regions of said closed perimeter frame (5) and joined to said closed perimeter frame (5) and extending towards said nose opening (25), where the free end (4) of both flexible flanges (3) is inside said nose opening (25), and in that said fixing region (12) of said pin (7) has two blocking segments (13) arranged at the same distance, in the direction of said longitudinal axis of the pin (7), with respect to said first end (8) and arranged on circumferentially opposite sides, where each blocking segment (13) has a step, where the riser (15) of each step is oriented towards said first end (8) and is suitable for housing the free end (4) of one of the flexible flanges (3) of the retainer (1), thereby blocking the axial movement of said second end (10) in the direction opposite said direction of insertion, said fixing region (12) also comprising two unblocking segments (14) arranged at the same distance as said blocking segments (13), in the direction of said longitudinal axis of the pin (7), with respect to said first end (8), the unblocking segments (14) being displaced angularly, according to a rotation of said longitudinal axis of the pin (7), with respect to said blocking segments (13), where the unblocking segments (14) do not have said step but rather have a smooth segment, in which the side surface of the pin (7) extends continuously to the end of the second end (10).

23. The machine according to any one of claims 21 or 22, characterized in that said flange (3) defines a flange axis that extends from said end through which the flange (3) is joined to said perimeter segment (2) to said free end (4), the projection of said flange axis in a plane comprising said perimeter segment (2) defines a flange direction, where, in said assembled position, the distance, in direction of said flange direction, between said free end (4) and said pin (7) is greater than the distance, in direction of said flange direction, between said pin (7) and a contact point (27) present in said perimeter segment (2), so that, in a relative movement between said pin (7) and said retainer (1) according to said flange direction, the pin (7) contacts said contact point (27) before contacting said free end (4).

24. The machine according to claim 23, characterized in that, in said assembled position, said perimeter segment (2) and said pin (7) are in contact through at least two pairs of blocking points (28), where one of said pair of blocking points (28) blocks

the relative movement between said retainer (1) and said pin (7) in one sense according to a direction in said plane comprising said perimeter segment (2) and perpendicular to said flange direction, and the other pair of blocking points (28) blocks the relative movement between said retainer (1) and said pin (7) in the opposite sense.

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25. A wear element (16) of an earth moving machine, said wear element (16) comprising a cavity (17) where, in an assembled position in which said wear element (16) is assembled on a support element, a nose (19) present in said support element is housed in said cavity (17), where said cavity (17) is demarcated by side walls (18) with a through opening arranged in one of said side walls (18), which is aligned, in said assembled position, with a nose opening (25) arranged in said nose (19), where said through opening and said nose opening (25) are suitable for housing therein a pin (7) suitable for fixing said wear element (16) in said nose (19) in said assembled position, where said through opening defines a longitudinal axis, where said longitudinal axis has a direction of insertion corresponding to the direction in which said pin (7) is introduced in said through opening to achieve said assembled position, where said pin (7) defines a longitudinal axis of the pin (7) and has a first end (8) with actuation means (11) suitable for rotating the pin (7) according to its longitudinal axis, and a second end (10), opposite said first end (8), where, in said assembled position, said first end (8) is housed in said through opening, referred to as inlet opening (20), and said second end (10) is housed inside said nose opening (25),

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characterized in that:

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said wear element (16) comprises a retainer (1) fixed to the inner face of the side wall comprising said inlet opening (20), said retainer (1) being formed from a sheet material comprising a perimeter segment (2), fixed to said inner face in a perimeter region of said inlet opening (20), and a flexible flange (3) joined at one end to said perimeter segment (2) and extending towards said nose opening (25), where the free end (4) of the flexible flange (3) stays shifted forward, according to said direction of insertion, with respect to said perimeter segment (2).

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26. The wear element (16) according to claim 25, characterized in that said perimeter segment (2) of said retainer (1) extends forming a closed perimeter frame (5) completely bordering said inlet opening (20).

5 27. The wear element (16) according to claim 26, characterized in that said retainer (1) has two flexible flanges (3) arranged in opposite regions of said closed perimeter frame (5) and joined to said closed perimeter frame (5) and extending towards said nose opening (25), where the free end of both flexible flanges (3) stays shifted forward, according to said direction of insertion, with respect to said perimeter
10 segment (2).

28. The wear element (16) according to any one of claims 25 to 27, characterized in that said retainer (1) is metallic and is preferably made of austenitic stainless steel.

15 29. The wear element (16) according to any one of claims 25 to 28, characterized in that said retainer (7) is attached to said wear element (16) by means of welding.

30. The wear element (16) according to any one of claims 25 to 27, characterized in that said retainer (1) is made of plastic.

20 31. The wear element (16) according to any one of claims 25 to 28 or 30, characterized in that said perimeter segment (2) has first snap-fitting means (6) and said inner face of the side wall has second corresponding snap-fitting means (22), where said first snap-fitting means (6) are suitable for being assembled on said
25 second snap-fitting means (22), thereby fixing said retainer (1) to said inner face.

32. The wear element (16) according to any one of claims 25 to 31, characterized in that said inner face of said side wall has a recess (23) suitable for housing therein said perimeter segment (2).

30 33. The wear element according to claim 32, characterized in that that said flange (3) defines a flange axis that extends from said end through which the flange (3) is joined to said perimeter segment (2) to said free end (4), the projection of said flange axis

in a plane comprising said perimeter segment (2) defines a flange direction, said perimeter segment (2) has an outer perimeter segment edge, said recess (23) has a recess edge, and in that there is a gap, in said flange direction, between said outer perimeter segment edge and said recess edge, so that said flange (3) is able to be moved according to said flange direction within said recess (23).

34. The wear element (16) according to any one of claims 25 to 33, characterized in that the side wall with said inlet opening (20) has, on its outer face, a recess extending to said inlet opening (20), suitable for housing therein a stop (9) arranged at the first end (8) of said pin (7).

35. A wear assembly of an earth moving machine comprising a wear element (16) and a pin (7), said wear element (16) comprising a cavity (17) where, in an assembled position in which said wear element (16) is assembled on a support element, a nose (19) present in said support element is housed in said cavity (17), where said cavity (17) is demarcated by side walls (18) with a through opening arranged in one of said side walls (18), which is aligned, in said assembled position, with a nose opening (25), arranged in said nose (19), where said through opening and said nose opening (25) are suitable for housing therein said pin (7) fixing said wear element (16) in said nose (19) in said assembled position, where said through opening defines a longitudinal axis, where said longitudinal axis has a direction of insertion corresponding to the direction in which said pin (7) is introduced in said through opening to achieve said assembled position, where said pin (7) defines a longitudinal axis of the pin (7) and has a first end (8) with actuation means (11) suitable for rotating said pin (7) according to its longitudinal axis, and a second end (10), opposite said first end (8), where, in said assembled position, said first end (8) is housed in said through opening, referred to as inlet opening (20), and said second end (10) is housed inside said nose opening (25),

characterized in that:

said wear element (16) comprises a retainer (1) fixed to the inner face of the side wall (18) comprising said inlet opening (20), said retainer (1) being formed from a sheet

material comprising a perimeter segment (2) fixed to said inner face in a perimeter region of said inlet opening (20), and a flexible flange (3) joined at one end to said perimeter segment (2) and extending towards said nose opening (25), where the free end (4) of said flexible flange (3) stays shifted forward, according to said direction of insertion, with respect to said perimeter segment (2),

and in that

said pin (7) has a fixing region (12), where said fixing region (12) coincides, in the direction of said longitudinal axis, with said inlet opening (20) in said assembled position, where said fixing region (12) has a blocking segment (13) having a step, where the riser (15) of said step is oriented towards said first end (8) and houses said free end (4) of said flexible flange (3), thereby blocking the axial movement of said pin (7) in the direction opposite said direction of insertion, said fixing region (12) also comprising an unblocking segment (14) arranged at the same distance as said blocking segment (13), in the direction of said longitudinal axis of the pin (7), with respect to said first end (8), said unblocking segment (14) being displaced angularly, according to a rotation of said longitudinal axis of the pin (7), with respect to said blocking segment (13), where said unblocking segment (14) does not have said step but rather has a smooth segment, in which the side surface of the pin (7) extends continuously to the end of said second end (10).

36. The wear assembly according to claim 35, characterized in that said perimeter segment (2) of said retainer (1) extends forming a closed perimeter frame (5) completely bordering said outlet opening (21).

37. The assembly according to claim 36, characterized in that said retainer (1) has two flexible flanges (3) arranged in opposite regions of said closed perimeter frame (5) and joined to said closed perimeter frame (5) and extending towards said nose opening (25), where the free (4) end of both flexible flanges (3) stays shifted forward, according to said direction of insertion, with respect to said perimeter segment (2), and in that said fixing region (12) of said pin (7) has two blocking segments (13) arranged at the same distance, in the direction of said longitudinal axis of the pin (7),

with respect to said first end (8) and arranged on circumferentially opposite sides, where each blocking segment (13) has a step, where the riser (15) of each step is oriented towards said first end (8) and is suitable for housing the free end (4) of one of the flexible flanges (3) of said retainer (1), thereby blocking the axial movement of said second end (10) in the direction opposite said direction of insertion, said fixing region (12) also comprising two unblocking segments (14) arranged at the same distance as the blocking segments, in the direction of said longitudinal axis of the pin (7), with respect to said first end (8), said unblocking segments (14) being displaced angularly, according to a rotation of said longitudinal axis of the pin (7), with respect to said blocking segments (13), where said unblocking segments (14) do not have said step but rather have a smooth segment, in which the side surface of the pin (7) extends continuously to the end of said second end (10).

38. The assembly according to any one of claims 35 to 37, characterized in that said retainer (1) is metallic and is preferably made of austenitic stainless steel.

39. The assembly according to any one of claims 35 to 38, characterized in that said retainer (1) is attached to said wear element (16) by means of welding.

40. The assembly according to any one of claims 35 to 37, characterized in that said retainer (1) is made of plastic.

41. The assembly according to any one of claims 35 to 38 or 40, characterized in that said perimeter segment (2) has first snap-fitting means (6) and said inner face of the side wall (18) has second corresponding snap-fitting means (22), where said first snap-fitting means (6) are suitable for being assembled on said second snap-fitting means (22), thereby fixing said retainer (1) to said inner face.

42. The assembly according to any one of claims 35 to 41, characterized in that said inner face of said side wall (18) has a recess (23) in which said perimeter segment (2) is housed.

43. The wear assembly according to claim 42, characterized in that that said flange (3) defines a flange axis that extends from said end through which the flange (3) is joined to said perimeter segment (2) to said free end (4), the projection of said flange axis in a plane comprising said perimeter segment (2) defines a flange direction, said
5 perimeter segment (2) has an outer perimeter segment edge, said recess (23) has a recess edge, and in that there is a gap, in said flange direction, between said outer perimeter segment edge and said recess edge, so that said flange (3) is able to be moved according to said flange direction within said recess (23).

10 44. The assembly according to any one of claims 35 to 43, characterized in that the side wall (18) with said inlet opening (20) has, on its outer face, a recess extending to said inlet opening (20), suitable for housing therein a stop (9) arranged at the first end (8) of said pin (7).

15 45. The assembly according to any one of claims 35 to 44, characterized in that said flange (3) defines a flange axis that extends from said end through which the flange (3) is joined to said perimeter segment (2) to said free end (4), the projection of said flange axis in a plane comprising said perimeter segment (2) defines a flange direction, where, in said assembled position, the distance, in direction of said flange
20 direction, between said free end (4) and said pin (7) is greater than the distance, in direction of said flange direction, between said pin (7) and a contact point (27) present in said perimeter segment (2), so that, in a relative movement between said pin (7) and said retainer (1) according to said flange direction, the pin (7) contacts said contact point (27) before contacting said free end (4).

25 46. The assembly according to claim 45, characterized in that, in said assembled position, said perimeter segment (2) and said pin (7) are in contact through at least two pairs of blocking points (28), where one of said pair of blocking points (28) blocks the relative movement between said retainer (1) and said pin (7) in one sense
30 according to a direction in said plane comprising said perimeter segment (2) and perpendicular to said flange direction, and the other pair of blocking points (28) blocks the relative movement between said retainer (1) and said pin (7) in the opposite sense.

47. A retainer (1) suitable for blocking a pin (7), said pin (7) being suitable for fixing a wear element (16) in a support element of an earth moving machine, said wear element (16) comprising a cavity (17) where, in an assembled position in which said wear element (16) is assembled on said support element, a nose (19) present in said support element is housed in said cavity (17), where said cavity (17) is demarcated by side walls (18) with at least one through opening arranged in one of said side walls (18), where said nose (19) has a nose opening (25) which, in said assembled position, is aligned with said through opening of said wear element (16), where, in said assembled position said pin (7) is housed in said through opening and said nose opening (25), where said through opening defines a longitudinal axis, said longitudinal axis having a direction of insertion corresponding to the direction in which said pin (7) is introduced in said through opening to achieve said assembled position, where said retainer (1) is formed from a sheet material comprising a perimeter segment (2), where said perimeter segment (2) extends forming a closed perimeter frame (5) and is suitable for being fixed to a perimeter region of said through opening or of said nose opening (25), and a flexible flange (3) joined at one end to said perimeter segment (2), where said flange (3) extends towards the inside of said frame (5) and is suitable for extending towards said through opening or said nose opening (25), where the free end (4) of the flexible flange (3) is suitable for staying shifted forward, according to said direction of insertion, with respect to said perimeter segment (2),

characterized in that

said perimeter segment (2) has first snap-fitting means (6) suitable for being assembled on second snap-fitting means (22) present in said perimeter region of said opening, thereby fixing said retainer (1) to said perimeter region in the direction of the longitudinal axis,

and in that

said retainer (1) has two flanges, arranged in opposite regions of said closed perimeter frame (5), said flanges being joined to said closed perimeter frame (5) and extending towards the inside of said closed perimeter frame (5), where the free ends (4) of both flexible flanges (3) are suitable for staying shifted forward, according to said direction of insertion, with respect to said closed perimeter frame (5).

48. Retainer (1) according to claim 47, characterized in that said retainer (1) is metallic and, preferably, said retainer (1) is made of austenitic stainless steel,

49. Retainer (1) according to claim 47, characterized in that said retainer (1) is made of plastic.

50 – The retainer (1) according to any one of claims 47 to 49, characterized in that said flange (3) has reinforcing means (29).

51. The retainer according to claim 50, characterized in that said reinforcing means (29) is a reinforced region manufactured by deep drawing.

52. The retainer (1) according to any one of claims 47 to 51, characterized in that the flange (3) defines a flange axis that extends from said end through which the flange (3) is joined to said perimeter segment (2) to said free end (4), and in that a section of said flange (3) with any plane parallel to said flange axis and perpendicular to a plane comprising said perimeter segment (2) has a first zone, close to said end through which the flange (3) is joined to said perimeter segment (2), that has a curvature that is convex when seen from said plane comprising said perimeter segment (2), and has a second zone, close to said free end (4), that has a curvature that is concave when seen from said plane comprising said perimeter segment (2).

53. A pin (7) suitable for fixing a wear element (16) in a support element of an earth moving machine, said wear element (16) comprising a cavity (17) where, in an assembled position in which said wear element (16) is assembled on said support element, a nose (19) present in said support element is housed in said cavity (17), where said cavity (17) is demarcated by side walls (18) with at least one through

opening arranged in one of said side walls (18), where said nose (19) has a nose opening (25) which, in said assembled position, is aligned with said through opening of said wear element (16), where, in said assembled position said pin (7) is housed in said through opening and said nose opening (25), where said through opening
5 defines a longitudinal axis, said longitudinal axis having a direction of insertion corresponding to the direction in which said pin (7) is introduced in said through opening to achieve said assembled position, where said pin (7) defines a longitudinal axis of the pin (7) and has a first end (8) with actuation means (11) suitable for rotating the pin (7) according to its longitudinal axis, and a second end (10), opposite said first
10 end (8),

characterized in that:

said pin (7) has a fixing region (12), where said fixing region (12) coincides, in the
15 direction of said longitudinal axis, with said through opening or with the beginning of said nose opening (25) in said assembled position, where said fixing region (12) has a blocking segment having a step, where the riser (15) of said step is oriented towards said first end (8) and is suitable for housing the free end (4) of a flexible flange (3) of a retainer (1), when said retainer (1) is formed from a sheet material comprising a
20 perimeter segment (2) and said flexible flange (3) joined at one end to said perimeter segment (2), said perimeter segment (2) being fixed to a perimeter region of said through opening or of said nose opening (25), and said flexible flange (3) extending towards said through opening or said nose opening (25), where the free end (4) of said flexible flange (3) stays shifted forward, according to said direction of insertion,
25 with respect to said perimeter segment (2), thereby blocking the axial movement of the pin (7) in the direction opposite the direction of insertion, said fixing region (12) also comprising an unblocking segment (14) arranged at the same distance as said blocking segment, in the direction of said longitudinal axis of the pin (7), with respect to said first end (8), said unblocking segment (14) being displaced angularly,
30 according to a rotation of said longitudinal axis of the pin (7), with respect to said blocking segment, where said unblocking segment (14) does not have said step but rather has a smooth segment, in which the side surface of the pin (7) extends continuously to the end of the second end (10)

and in that said actuation means comprise an opening coaxial with the longitudinal axis of the pin and arranged at the first end, where the opening has a non-circular cross-section.

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54. The pin (7) according to claim 53, characterized in that said fixing region (12) has two blocking segments (13) arranged at the same distance, in the direction of said longitudinal axis of the pin (7), with respect to said first end (8) and arranged on circumferentially opposite sides, where each blocking segment (13) has a step, where
10 the riser (15) of each step is oriented towards said first end (8) and is suitable for housing the free end (4) of one of the flexible flanges (3) of a retainer (1), when said retainer (1) has a perimeter segment (2) that extends forming a closed perimeter frame (5) and two flanges arranged in opposite regions of said closed perimeter frame (5), said flanges being joined to said closed perimeter frame (5) and extending
15 towards the inside of said closed perimeter frame (5), said closed perimeter frame (5) being fixed to a perimeter region of said through opening or of said nose opening (25), where the free ends (4) of both flexible flanges (3) are suitable for staying shifted forward, according to said direction of insertion, with respect to said closed perimeter frame (5), thereby blocking the axial movement of the second end (10) in the direction
20 opposite said direction of insertion, said fixing region (12) also comprising two unblocking segments (14) arranged at the same distance as said blocking segments (13), in the direction of said longitudinal axis of the pin (7), with respect to said first end (8), said unblocking segments (14) being displaced angularly, according to a rotation of said longitudinal axis of the pin (7), with respect to said blocking segments (13), where said unblocking segments (14) do not have said step but rather have a
25 smooth segment, in which the side surface of the pin (7) extends continuously to the end of the second end (10).

55. The pin (7) according to one of claims 53 or 54, characterized in that said fixing
30 region (12) is close to said second end (10).

56. The pin (7) according to any one of claims 53 to 55, characterized in that said riser (15) of said step leans against said direction of insertion at an angle greater than

0 degrees, so that an upper end of said riser (15), more separated from said longitudinal axis of the pin (7) than a lower end of said riser (15), is closer to said first end (8) of the pin than said lower end.

5 57. The pin (7) according to claim 56, characterized in that said angle is greater than 2 degrees and, preferably, is greater than 4 degrees.

58 – The pin (7) according to any one of claims 53 to 57, characterized in that said riser (15) has an upper end, more separated from said longitudinal axis of the pin (7)
10 than a lower end of said riser (15), and said blocking segment has a ramp (30), opposed to said riser (15), and a lower portion (31) extending from said lower end of the raiser (15) to a lower end of said ramp (30).

59 – The pin according to claim 58, characterized in that said lower portion (31) is
15 inclined towards said longitudinal axis of the pin (7) so that said lower portion (31) is closer to said longitudinal axis of the pin (7) at said lower end of the raiser (15) than at said lower end of said ramp (30).

60. The pin (7) according to any one of claims 58 or 59, characterized in that said
20 lower portion (31) has a recessed portion (32), closer to said raiser (15) than to said ramp (30), for housing said free end (4) of said flange (3).

61. A wear element (16) of an earth moving machine, said wear element (16) comprising a cavity (17) where, in an assembled position in which said wear element
25 (16) is assembled on a support element, a nose (19) present in said support element is housed in said cavity (17), where said cavity (17) is demarcated by side walls (18) with two openings arranged in two of said side walls (18) opposite one another, which are aligned with one another and aligned, in said assembled position, with a through nose opening (25) arranged in said nose (19), where said openings and said nose
30 opening (25) are suitable for housing therein a pin (7) suitable for fixing said wear element (16) in said nose (19) in said assembled position, where said openings define a longitudinal axis, where said longitudinal axis has a direction of insertion corresponding to the direction in which said pin (7) is introduced in said openings to

achieve said assembled position, where said pin (7) defines a longitudinal axis of the pin (7) and has a first end (8) with actuation means (11) suitable for rotating the pin (7) according to its longitudinal axis, and a second end (10), opposite said first end (8), where, in said assembled position, said first end (8) is housed in one of said openings, referred to as inlet opening (20), which is a through opening, and said second end (10) is housed in the other one of said openings, referred to as outlet opening (21),

characterized in that:

said wear element (16) comprises a retainer (1) fixed to the inner face of the side wall comprising said outlet opening (21), said retainer (1) being formed from a sheet material comprising a perimeter segment (2), fixed to said inner face in a perimeter region of said outlet opening (21), and a flexible flange (3) joined at one end to said perimeter segment (2) and extending towards said outlet opening (21), where the free end (4) of said flexible flange (3) is inside said outlet opening (21).

62. The wear element (16) according to claim 61, characterized in that said perimeter segment (2) of said retainer (1) extends forming a closed perimeter frame (5) completely bordering said outlet opening (21).

63. The wear element (16) according to claim 62, characterized in that said retainer (1) has two flexible flanges (3), arranged in opposite regions of said closed perimeter frame (5) and joined to said closed perimeter frame (5) and extending towards said outlet opening (21), where the free end (4) of both flexible flanges (3) is inside said outlet opening (21).

64. The wear element (16) according to any one of claims 61 to 63, characterized in that said retainer (1) is metallic and is preferably made of austenitic stainless steel.

65. The wear element (16) according to any one of claims 61 to 64, characterized in that said retainer (1) is attached to the wear element (16) by means of welding.

66. The wear element (16) according to any one of claims 61 to 63, characterized in that said retainer (1) is made of plastic.

67. The wear element (16) according to any one of claims 61 to 64 or 66, characterized in that said perimeter segment (2) has first snap-fitting means (6) and said inner face of the side wall has second corresponding snap-fitting means (22), where said first snap-fitting means (6) are suitable for being assembled on said second snap-fitting means (22), thereby fixing said retainer (1) to said inner face.

68. The wear element (16) according to any one of claims 61 to 67, characterized in that said inner face of said side wall has a recess (23) suitable for housing therein said perimeter segment (2).

69. The wear element according to claim 68, characterized in that that said flange (3) defines a flange axis that extends from said end through which the flange (3) is joined to said perimeter segment (2) to said free end (4), the projection of said flange axis in a plane comprising said perimeter segment (2) defines a flange direction, said perimeter segment (2) has an outer perimeter segment edge, said recess (23) has a recess edge, and in that there is a gap, in said flange direction, between said outer perimeter segment edge and said recess edge, so that said flange (3) is able to be moved according to said flange direction within said recess (23).

70. The wear element (16) according to any one of claims 61 to 69, characterized in that the side wall with said inlet opening (20) has, on its outer face, a recess extending to said inlet opening (20), suitable for housing therein a stop (9) arranged at the first end (8) of said pin (7).

71. The wear element (16) according to any one of claims 61 to 70, characterized in that it comprises a retainer (1) according to any one of claims 47 to 52.

72. A wear assembly of an earth moving machine comprising a wear element (16) according to any one of claims 61 to 71, and a pin (7) according to any one of claims 53 to 60, where said fixing region (12) coincides, in the direction of said longitudinal

axis, with said outlet opening (21) in said assembled position, where the riser (15) of said step houses said free end (4) of said flexible flange (3), thereby blocking the axial movement of the pin (7) in the direction opposite the direction of insertion.

5 73. An earth moving machine comprising a support element with a nose (19) suitable for having a wear element (16) assembled thereon by means of a pin (7), said wear element (16) comprising a cavity (17) where, in an assembled position in which said wear element (16) is assembled on said support element, said nose (19) is housed in said cavity (17), where said cavity (17) is demarcated by side walls (18) with at
10 least one through opening arranged in one of said side walls, where said nose (19) has a nose opening (25) which, in said assembled position, is aligned with said through opening of said wear element (16), where, in said assembled position said pin (7) is housed in said through opening and said nose opening, where said nose opening (25) defines a longitudinal axis, said longitudinal axis having a direction of
15 insertion corresponding to the direction in which said pin (7) is introduced in the through opening to achieve said assembled position,

characterized in that

20 it comprises a retainer (1) according to any one of claims 47 to 52, where said perimeter segment (2) is fixed to a perimeter region of said nose opening (25) and said flexible flange (3) extends towards the inside of said nose opening (25).

25 74. The machine according to claim 73, characterized in that it further comprises a pin (7) according to any one of claims 53 to 60, where said fixing region (12) coincides, in the direction of said longitudinal axis (7), with the beginning of said nose opening (25) in said assembled position.

30 75. The machine according to any one of claims 73 or 74, characterized in that that said flange (3) defines a flange axis that extends from said end through which the flange (3) is joined to said perimeter segment (2) to said free end (4), the projection of said flange axis in a plane comprising said perimeter segment (2) defines a flange direction, where, in said assembled position, the distance, in direction of said flange

direction, between said free end (4) and said pin (7) is greater than the distance, in direction of said flange direction, between said pin (7) and a contact point (27) present in said perimeter segment (2), so that, in a relative movement between said pin (7) and said retainer (1) according to said flange direction, the pin (7) contacts said contact point (27) before contacting said free end (4).

76. The machine according to claim 75, characterized in that, in said assembled position, said perimeter segment (2) and said pin (7) are in contact through at least two pairs of blocking points (28), where one of said pair of blocking points (28) blocks the relative movement between said retainer (1) and said pin (7) in one sense according to a direction in said plane comprising said perimeter segment (2) and perpendicular to said flange direction, and the other pair of blocking points (28) blocks the relative movement between said retainer (1) and said pin (7) in the opposite sense.

77. A wear element (16) of an earth moving machine, said wear element (16) comprising a cavity (17) where, in an assembled position in which said wear element (16) is assembled on a support element, a nose (19) present in said support element is housed in said cavity (17), where said cavity (17) is demarcated by side walls (18) with a through opening arranged in one of said side walls (18), which is aligned, in said assembled position, with a nose opening (25) arranged in said nose (19), where said through opening and said nose opening (25) are suitable for housing therein a pin (7) suitable for fixing said wear element (16) in said nose (19) in said assembled position, where said through opening defines a longitudinal axis, where said longitudinal axis has a direction of insertion corresponding to the direction in which said pin (7) is introduced in said through opening to achieve said assembled position, where said pin (7) defines a longitudinal axis of the pin (7) and has a first end (8) with actuation means (11) suitable for rotating said pin (7) according to its longitudinal axis, and a second end (10), where, in said assembled position said first end (8) is housed in said through opening, referred to as inlet opening (20), and said second end (10) is housed inside said nose opening (25),

characterized in that

said wear element (16) comprises a retainer (1) according to any one of claims 47 to 52, where said perimeter segment (2) is fixed to the inner face of the side wall comprising said inlet opening (20) in a perimeter region of said inlet opening (20), and where said flexible flange (3) extends towards said nose opening (25), where the free end (4) of said flexible flange (3) stays shifted forward, according to said direction of insertion, with respect to said perimeter segment (2).

78. A wear assembly of an earth moving machine comprising a wear element (16) according to any one of claims 61 to 71, and a pin (7) according to any one of claims 53 to 60, where said fixing region (12) coincides, in the direction of said longitudinal axis, with said inlet opening (20) in said assembled position, where the riser (15) of said step houses said free end (4) of said flexible flange (3), thereby blocking the axial movement of said pin (7) in the direction opposite said direction of insertion.

79. A wear assembly comprising a pin (7) according to any one of claims 53 to 60 and a retainer (1) suitable for blocking said pin (7), where said retainer (1) is formed from a sheet material comprising a perimeter segment (2), suitable for being fixed to a perimeter region of said through opening or of said nose opening (25), and a flexible flange (3) joined at one end to said perimeter segment (2) and suitable for extending towards said through opening or said nose opening (25), where the free end (4) of the flexible flange (3) is suitable for staying shifted forward, according to said direction of insertion, with respect to said perimeter segment (2).

80. The assembly according to claim 79, characterized in that said perimeter segment (2) of said retainer (1) extends forming a closed perimeter frame (5) completely bordering said outlet opening (21).

81. The assembly according to claim 80, characterized in that said retainer (1) has two flexible flanges (3), arranged in opposite regions of said closed perimeter frame (5) and joined to said closed perimeter frame (5) and extending towards said outlet opening (21), where the free end (4) of both flexible flanges (3) is inside said outlet opening (21).

82. The assembly according to any one of claims 79 to 81, characterized in that said retainer (1) is metallic and is preferably made of austenitic stainless steel.

5 83. The assembly according to any one of claims 79 to 81, characterized in that said retainer (1) is made of plastic.

84. The assembly according to any one of claims 79 to 83, characterized in that said retainer (1) is according to any one of claims 47 to 52.

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85. The assembly according to any one of claims 79 to 84, characterized in that said flange (3) defines a flange axis that extends from said end through which the flange (3) is joined to said perimeter segment (2) to said free end (4), the projection of said flange axis in a plane comprising said perimeter segment (2) defines a flange direction, where, in said assembled position, the distance, in direction of said flange direction, between said free end (4) and said pin (7) is greater than the distance, in direction of said flange direction, between said pin (7) and a contact point (27) present in said perimeter segment (2), so that, in a relative movement between said pin (7) and said retainer (1) according to said flange direction, the pin (7) contacts said contact point (27) before contacting said free end (4).

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86. The assembly according to claim 85, characterized in that, in said assembled position, said perimeter segment (2) and said pin (7) are in contact through at least two pairs of blocking points (28), where one of said pair of blocking points (28) blocks the relative movement between said retainer (1) and said pin (7) in one sense according to a direction in said plane comprising said perimeter segment (2) and perpendicular to said flange direction, and the other pair of blocking points (28) blocks the relative movement between said retainer (1) and said pin (7) in the opposite sense.

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87. Use of a retainer (1) according to any one of claims 47 to 54 for blocking a pin (7), said pin (7) fixing a wear element (16) in a support element of an earth moving machine, said wear element (16) comprising a cavity (17) where, in an assembled

position in which said wear element (16) is assembled on said support element, a nose (19) present in said support element is housed in said cavity (17), where said cavity (17) is demarcated by side walls (18) with at least one through opening arranged in one of said side walls (18), where said nose (19) has a nose opening (25) which, in said assembled position, is aligned with said through opening of said wear element (16), where, in said assembled position said pin (7) is housed in said through opening and said nose opening (25), where said through opening defines a longitudinal axis, said longitudinal axis having a direction of insertion corresponding to the direction in which said pin (7) is introduced in said through opening to achieve said assembled position, where said retainer (1) is formed from a sheet material comprising a perimeter segment (2), fixed to a perimeter region of said through opening or of said nose opening (25), and a flexible flange (3) joined at one end to said perimeter segment (2) and extending towards said through opening or said nose opening (25), where the free end (4) of the flexible flange (3) stays shifted forward, according to said direction of insertion, with respect to said perimeter segment (2).

88. Use of a pin (7) according to any one of claims 53 to 60, for fixing a wear element (16) in a support element of an earth moving machine, said wear element (16) comprising a cavity (17) where, in an assembled position in which said wear element (16) is assembled on said support element, a nose (19) present in said support element is housed in said cavity (17), where said cavity (17) is demarcated by side walls (18) with at least one through opening arranged in one of said side walls (18), where said nose (19) has a nose opening (25) which, in said assembled position, is aligned with said through opening of said wear element (16), where, in said assembled position said pin (7) is housed in said through opening and said nose opening (25), where said through opening defines a longitudinal axis, said longitudinal axis having a direction of insertion corresponding to the direction in which said pin (7) is introduced in said through opening to achieve said assembled position.

89. Use of an assembly according to any one of claims 79 to 86, for fixing a wear element (16) in a support element of an earth moving machine, said wear element (16) comprising a cavity (17) where, in an assembled position in which said wear element (16) is assembled on said support element, a nose (19) present in said

support element is housed in said cavity (17), where said cavity (17) is demarcated by side walls (18) with at least one through opening arranged in one of said side walls (18), where said nose (19) has a nose opening (25) which, in said assembled position, is aligned with said through opening of said wear element (16), where, in said assembled position said pin (7) is housed in said through opening and said nose opening (25), where said through opening defines a longitudinal axis, said longitudinal axis having a direction of insertion corresponding to the direction in which said pin (7) is introduced in said through opening to achieve said assembled position.

90. Method of disassembling a wear element (16) of a support element of an earth moving machine, said wear element (16) comprising a cavity (17) where, in an assembled position in which said wear element (16) is assembled on a support element, a nose (19) present in said support element is housed in said cavity (17), where said cavity (17) is demarcated by side walls (18) with two openings arranged in two of said side walls (18) opposite one another, which are aligned with one another and aligned, in said assembled position, with a through nose opening (25) arranged in said nose (19), where said openings and said nose opening (25) are housing therein a pin (7) according to any one of claims 53 to 60, fixing said wear element (16) in said nose (19) in said assembled position, where said openings define a longitudinal axis, where said longitudinal axis has a direction of insertion corresponding to the direction in which said pin (7) is introduced in said openings to achieve said assembled position, where said pin (7) defines a longitudinal axis of the pin (7) and has a first end (8) with actuation means (11) suitable for rotating the pin (7) according to its longitudinal axis, and a second end (10), opposite said first end (8), where, in said assembled position, said first end (8) is housed in one of said openings, referred to as inlet opening (20), which is a through opening, and said second end (10) is housed in the other one of said openings, referred to as outlet opening (21), where:

[a] said wear element (16) comprises a retainer (1) fixed to the inner face of the side wall comprising said outlet opening (21), said retainer (1) being formed from a sheet material comprising a perimeter segment (2), fixed to said inner face in a perimeter region of said outlet opening (21), and a flexible flange (3) joined at one end to said

perimeter segment (2) and extending towards said outlet opening (21), where the free end (4) of said flexible flange (3) is inside said outlet opening (21),

or

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[b] said wear element (16) comprises a retainer (1) fixed to the inner face of the side wall comprising said inlet opening (20), said retainer (1) being formed from a sheet material comprising a perimeter segment (2), fixed to said inner face in a perimeter region of said inlet opening (20), and a flexible flange (3) joined at one end to said perimeter segment (2) and extending towards said nose opening (25), where the free end (4) of the flexible flange (3) stays shifted forward, according to said direction of insertion, with respect to said perimeter segment (2),

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or

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[c] the nose comprises a retainer (1) which is formed from a sheet material comprising a perimeter segment (2), fixed to a perimeter region of said nose opening (25) and a flexible flange (3) joined at one end to said perimeter segment (2) and extending towards the inside of said nose opening (25),

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characterized in that it comprises:

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[i] a step of rotating said pin (7) along said longitudinal axis of the pin (7) through said actuation means (11) present in said first end (8) until said flange (3) is faced to said unblocking segment (14),

[ii] a step of extracting said pin from said through opening and said nose opening (25), and

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[iii] a step of extracting said wear element (16) from said support.

91. The method according to claim 90, wherein said perimeter segment (2) extends forming a closed perimeter frame (5), where said flange extends towards the inside of said frame.

5 92. The method according to claim 91, characterized in that said retainer (1) has two flanges, arranged in opposite regions of said closed perimeter frame (5), said flanges being joined to said closed perimeter frame (5) and extending towards the inside of said closed perimeter frame (5), where the free ends (4) of both flexible flanges (3)
10 are suitable for staying shifted forward, according to said direction of insertion, with respect to said closed perimeter frame (5).

93. The method of any one of claims 90 to 92, wherein said retainer is according to any one of claims 47 to 52.

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