

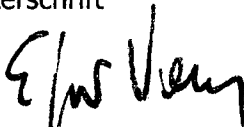
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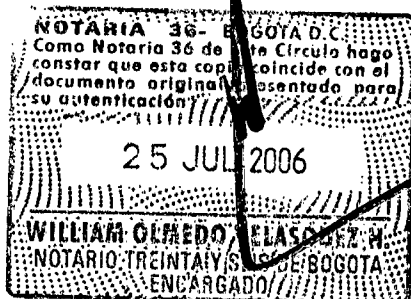
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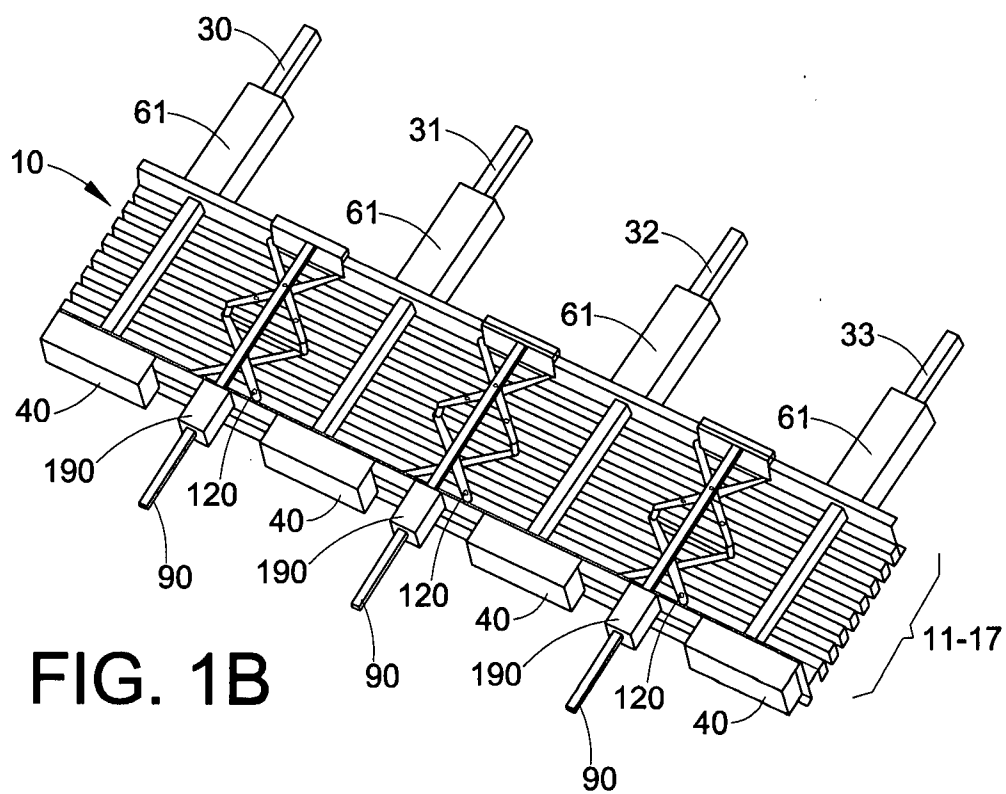
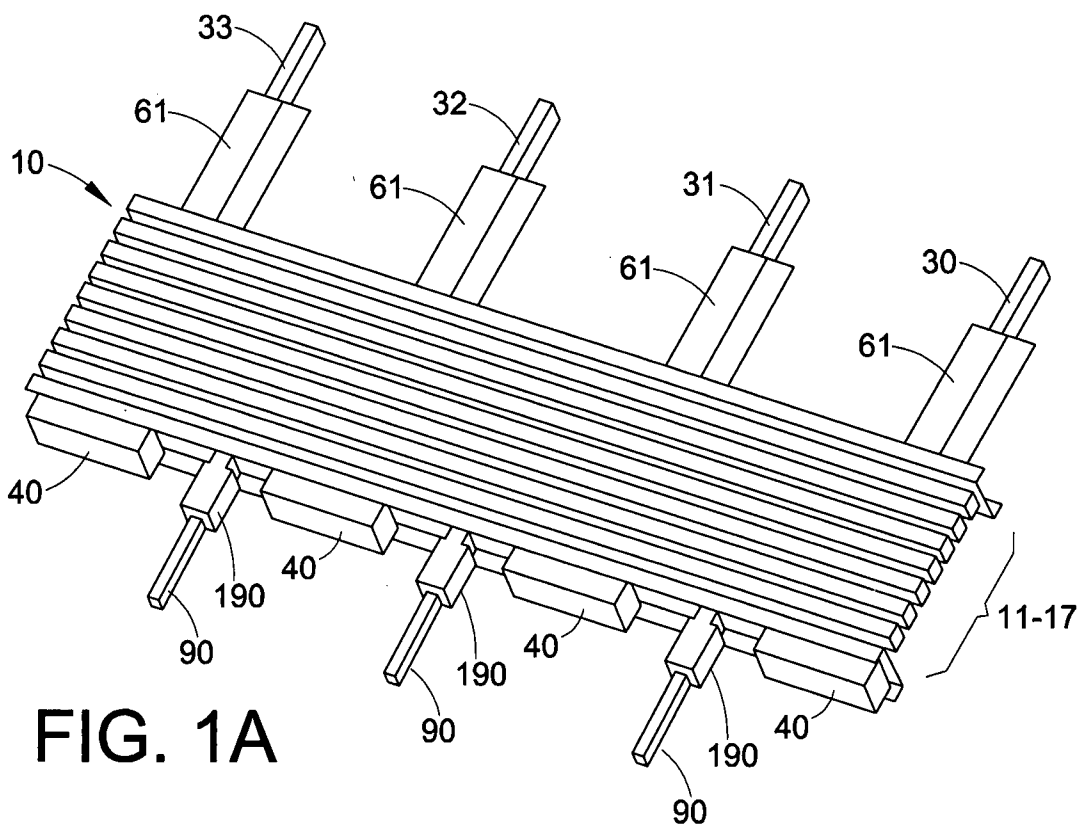
Apostille

(Convention de La Haye du 5 octobre 1961)

1. Land Bundesrepublik Deutschland
Diese öffentliche Urkunde
2. ist unterschrieben von Georg Mehler
3. in seiner Eigenschaft als Notar in Trostberg
4. sie ist versehen mit dem Siegel des Notars
Georg Mehler in Trostberg
5. in Traunstein
6. am neunundzwanzigsten September
zweitausendfünf
7. durch den Präsidenten des Landgerichts Traunstein
8. unter Nr. 91/1 E 966/2005
9. Siegel
10. Unterschrift


Edgar Vavra
Präsident des Landgerichts





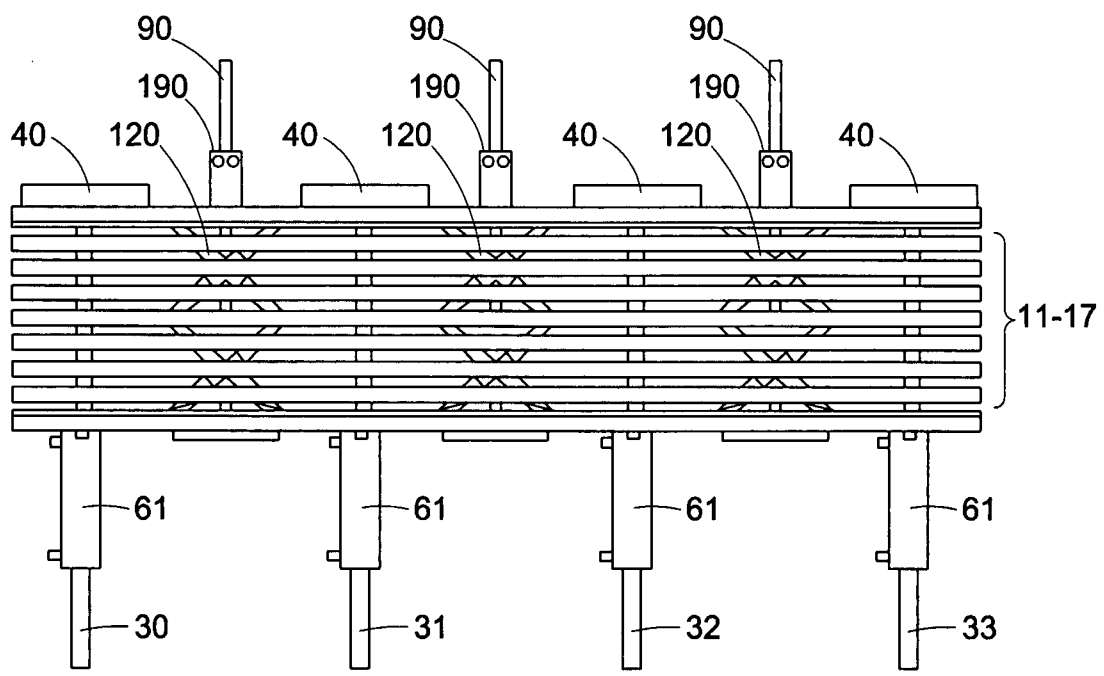


FIG. 1C

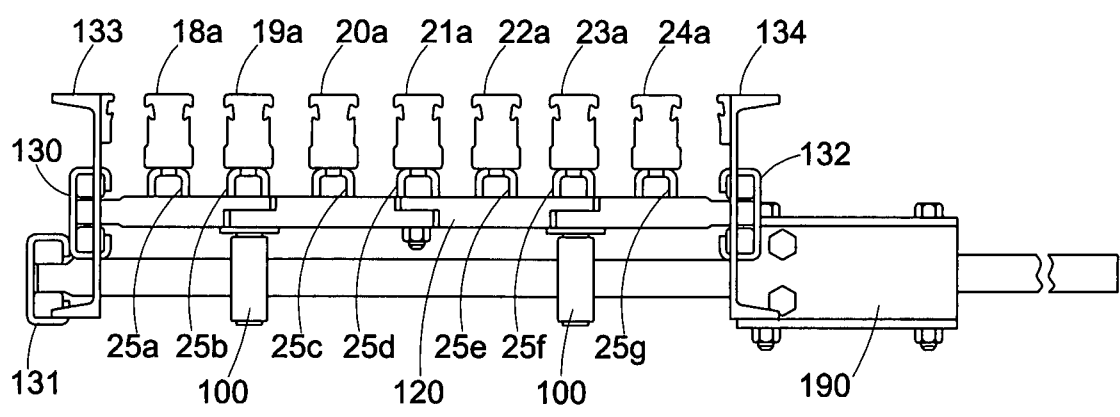


FIG. 2

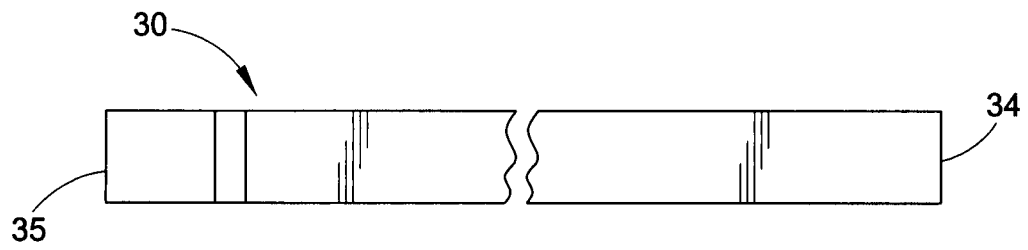


FIG. 3A

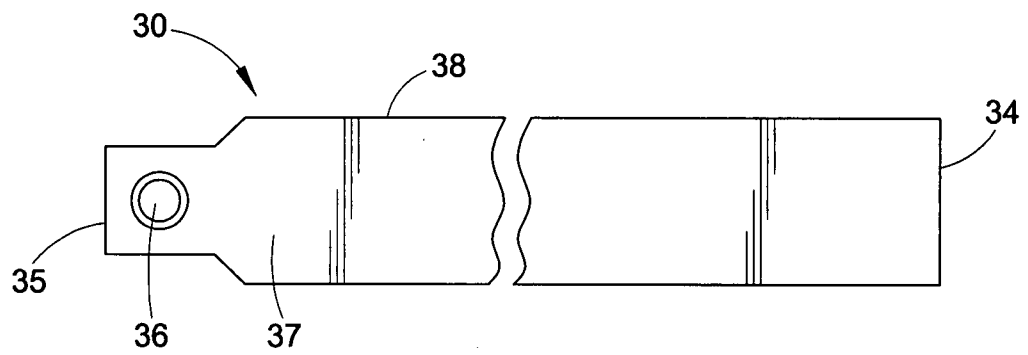


FIG. 3B

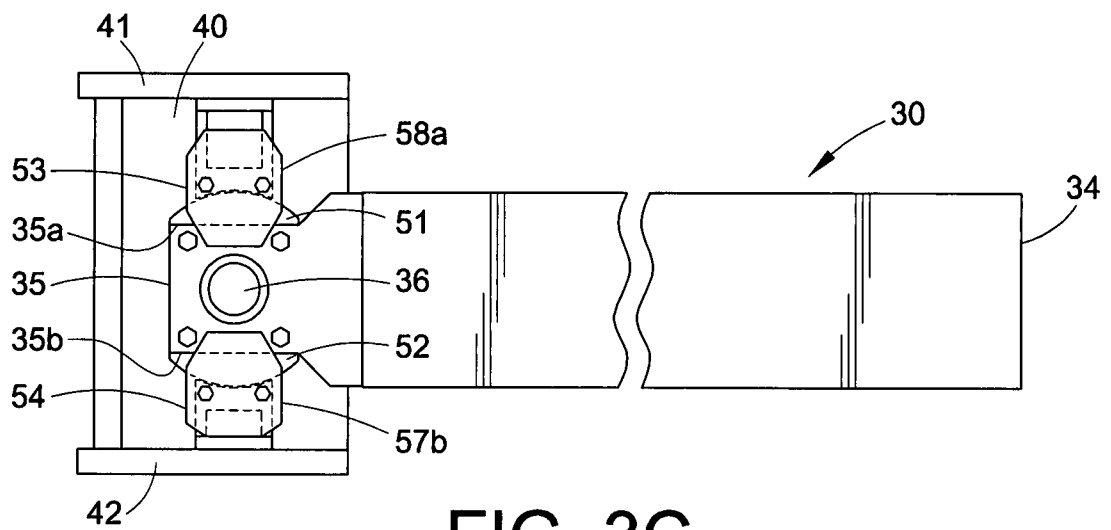
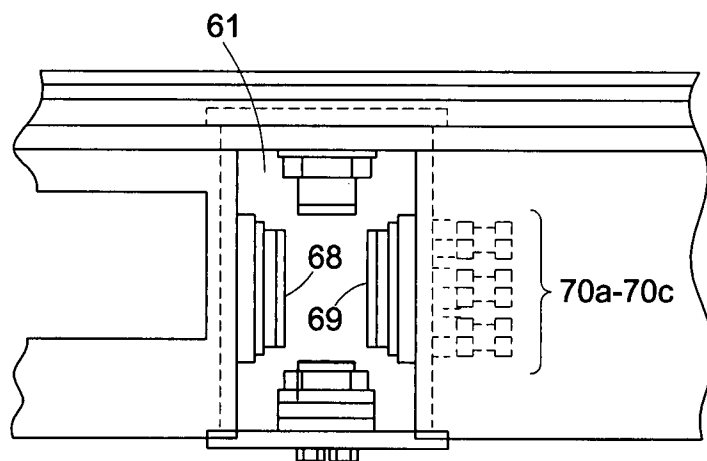
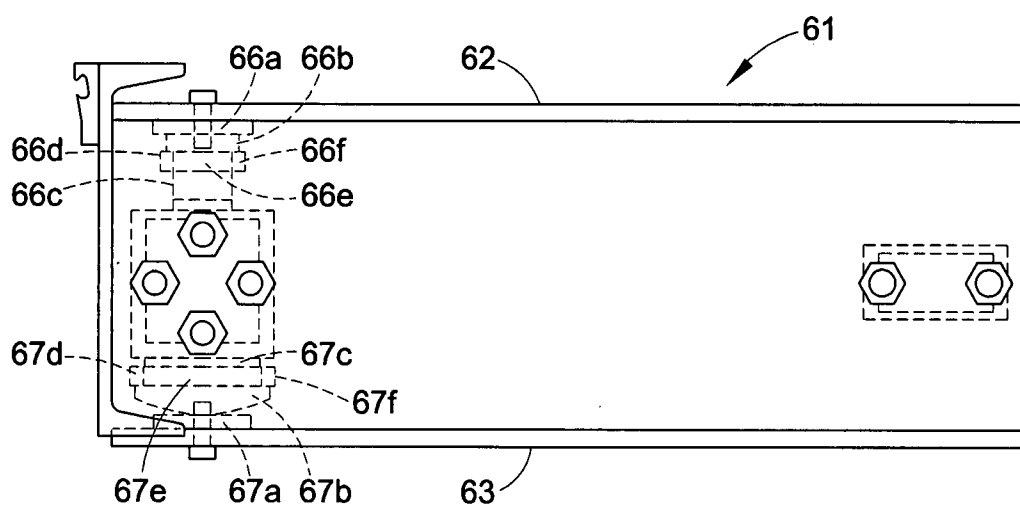
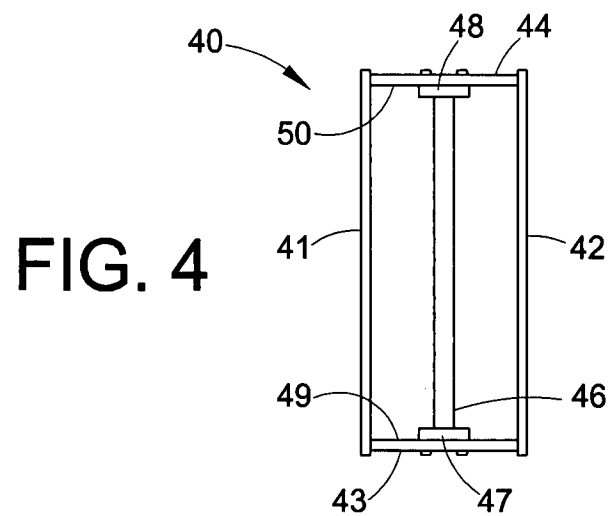


FIG. 3C



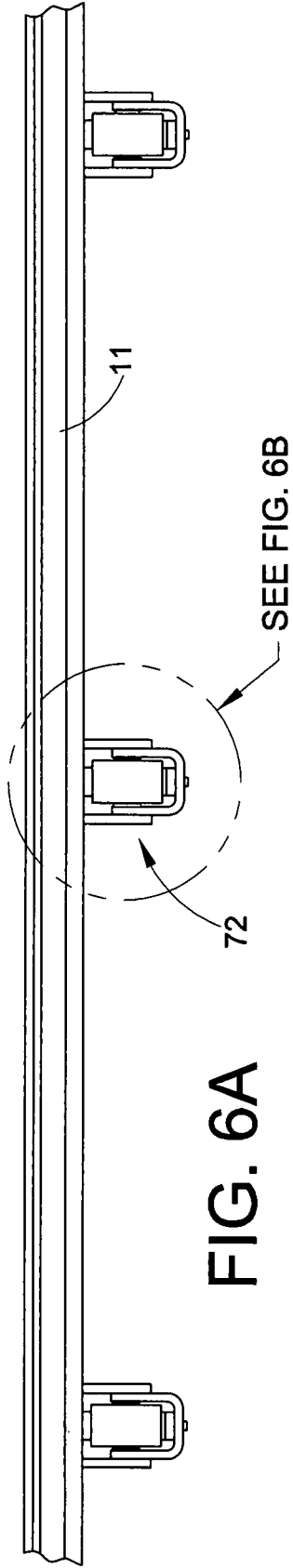


FIG. 6A

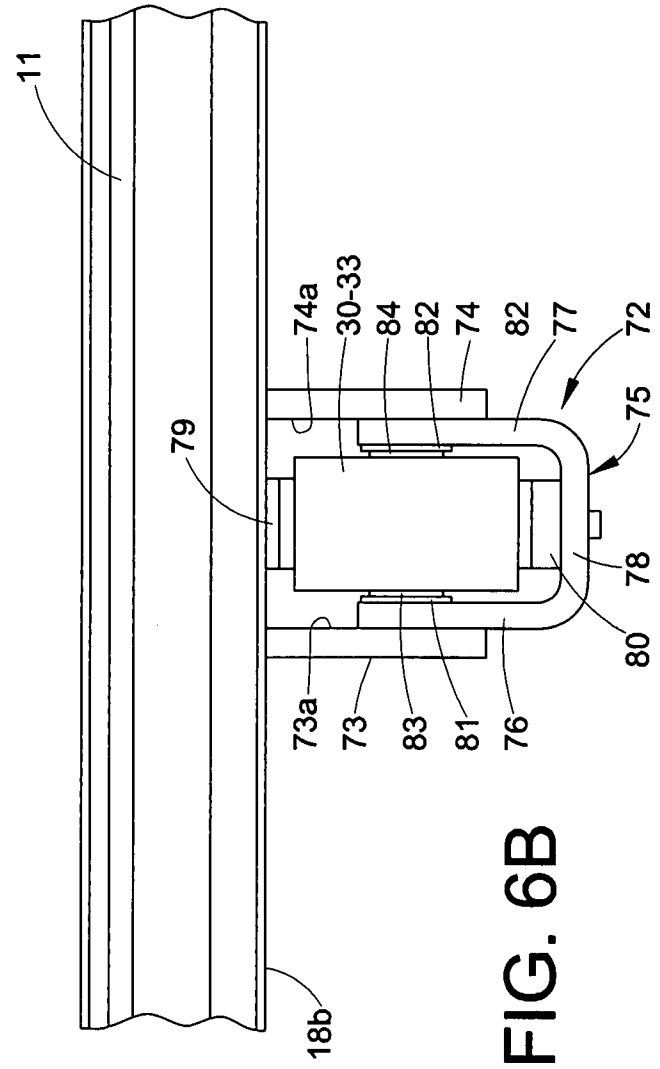
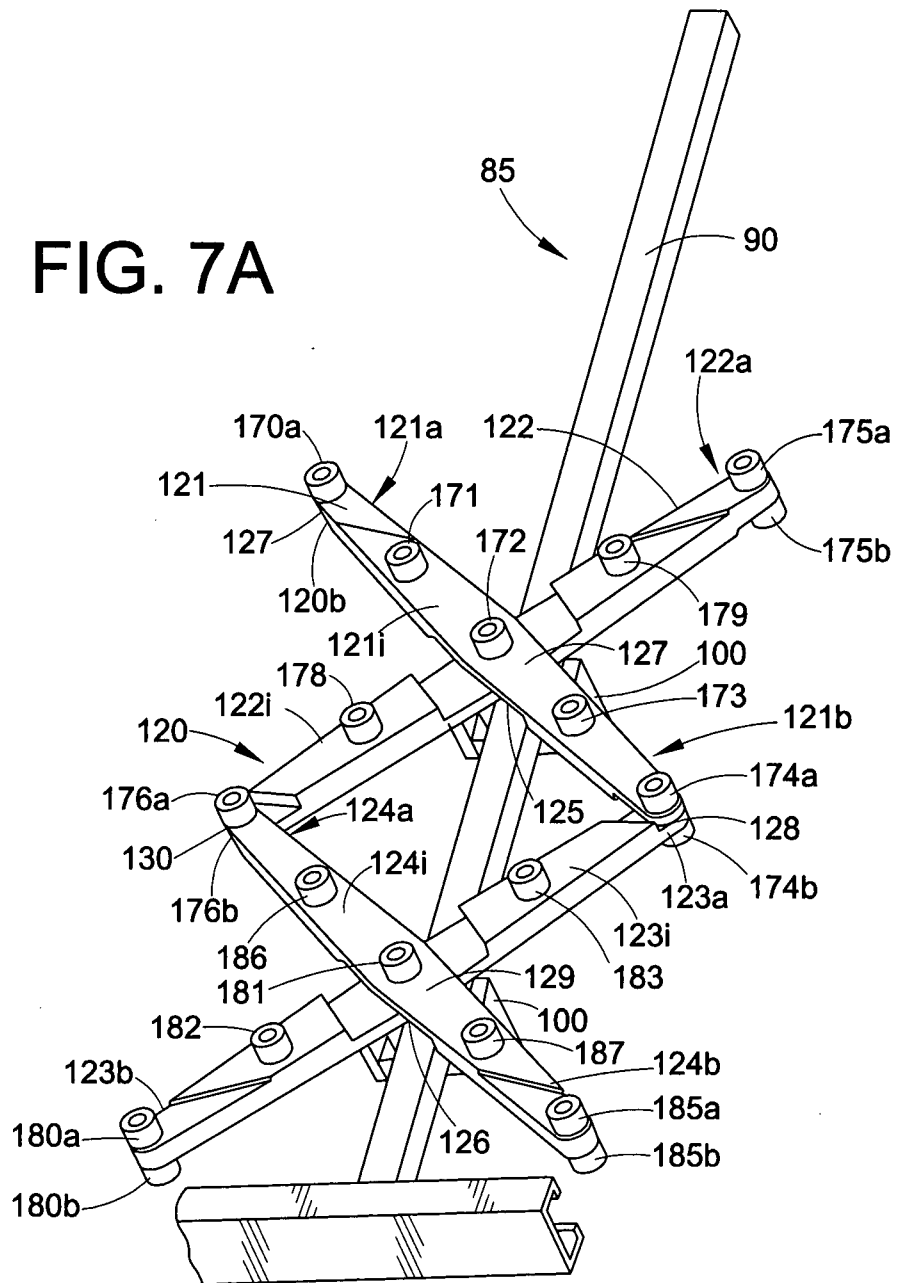


FIG. 6B

FIG. 7A



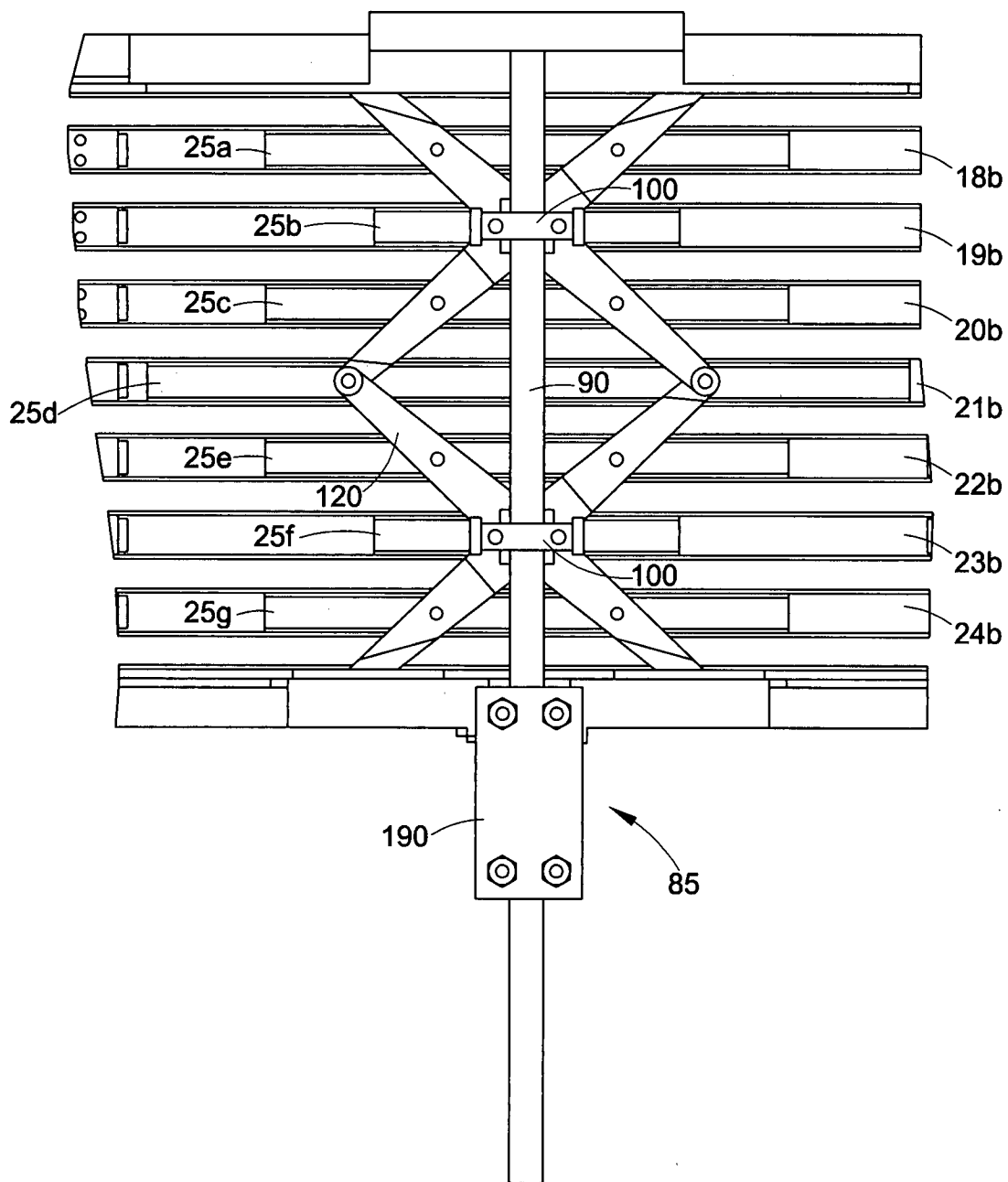


FIG. 7B

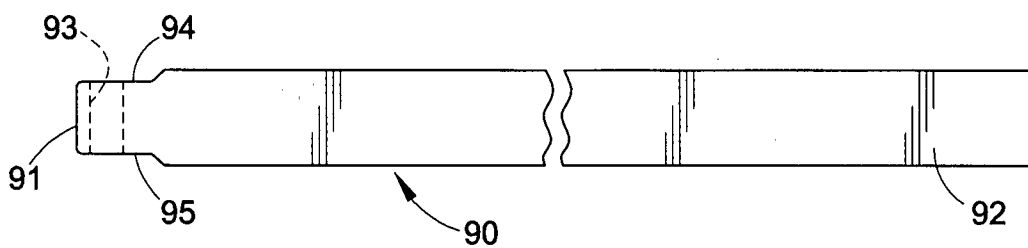


FIG. 7C

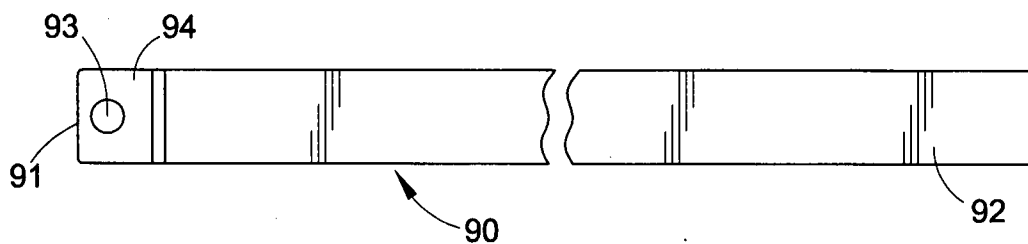


FIG. 7D

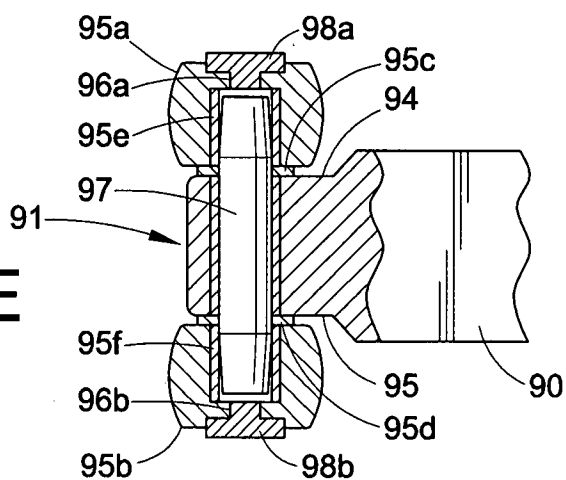


FIG. 7E

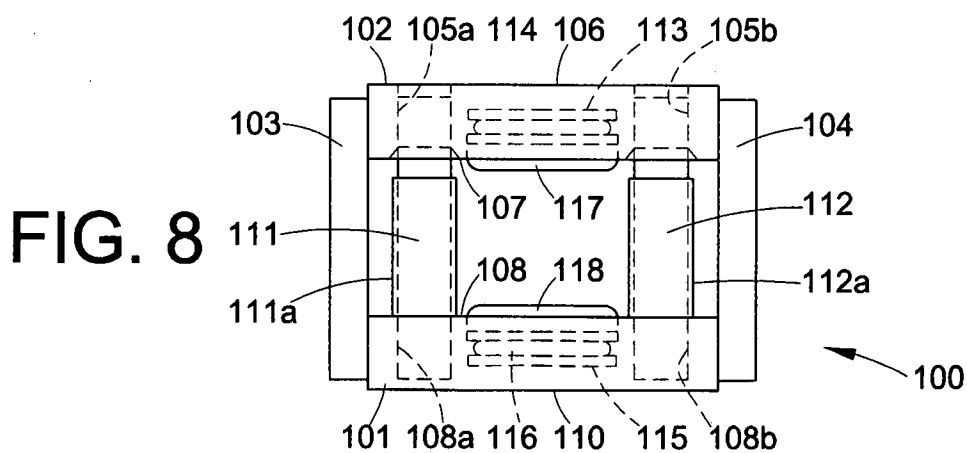


FIG. 8

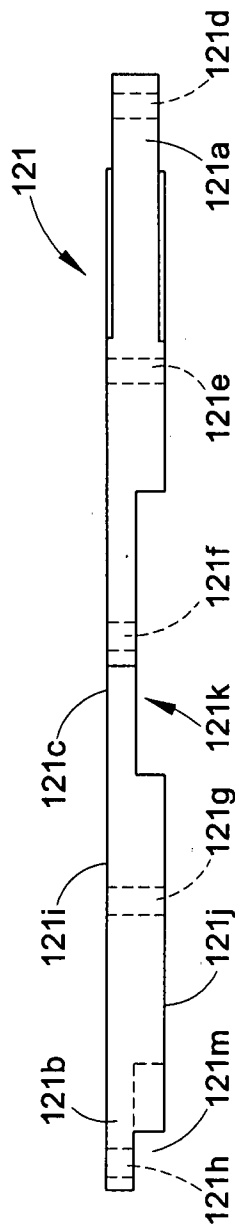


FIG. 9A

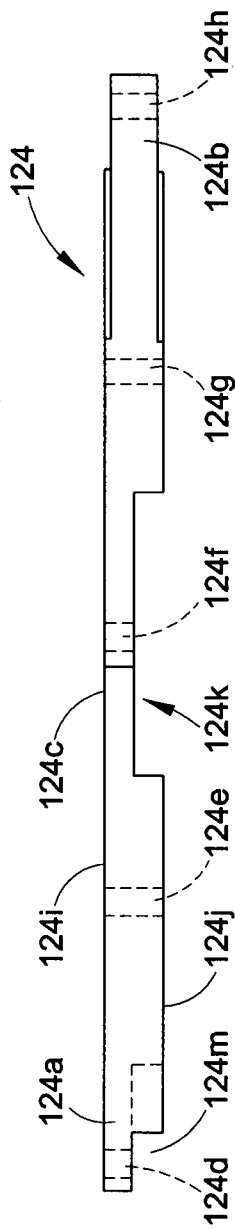


FIG. 9B

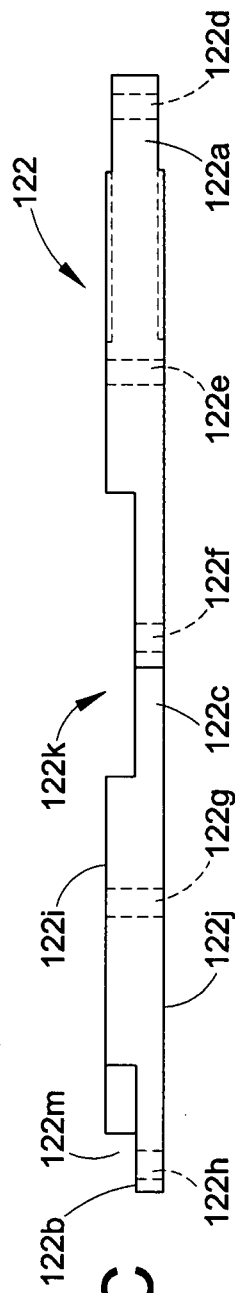


FIG. 9C

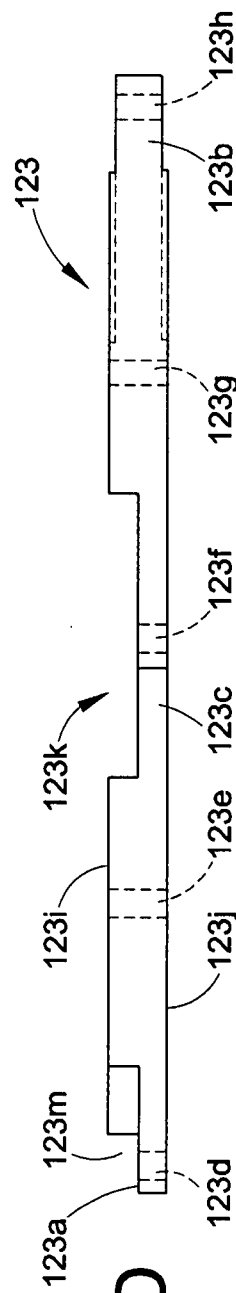


FIG. 9D

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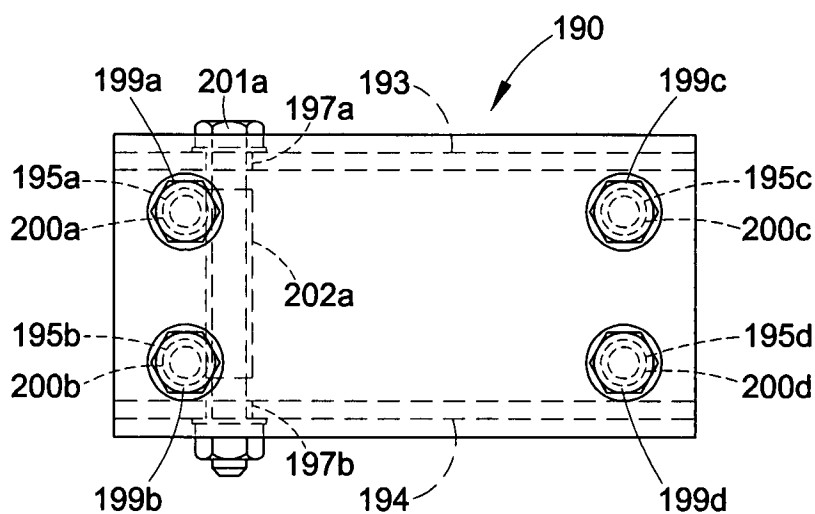


FIG. 10A

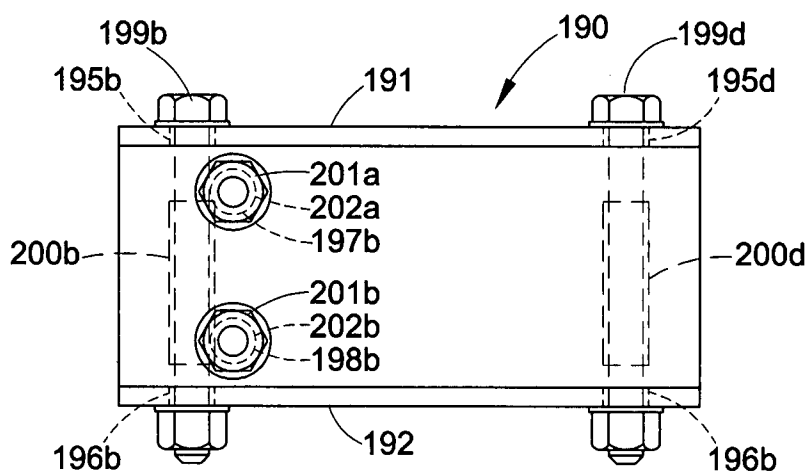


FIG. 10B

DIVISION DE NUEVAS CREACIONES

RADICACIÓN EXPEDIENTE No . 03-027430

EL EXTRACTO DE LA PRESENTE SOLICITUD DE PATENTE DE INVENCION

FUE PUBLICADO EN LA GACETA DE PROPIEDAD INDUSTRIAL No 545 DE

FECHA 29 DE OCTUBRE 2004 EL TERMINO HABIL SEÑALADO POR LA LEY

EXPIRA EL 27 DE ENERO DEL 2005

NOTA: Dentro del plazo de los seis (6) meses siguientes a partir de la fecha de publicación en la gaceta de Propiedad Industrial, deberá solicitar y cancelar el examen de patentabilidad so pena de que la solicitud caiga en abandono, de acuerdo con lo establecido en el Artículo 44 de la Decisión 486/2000.

SE PRESENTARON OPOSICIONES POR PARTE DE TERCEROS.

SI _____

NO X

Bogotá D.C, AGOSTO DE 2007

United States Patent [19]

Leroux

[11] 4,120,066

[45] Oct. 17, 1978

[54] EXPANSION JOINT FOR ROADWAY SECTIONS

[76] Inventor: Yves Gerald Leroux, 8790 Terrasse Forget, La Salle, Quebec, Canada

[21] Appl. No.: 802,497

[22] Filed: Jun. 1, 1977

[51] Int. Cl.² E01D 19/06

[52] U.S. Cl. 14/16.5; 404/69; 52/396

[58] Field of Search 404/69, 68, 47; 14/16.5; 52/396

[56] References Cited

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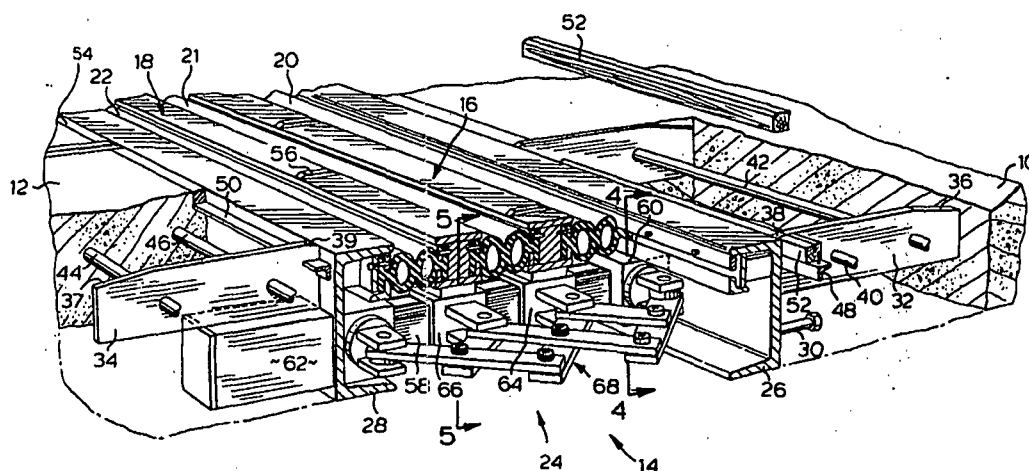
Primary Examiner—Nile C. Byers

Attorney, Agent, or Firm—Hirons & Rogers

[57] ABSTRACT

An expansion joint for mounting in the gap left between roadway sections, e.g. sections of a roadway bridge structure, to accommodate thermal expansion of the sections, is provided with at least one intermediate beam member extending in the gap across the width of the roadway and sealing strips of elastomeric material fitted between the roadway section edge structures and the intermediate beam. The joint has a plurality of units spaced apart across the width of the roadway, each unit comprising a lazy tong link arrangement pivotally mounted to the edge structures of the two roadway sections and to the intermediate beam members and extending across the gap, so as to ensure that any expansion or contraction of the gap between the roadway sections is equally distributed among the various parts of the gap on each side of and between the intermediate beam or beams. A spanning member is provided in each joint unit, which extends across the gap below the intermediate beam members and is slidable with respect to them and with respect to the roadway sections. The lazy tongs link arrangement and the spanning member are both pivotable to a small degree with respect to each of the roadway sections, so as to accommodate relative height changes between them without damage to the structural parts.

18 Claims, 9 Drawing Figures



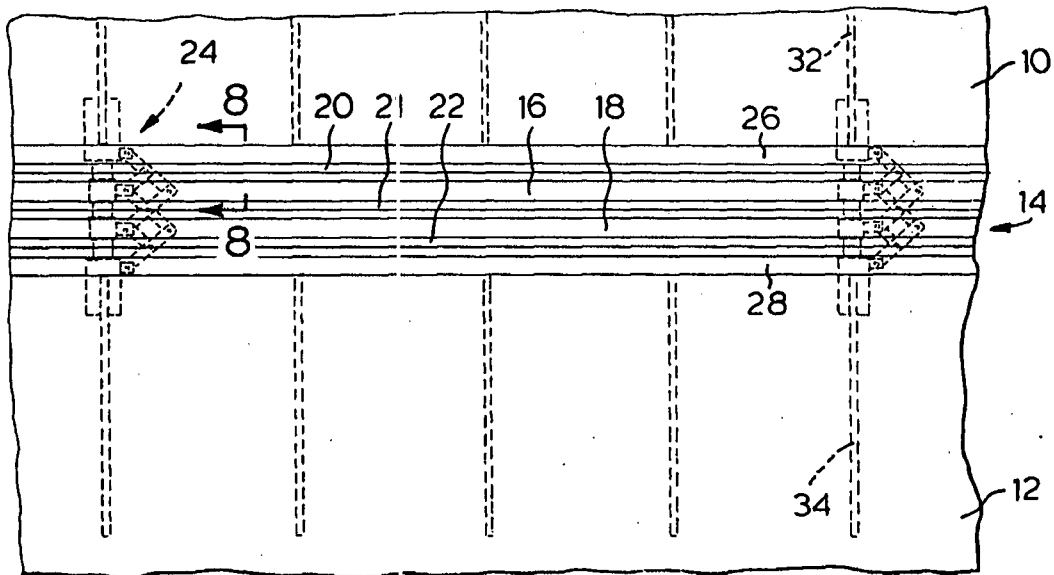


FIG. 1

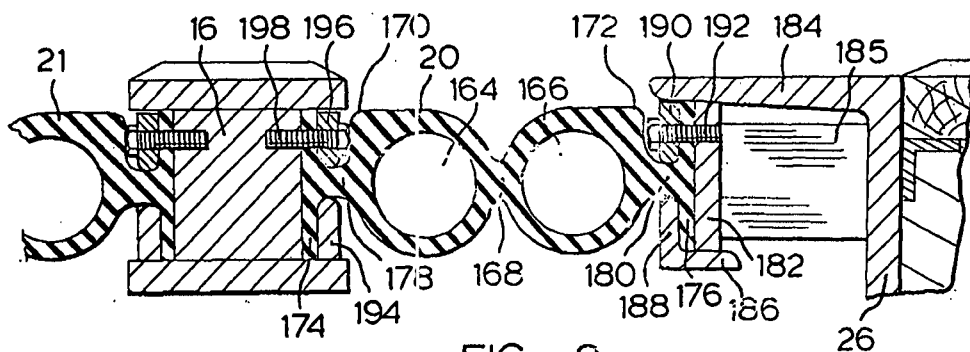


FIG. 8

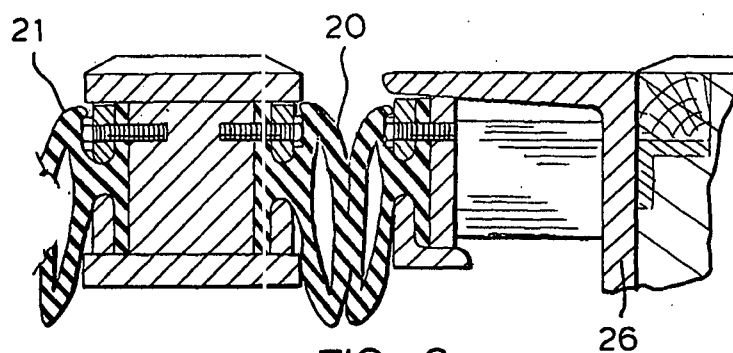
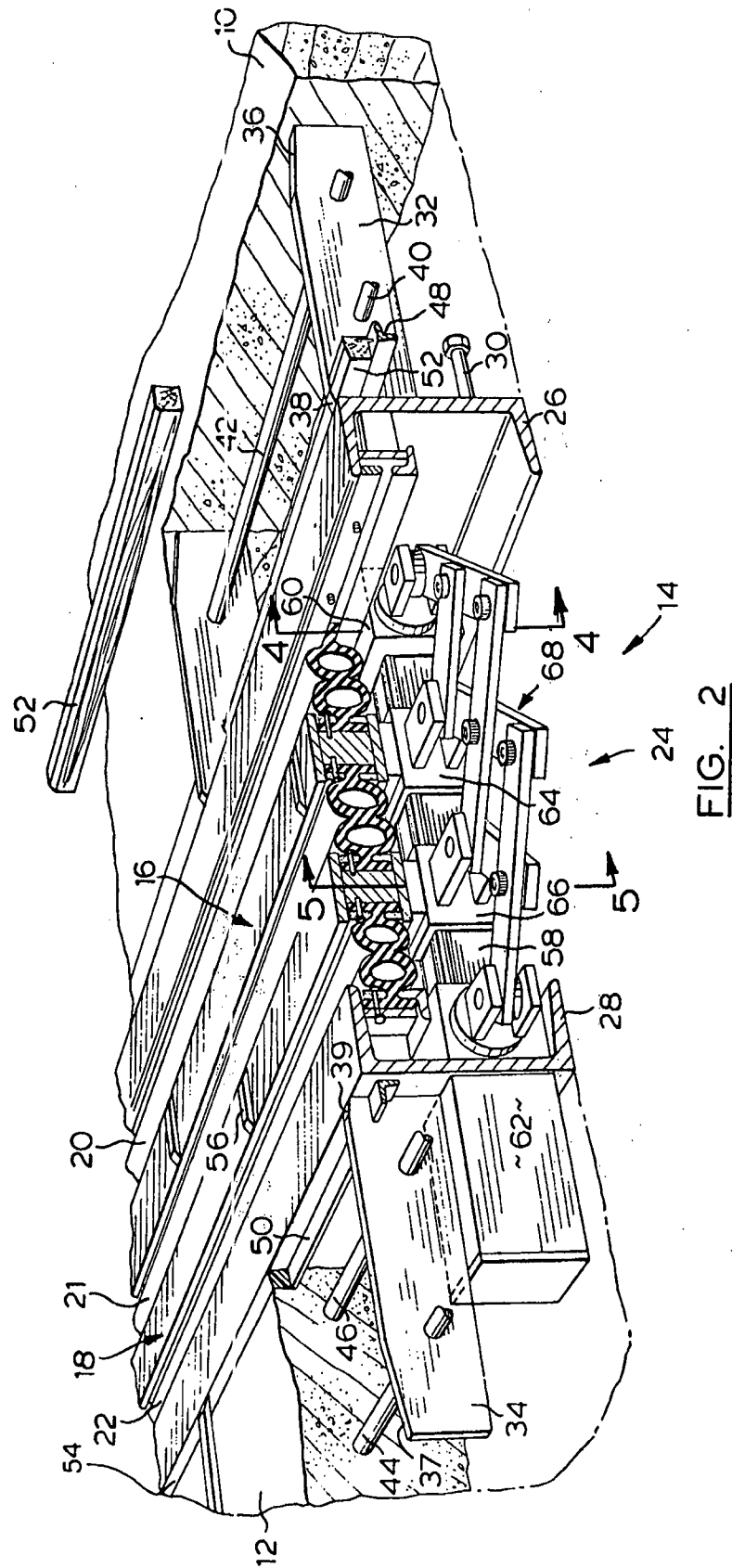


FIG. 9



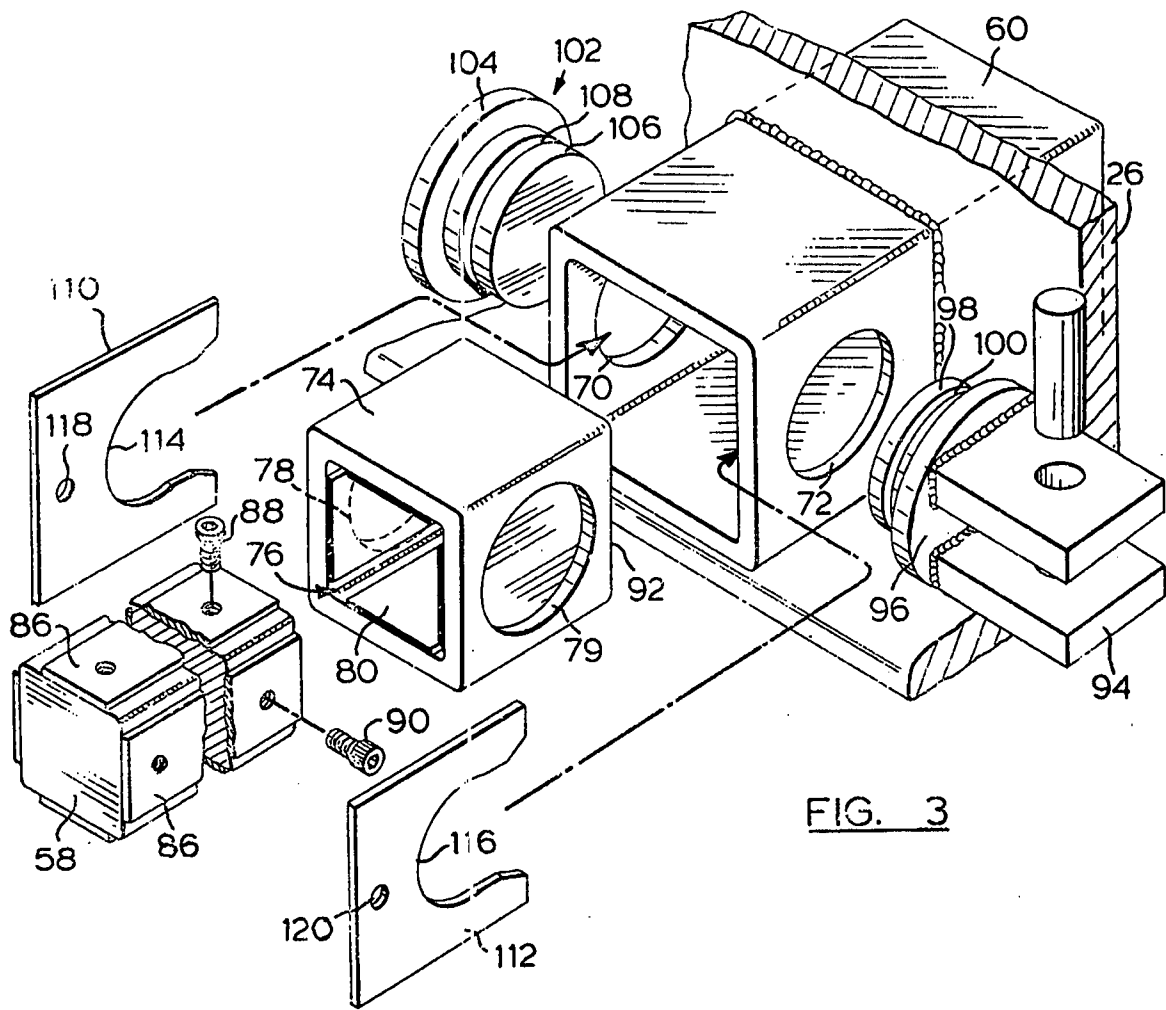


FIG. 3

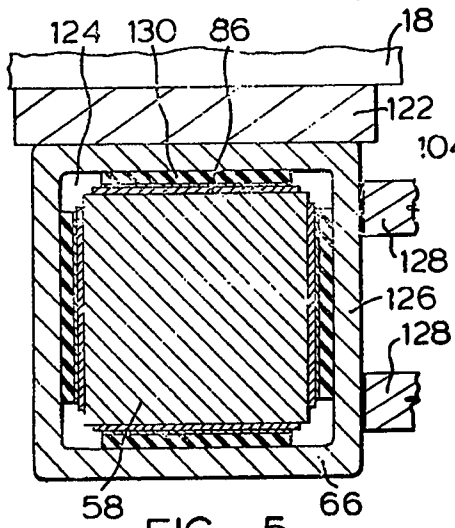


FIG. 5

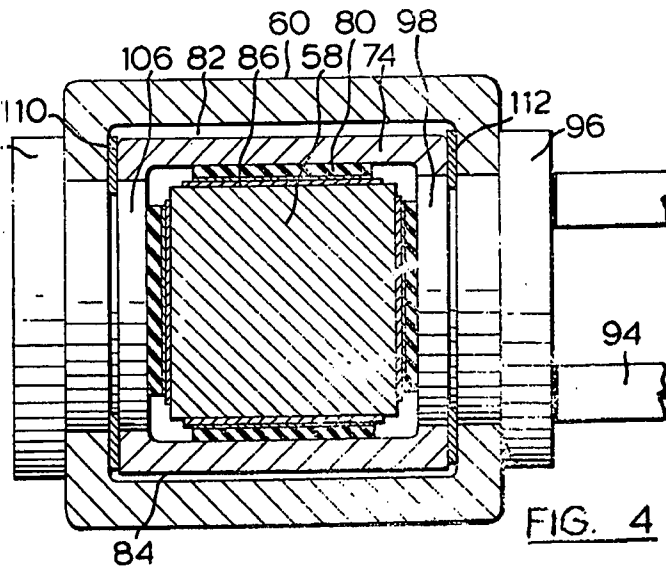
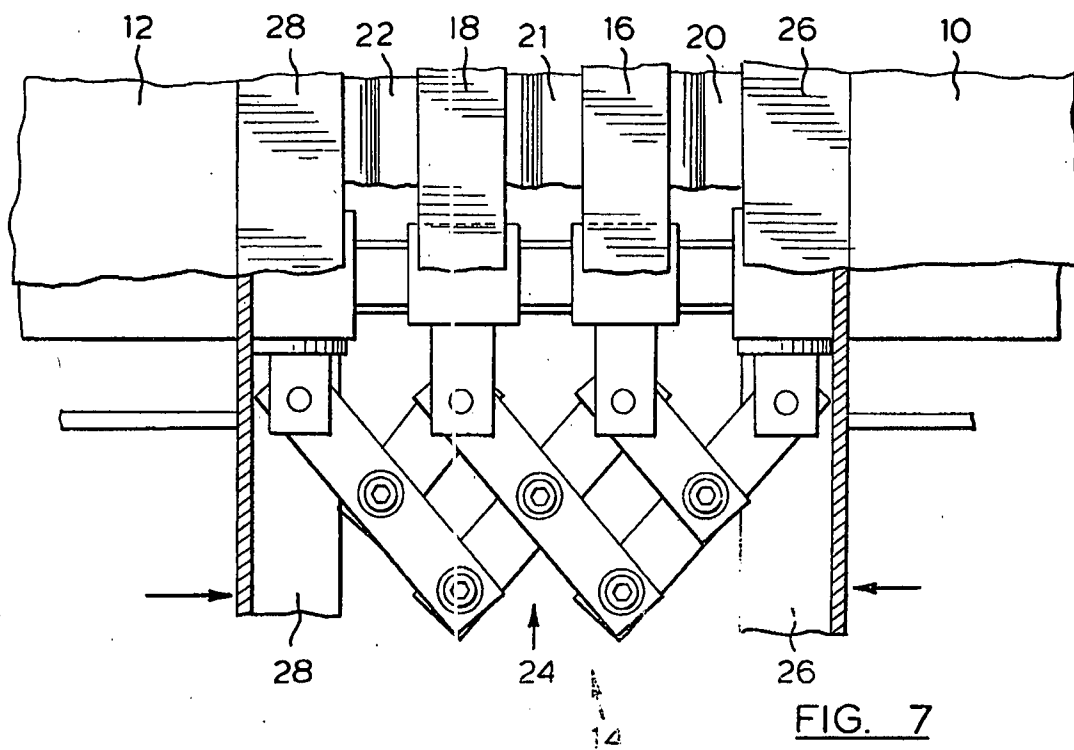
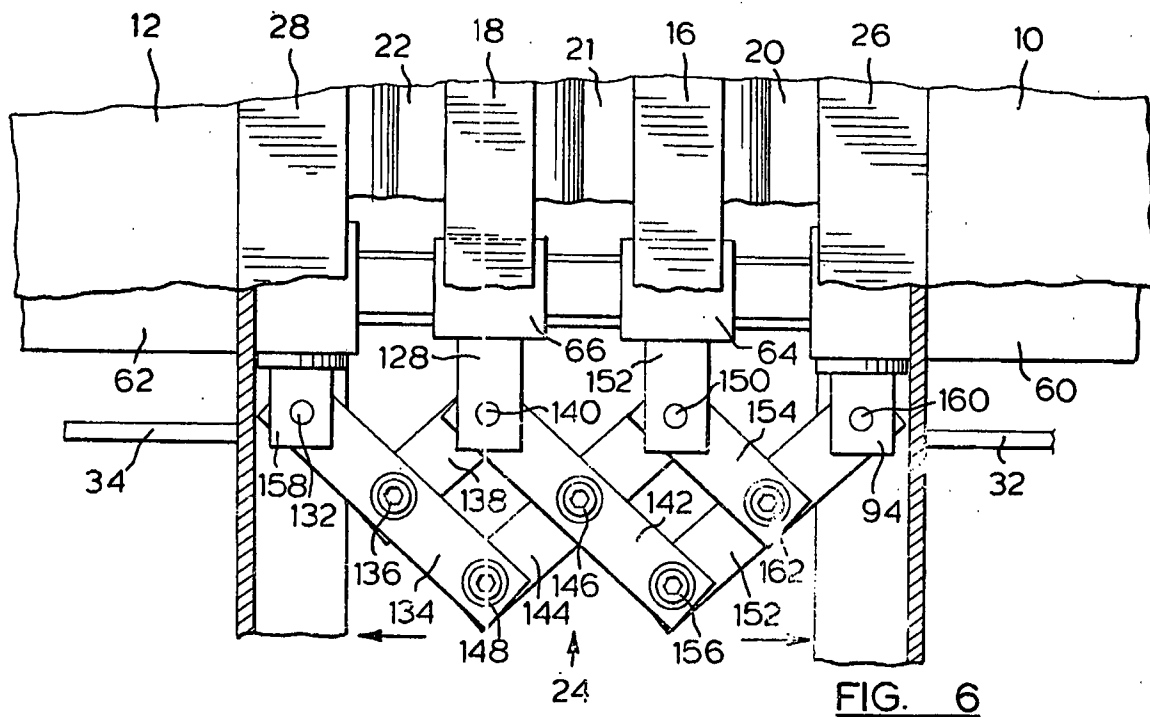


FIG. 4



5

FIG. 7 is a view similar to that of FIG. 6, showing the joint unit in a contracted position;

FIG. 8 is a vertical section of a portion of the joint showing the sealing strip, in its expanded position;

FIG. 9 is a view similar to that of FIG. 8, showing the parts in the contracted position.

DETAILED DESCRIPTION OF THE SPECIFIC PREFERRED EMBODIMENT

In the drawings, like reference numerals indicate like parts.

With respect to FIG. 1, there is indicated a first concrete roadway section 10, e.g. of a bridge, and a second concrete roadway section 12 having a gap 14 between their adjacent edges, the gap extending the full width of the roadway. The gap 14 is provided to accommodate expansion and contraction of the roadway sections 10, 12 due to thermal factors, causing consequent contraction and expansion of the width of the gap 14. To permit such contraction and expansion of the gap 14 and at the same time maintain a substantially watertight seal of gap 14, as required by many highway authorities, an expansion joint according to the present invention is provided, comprising a number, e.g. 2 of intermediate beams generally indicated 16, 18, extending the full width of the roadway, parallel to one another and to the roadway section edges and dividing the gap 14 into substantially equal longitudinal portions. Compressible sealing strips 20, 21, 22 are provided to fill the gaps between the intermediate beams 16, 18. At intervals of about 3 feet along the length of the gap 14, individual joint units such as 24 are provided, secured to edge structures of the roadway sections 10, 12, and connected to the intermediate beams 16, 18 so as to retain the intermediate beams 16, 18 in position to keep the gaps 14 divided into substantially equal width longitudinally extending portions, and retain watertightness of the joint. The structure and operation of individual joint units 24 are illustrated in FIGS. 2-9.

The overall structure and arrangement of a joint unit 24 is illustrated in FIG. 2. The concrete roadway sections 10, 12 are each provided along their edges with a respective channel beam 26, 28, the channel of which faces into the gap 14. The channel beams are rigidly secured to the concrete by integral Nelson studs such as 30, in the conventional way. Each of the channel beams 26, 28 is provided with a series of vertical anchoring plates such as 32, 34 respectively, welded to the outer face of the channel beams 26, 28 and extending away from the gap 14. The top surfaces of the plates 32, 34, in the finished joint, form part of the roadway surface. At their rearward ends, away from the gap 14, they are provided with inclined top surfaces 36, 37 sloping upwardly in the direction towards gap 14, so as to accommodate the traverse of a snowplow or similar blade without dislodgement of the roadway section. Similar top surface inclinations 38, 39 are provided extending away from the gap 14, at the front of the plates, for the same purpose. Adjacent pairs of vertical plates 32, 34 are tied together for rigidity purposes by transverse bars 40, 42, 44, 46 welded to the plates.

Also extending between adjacent pairs of plates 32, 34 etc. are angle irons 48, 50, the vertical faces of which are welded to the external vertical face of the respective channel beams 26, 28 to present a horizontal surface a short distance below the top edge of channel beams 26, 28. The angle irons 48, 50 are welded at their ends to the plates 32, etc. When the joint is assembled ready for

6

installation and pouring of concrete, wooden struts 52 are ledged on the upper horizontal surface of the channel beams 26, 28, the wooden struts 52 being of a suitable length to extend tightly between pairs of plates 32, etc., and of a suitable thickness to register with the top surfaces of the plates 32. The concrete roadbed 10, 12 is poured, substantially to the level of the inclined surfaces 36, 37 on the plates 32, 34. After the concrete has set and hardened, the wooden struts 52 can be removed, leaving a short gap or recess in the poured concrete, extending between the plates 32, 34. This gap can subsequently be filled with epoxy resin as indicated at 54. Such an arrangement and procedure offers substantial advantages, since it is well known that concrete and steel will not properly bond together to give a watertight joint. However, epoxy resin will bond firmly both to steel and to concrete, so that in this manner, a watertight joint as between the channel beams 26, 28 and the plates 32, 34 welded thereto, on one hand, and the concrete of the roadbeds 10, 12, on the other, is obtained.

At intervals of about 3 feet along their lengths, the intermediate beams 16, 18 are provided on their top surfaces with skid bars 56, having upwardly and inwardly inclined side surfaces. The skid bars 56 are presented in staggered relationship with those on the adjacent intermediate bar. The provision of these skid bars serves to prevent damaging and digging out of the joint unit 24, by traverse of a snowplow, grader or other bladed vehicles across the expansion joint.

The joint unit itself, generally indicated 24, comprises a spanning member 58 extending across the width of the gap 14, the ends of the spanning member 58 being slidably received in respective end boxes 60, 62, protruding through apertures in the channel beams 26, 28. The spanning member also passes slidably through glide boxes 64, 66, respectively secured to intermediate beams 16, 18. The end boxes 60, 62 and glide boxes 64, 66 have a pivotal lazy tongs link arrangement 68 pivotally secured thereto and extending to one side of the boxes and spanning member 58. The spanning member 58 and lazy tong link arrangement 68 are hingedly mounted into the end boxes 60, 62 to accommodate relative vertical movement as between roadway sections 10, 12. The intermediate beams 16, 18 with sealing strips 20, 21, 22 mounted therebetween are located vertically above the spanning member 58.

With reference to FIG. 3, this illustrates in exploded perspective the manner in which the spanning member 58 and lazy tong link arrangement 24 are mounted in the concrete roadway section. The end box 60 extends through an aperture in and is welded to the channel beam 26, so that it is rigidly fixed thereto. The end box 60 is of generally square cross-section, with a square aperture therein, facing inwardly towards the gap between the roadway sections. In its forward side walls, located forwardly of the vertical web of channel beam 26, the end box is provided with a pair of aligned circular apertures 70, 72. An intermediate cubiform box 74 is provided, having a square aperture 76 extending right way through its center, from its front wall to its rear wall, and having a pair of aligned circular apertures 78, 79 in its side walls. All four of the interior side walls of the intermediate cubiform box 74 are provided with glide pads 80, these pads comprising a reinforced rubber body with a friction-reducing PTFE coating. The intermediate cubiform box 74 is a loose fit in the square aperture in the end box 60, in which it is placed so that its circular side wall apertures 78, 79 align with the

The operation of the joint units will be apparent from FIGS. 6 and 7, in conjunction with the above description. FIG. 6 generally shows a part of the joint unit, in plan view, in its expanded condition. The forks 94 extending from the end box 60 are pivotally connected by means of a pivot pin 160 to a first link arm 152 of the lazy tongs arrangement 24. Near its center, first link arm 152 is pivotally connected to a pivot pin 162 to the end of a second link arm 154 of the lazy tongs arrangement. The other end of this second link arm 154 is pivotally connected by means of a pivot pin 150 to the forks 152 fixed to the glide unit 64 which is secured to the intermediate beam member 16. The end of a third link arm 144 of the lazy tongs link arrangement 24 is also pivotally connected to pivot pin 150. A fourth link arm 142 is pivotally connected at its center, by means of pivot pin 146 to the center of third link arm 144, at one of its ends by means of pivot pin 156 to the end of first link arm 152 and at its other end by means of pivot pin 140 to the forks 128 welded to glide unit 66 which is fixed to the other intermediate beam member 18. A fifth link arm 134 and a sixth link arm 138 are provided, to complete the lazy tongs link arrangement 24, the fifth link arm 134 being pivotally connected by pivot pin 148 to the end of third link arm 144 remote from its connection to the forks 152. The other end of the fifth link arm 134 is pivotally connected to the forks 158 extending from the other end box 62, by means of pivot pin 132. The sixth link arm is pivotally connected to pivot pin 140, associated with forks 128 of the glide unit 66, at one end, and is pivotally connected by means of pivot pin 136 to the middle of fifth link arm 134.

Now, in this arrangement, the ratio of the spacings between roadway section 10 and intermediate beam member 16, between intermediate beam members 16, 18, and between intermediate beam member 18 and roadway section 12, are maintained in a constant ratio, even when the overall size of the gap 14 between the roadway sections changes due to thermal factors. In FIG. 7, it will be seen that roadway section 10 has expanded, thereby pushing channel beam 26 to the left, narrowing the gap 14. The lazy tongs link arrangement responds to this movement, and contracts, by pivoting action, to move the intermediate beams 16, 18 to the right, a proportionate distance, to maintain the same ratio of spacing within the overall gap. This movement of intermediate beams 16, 18 and channel beam 26 is accommodated by sliding movement of the spanning member 58 within the glide units or boxes 64, 66, and within the end boxes 60, 62 as previously described. By this means, the change in overall width of the gap is accommodated equally by the various resilient sealing strips 20, 21, 22, located in the gaps, and there is no risk of one of these strips becoming over extended as a result of such gap movement, to spoil its efficiency.

Further, if either of the roadway sections 10, 12 should become vertically displaced with reference to the other, e.g. by the slight sinking of a bridge pillion supporting one of the roadway sections, this movement can be accommodated without damage to the lazy tongs link arrangement 24, by the arrangement of spanning member 58 within end boxes 60, 62 as previously described. If this vertical displacement occurs, spanning member 58 will assume a downward inclination across the gap, to accommodate it, hinging within the end boxes 60, 62. As it does so, it will bring the intermediate beam members 16, 18 down also, a proportionate amount, by engagement of the undersurface of the inter-

mediate beam member 58 with the bottom walls of the glide boxes 64, 66, thereby evening the height discrepancy across the roadway joint. The lazy tongs link arrangement 24 will also assume the same downward inclination across the gap, since rotation of the forks 94, 158 thereof relative to the end boxes 60, 62 is permitted as previously described with reference to FIGS. 3 and 4, so that the lazy tongs link arrangement can continue to operate to equalize the change in width of the gap without bending, jamming the pivot pins or otherwise damaging the lazy tongs arrangement.

FIGS. 8 and 9 illustrate a specific preferred embodiment of the form of sealing strip for use in the present invention, its means of anchoring in the spaces in the expansion joint units, and its action on expansion and contraction of the gap.

With reference to FIG. 8, the sealing strip 20 as viewed in cross-section comprises a pair of circular apertures 164, 166 surrounded by a rubber web, the web having a narrow neck 168 between the two apertures 164, 166. The top wall of the strip 20 terminates at its sides in a pair of shoulders 170, 172. Side mounting flanges 174, 176 are provided outwardly of the shoulders 170, 172, the flanges 174, 176 being integrally connected to the rest of the sealing strip by means of side necks 178, 180. It will be noted that the side flanges 174, 176 extend upwardly beyond the level of the side necks 178, 180, approximately to the level of the shoulders 170, 172. This arrangement has significant practical advantages, in enhancing the sealing action of the sealing strip 20, since it is virtually impossible for water to seep around the seal at the edges, over shoulder 170, with this arrangement, the side flanges acting in the manner of a dam. It also enables the sealing strips to be removed from above the joint, the replacement purposes, in conjunction with the mounting arrangements described below.

For mounting the sealing strips 20, etc. the channel beam 26 is provided with a vertical flange member 182, welded to and depending from the underside of the top 184 of the channel member 26. The vertical flange member 182 depends a distance of about $\frac{1}{2}$ of the vertical width of the channel of member 26, which approximately corresponds to the height of the side flange 176 of the sealing strip 20. The vertical flange member 182 extends the full length of the channel member 26, and is also anchored thereto by means of webs 185 provided at intervals along the length of the channel member 26 and welded to the internal vertical face of the channel member 26 and the rear vertical face of the flange 182. Fixed to the bottom edge of the vertical flange 182, and extending the full length thereof, is an angle bar 186 having an upstanding portion 188 extending upwardly from the bottom of the flange member 182 and spaced inwardly a short distance therefrom. A depending bar 190 extends downwardly from the end of the top 184 of channel member 26, in alignment with the upstanding part 188 of the angle bar 186, leaving a space therebetween sufficient to tightly accommodate the side neck 180 of the sealing strip 20. Aligned bolt holes for the accommodation of bolts 192 are provided at intervals, through the depending member 190 and the vertical flange member 182, the bolts being held rigidly in vertical flange member 182, to prevent rotation and facilitate the tightening of nuts thereon.

An essentially similar mounting arrangement is provided on the side face of the intermediate beam member 16, for receiving the other side mounting flange 174 of