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(54) **Access means**

(57) An access means comprising at least one of the following expedients;

a) ramp means (15) comprising a plurality of discrete ramp elements (17) and connecting means (C1-C3) flexibly connecting said elements together to provide a support part for a load.

b) a short bridge member (40) comprising an outwardly facing support surface for a load and projecting therefrom on each of two transversely opposite sides thereof a plurality of longitudinally spaced locating parts

c) a long bridge means (61) comprising a plurality of discrete bridge elements (62) and connecting means (65) flexibly connecting said bridge elements together to provide a support part for a load each bridge element being provided with mounting means whereby opposite end parts of a bridge element may be engaged with transversely spaced ramp means.

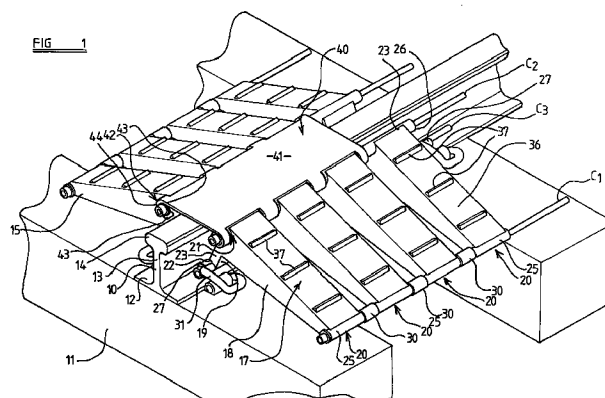
d) an adaptor means (80) comprising a plurality of discrete adaptor elements (81) and connecting means (D1-D3) flexibly connecting said adaptor elements together to provide a support part for a load, wherein each adaptor element comprises a rail engaging means (90) for engaging a part of a railway rail (10) and access engagement means to engage a ramp means.

e) a flexible mat comprising a plurality of flexible longitudinally extending elements and a plurality of flexible transversely extending elements, the longi-

tudinally extending elements being connected to the transversely extending elements.

f) a shield member (70) comprising a channel section element adapted to be mounted on a railway rail.

g) filler means comprising a plurality of discrete filler elements and connecting means flexibly connecting said filler elements together to provide a support part for a load.



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## Description

[0001] This invention relates to an access means, for example, for providing access for a vehicle or a pedestrian or the like, herein after referred to as a load to a location requiring passage of the load onto or over a rail of a railway track.

[0002] Hitherto, for example, when it has been desired to provide access for a vehicle to move along a railway track it has been necessary for the vehicle to move generally transversely to the track into a position in which the vehicle is supported on top of the rails of the track and then the vehicle has been rotated so as to lie generally parallel to the track.

[0003] In an attempt to avoid damage to the track during such procedures it has been commonplace to use baulks of timber to provide a ramp so that the vehicle can climb on to the top of the track and in addition the baulks have been disposed above the rails in an attempt to avoid damage during the rotating operation.

[0004] Also, for example, when it has been desired to move a vehicle transversely across a railway track, baulks of timber have been used to provide a ramp up to and down from the track with the baulks being disposed above the rails so as to avoid damage to the rails during passage over the rails.

[0005] The use of such baulks of timber is inconvenient and time consuming and frequently the baulks become displaced, in use, leading to damage to the track and/or vehicles and/or may cause nipping or other injury or inconvenience to a pedestrian.

[0006] An object of the invention is to provide an access means whereby the above mentioned problems are overcome or reduced.

[0007] According to one aspect of the invention we provide an access means comprising at least one of the following expedients;

- a) ramp means comprising a plurality of discrete ramp elements and connecting means flexibly connecting said elements together to provide a support part for a load,
- b) a short bridge member comprising an outwardly facing support surface for a load and projecting therefrom on each of two transversely opposite sides thereof a plurality of longitudinally spaced locating parts,
- c) a long bridge means comprising a plurality of discrete bridge elements and connecting means flexibly connecting said bridge elements together to provide a support part for a load each bridge element being provided with mounting means,
- d) an adaptor means comprising a plurality of discrete adaptor elements and connecting means flexibly connecting said adaptor elements together to provide a support part for a load, wherein each adaptor element comprises a rail engaging means, for engaging a part of a railway rail, and further

engagement means,

e) a flexible mat comprising a plurality of flexible longitudinally extending elements and a plurality of flexible transversely extending elements, the longitudinally extending elements being connected to the transversely extending elements,

f) a shield member comprising a channel section element adapted to be mounted on a railway rail,

g) filler means comprising a plurality of discrete filler elements and connecting means flexibly connecting said filler elements together to provide a support part for a load.

[0008] Where the access means comprises expedient (a);

[0009] The discrete ramp elements may be movable relative to the connecting means.

[0010] The discrete ramp elements may have a clearance opening in which the connecting means is received.

[0011] The connecting means may comprise an elongate element in connecting relationship with the discrete ramp elements.

[0012] A connecting means may be disposed one at a plurality of locations of each discrete element.

[0013] The connecting means may comprise a flexible element.

[0014] The connecting means may comprise a wire rope, comprising a plurality of spirally wound strands.

[0015] Each discrete ramp element may have a connecting means disposed one at each of three locations on each element.

[0016] Each ramp element may comprise first and second foot parts which are spaced apart in a transverse direction of the ramp means, the elements being disposed side-by-side in a longitudinal direction of the ramp means.

[0017] The support part of each element may extend in a direction inclined upwardly from said first foot part towards a position disposed above the second foot part.

[0018] A connecting means may be disposed adjacent each of said first and second foot parts and a third connecting means may be disposed adjacent said upper end of the support part.

[0019] Each ramp element may have a first limb, an upper part of which provides said support part, and a second limb extending transversely relative to the first limb at the end of the first limb which provides the upper end of the support part, the end of the first limb remote from the second limb and the lower end of the second limb being provided with said first and second foot parts.

[0020] Each pair of adjacent discrete ramp elements may be separated adjacent at least one, and preferably adjacent the first, foot parts, by a separating member.

[0021] The separating member may be tubular and may be generally cylindrical.

[0022] The separating members may be flexible. For example, they may be made of synthetic plastics mate-

rial.

**[0023]** The separating elements may comprise flexible elements such as synthetic plastics tubes.

**[0024]** Each discrete ramp element may be of generally inverted channel section the side walls of the channel increasing in depth in the direction away from the end provided with the first foot part.

**[0025]** The upper surface of the support part may be generally planar but provided with a plurality of longitudinally extending ribs at spaced positions along the transverse extent of the ramp means.

**[0026]** The connecting means may be provided with a stop at each end against which stop end discrete ramp elements may abut.

**[0027]** The stop may comprise a swaged sleeve or clamp element which is clampable to a connecting means by a fastener means such as one or more threaded fasteners. One example of such a clamp is that commonly known as a "bull dog" clamp.

**[0028]** If desired, each discrete ramp element may be provided with a locating means, such as a crimp, whereby each discrete element is located in a direction longitudinally of the connecting means. If desired such locating means may be provided on a desired one or more of said discrete elements.

**[0029]** When the access means comprises expedient (b);

**[0030]** The locating means may be adapted to cooperate with a connecting means of a ramp means according to expedient (a), and/or an adaptor means according to expedient (d), and/or a filler means according to expedient (g).

**[0031]** Each locating part may be of generally hook configuration comprising a pair of spaced upper and lower limbs interconnected by a transversely extending part.

**[0032]** The short bridge member may comprise an engagement means to engage a railway rail.

**[0033]** The engagement means may comprise a channel shaped element adapted to receive a railhead of said railway rail.

**[0034]** Where the access means comprises expedient (c);

**[0035]** The mounting means may be adapted to cooperate with a connecting means of a ramp means according to expedient (a), and/or an adaptor means according to expedient (d), and/or a filler means according to expedient (g).

**[0036]** The connecting means of the ramp means may be the connecting means disposed adjacent said upper end of the support part.

**[0037]** The mounting means may comprise a recess adapted to receive portions of the ramp means.

**[0038]** The mounting means may alternatively comprise a hook part extending outwardly from the bridge element to engage a lower part of the ramp means.

**[0039]** The support part of the bridge means may have a generally planar upwardly facing surface.

**[0040]** The upwardly facing surface has a generally horizontal portion.

**[0041]** The upwardly facing surface may comprise a middle part having end portions inclined to the middle part.

**[0042]** The upwardly facing surface may have a plurality of transversely spaced ribs each rib extending in a longitudinal direction.

**[0043]** Where the access means comprises expedient (d);

**[0044]** The rail engagement means may comprise a transverse part and a rail engagement part, adapted to be received in a recess provided on the side of said railway rail.

**[0045]** The further engagement means may comprise means to engage a ramp means according to expedient (a)

**[0046]** The further engagement means may comprise a hook-shaped part adapted to engage a lower part of the ramp means.

**[0047]** The adaptor means may be provided with a part of reduced depth adjacent to the rail. Where the rail is provided with anchor means to connect the rail to the tie such that a ramp means as described herein cannot be located adjacent the rail, the part of reduced depth may enable the adaptor means to be located in place adjacent the rail without engaging the anchor means and the ramp means may be connected to the adaptor means.

**[0048]** Where the access means comprises expedient (e);

**[0049]** One of said elements may comprise metal wire comprising a plurality of spirally wound strands, whilst the other of the elements comprise a chain comprising a plurality of rigid, pivotally interconnected, loops.

**[0050]** The wire elements may be disposed so as to extend through openings of said loops.

**[0051]** Locating means may be provided on at least one end of at least one of said transversely extending elements or longitudinally extending elements.

**[0052]** Where the access means comprises expedient (f);

**[0053]** The shield member may be provided with at least two feet on opposite sides thereof adapted to engage a base plate of a railway rail.

**[0054]** According to a second aspect of the invention we provide an access means according to the first aspect of the invention and a railway rail in combination.

**[0055]** The access means may comprise ramp means according to expedient (a), disposed on at least one side of the railway rail.

**[0056]** The railway rail may be mounted on a plurality of ties disposed at spaced positions longitudinally of the rail and the rail having a base part which is fastened to a tie by an anchor means.

**[0057]** The anchor means may cooperate with the ramp means to locate the ramp means and prevent displacement thereof away from the rail in a direction trans-

verse to the rail.

**[0058]** A short bridge member according to expedient (b) may be engaged with the ramp means.

**[0059]** The locating part of the short bridge member may be engaged with the ramp means.

**[0060]** The access means may comprise a long bridge member according to expedient (c) wherein the mounting means are engaged with the ramp means.

**[0061]** The access means may be provided with adaptor means according to expedient (d).

**[0062]** A flexible mat according to expedient (e) may be connected to at least one of the ramp means.

**[0063]** The connecting means may be connected directly or indirectly via the separating members to the connecting means associated with the first base part.

**[0064]** The chain members may extend longitudinally of the assembly.

**[0065]** A shield member according to expedient (f) may be arranged over the rail.

**[0066]** A filler means according to expedient (g) may be disposed between the ramp means and the rail.

**[0067]** According to a third aspect of the invention we provide access means comprising a pair of ramp means according to expedient (a) disposed in transversely spaced relationship and interconnected by a long bridge means according to expedient (c), the mounting means of the long bridge means being in operative mounting relationship with the ramp means.

**[0068]** The long bridge means may be provided with a latch member, such as a hinged latch to retain the long bridge means on the associated ramp means.

**[0069]** In this case the ramp means may be disposed at opposite sides of a conduit which may contain wiring or the like. The conduit may comprise a channel section member which may be provided with a lid member and the members may be made of suitable material such as concrete.

**[0070]** The invention will now be described in more detail by way of example with reference to the accompanying drawings, wherein:-

Figure 1 is a fragmentary perspective view, partly broken away, of part of a railway track having an access means embodying the invention;

Figure 2 is a fragmentary perspective view, to an enlarged scale, of part of the access means of Figure 1;

Figure 3 is a fragmentary perspective view to an enlarged scale of an alternative part of the access means of Figure 1;

Figure 4 is a fragmentary perspective view showing part of another embodiment of the invention;

Figure 5 is a fragmentary perspective view partially broken away, of part of a railway track according to the invention incorporating the embodiment of Figure 3;

Figure 6 is a fragmentary perspective view showing a further embodiment of the invention;

Figure 7 is a fragmentary perspective view showing a yet further embodiment of the invention;

Figure 8 is a fragmentary perspective view showing an alternative arrangement of the embodiment of Figure 7; and

Figure 9 is a fragmentary perspective view showing a shield member which may be used with the ramp means of the embodiment illustrated with reference to Figure 1 and of the embodiment illustrated with reference to Figure 5.

**[0071]** Referring now to the Figures, part of a conventional railway track is illustrated in Figure 1 and comprises a pair of conventional rails 10 which are supported in conventional manner on ties 11 at a conventional gauge. In Figure 1 only one of the rails 10 is illustrated and this comprises a base plate 12 connected by a vertical web 13 to a rail head 14 on which the wheels of a railway vehicle run in conventional manner.

**[0072]** Disposed on opposite sides of the rail 10 are load access means comprising ramp means 15. Each ramp means 15 comprises a plurality, in the present example eight, of discrete ramp elements 17, but if desired a different number of ramp elements may be provided so that each ramp means may be longer or shorter than that illustrated or indeed, each ramp element 17 may be made narrower or wider than illustrated.

**[0073]** The discrete ramp elements 17 are interconnected, in side-by-side relationship, by three connecting means C1, C2, C3 which, in the present example, comprise flexible spirally wound steel wires. If desired, however, the connecting means may comprise other suitable elongate members and may be relatively flexible or rigid.

**[0074]** Each ramp element 17 comprises a first limb 18 and a second limb 19 which extends transversely to the first limb 18. The first limb 18 is of inverted channel section configuration, the sides of the channel increasing in depth in a direction away from a leading end 20 towards an upper trailing end 21 at which the second limb 19 is provided which extends downwardly to a lower trailing end 22. The second limb 19 is also of channel section configuration having side limbs 23.

**[0075]** Welded to each element 17 at the leading end 20, the upper trailing end 21 and the lower trailing end 22 are tubes 25, 26, 27 respectively. The tubes 25, 26, 27 have a central passage which is a clearance fit on the associated connecting means C1-C3 so that the ramp elements are angularly flexibly mounted relative to each connecting means.

**[0076]** Each ramp element 17 is separated from an adjacent element 17 at the leading end 20 by a tubular separating member 30 engaged on the connecting means C1. The separating members 30 are made of flexible material such as synthetic plastics material.

**[0077]** The tubes 26, 27 are longer than the tubes 25

and so project further outwardly of their respective side limbs 18, 23. The adjacent ends of the tubes 26, 27 are dimensioned to abut or to be closely spaced so that a separating member 30 is not required.

[0078] Suitable stop means are provided between each connecting means C1, C3 and end ramp elements 17 to retain the ramp elements assembled together on the connecting means. The stop means may comprise a ferrule 24 swaged or otherwise fastened to each of the respective connecting means C1-C3 and adapted to abut the outwardly facing side of the respective end ramp element. Alternatively the stop means may comprise a clamp element clamped to a connecting member by a fastening means such as at least one threaded fastener. One such type of clamp is that commonly known as a "bull dog" clamp.

[0079] The combination of connecting means abutting ends of the tubes 26, 27 and the flexible separating members 30 maintains the ramp elements fairly firmly connected together whilst permitting relative flexing between the parts as necessary in service as hereinafter to be described.

[0080] If desired, suitable locating means may be provided between at least some of the ramp elements 17 and at least one of the connecting means C1-C3 to limit their relative movement in a longitudinal direction. Such locating means may comprise a crimp provided between the associated tubular elements 25-27 and the associated connecting means. The crimp may be provided adjacent a mid-point, in the longitudinal direction, of each ramp element and may be provided for each connecting member or only one or only two connecting members.

[0081] The tubular elements 25 and 27 provide the leading and trailing feet parts of each ramp element and hence, in combination, of the ramp means.

[0082] As shown in Figure 1, the trailing feet are engaged with a clip 31 provided, in conventional manner, to engage the foot part 12 of the rail 10 to locate the rail on the tie 11. As a result, movement of the ramp means in a direction transverse of the rail 10 away from the rail is prevented.

[0083] Each ramp element has a generally planar support part 36 for a load. In this example and the other expedients of the access means, the load is a vehicle but may be a pedestrian. The planar surface 36 which extends upwardly away from the leading foot part to a position spaced generally above the trailing foot part. A plurality of transversely spaced, longitudinally extending, ribs 37 may be provided on each support part 36 to facilitate grip between a load and the ramp means. If desired any other suitable grip improving means may be provided such as by punching a desired pattern in the support part 36 or by coating it with a suitable grip enhancing coating.

[0084] A short bridge member 40 is mounted on the ramp means adjacent their upper ends and comprises a planar member 41 having a plurality of mounting parts

42 in the form of hook members having spaced parallel upper and lower limbs 43 interconnected by a transverse part 44. The hook parts engage over the tubular parts 26. As a result the short bridge member 40 is located on the ramp means and also serves to help retain the ramp means in position. The bridge member 40 may be of a longitudinal extent which may equal the longitudinal extent of each ramp means or may be of a shorter length as desired. The plate part 41 is adapted, on its undersurface to engage the top of the rail head 14 so that the weight of a load supported thereon is taken by the rail.

[0085] An alternative configuration for the short bridge member is shown at 45 in Figure 3. In this example, the bridge member 45 comprises a surface 46 comprising two inclined sections 46a, 46b which are inclined away from the centre line of the surface 46. Mounting means in the form of end hook members 47a and intermediate hook member 47b are provided at either side of the short bridge member 45 to engage tubular parts 26 of the access means of Figure 1. The hook members 47a, 47b have a transverse part 48 disposed at an angle of approximately 85° from the plane of the inclined parts 46a, 46b. The width of the end hook members 47a is half that of the intermediate hook members 47b, such that the end hook members 47a of two adjacent short bridge members 45 may be introduced into a common gap between adjacent ramp elements 17. Attached to the surface of the bridge member 45 is a channel section 49 adapted to engage the top of a rail head, so that the weight of a load supported by the bridge member 45 is taken by the rail head 14.

[0086] It will be apparent of that the transverse part 46 of the bridge member 45 could be generally planar if desired.

[0087] In use, a vehicle to be positioned on the track is driven generally transversely up the ramp means on the appropriate side of the track until the vehicle is supported on the pair of short bridges 41 or 45 associated with each rail, then the vehicle is rotated through generally 90° so that the vehicle is aligned in the longitudinal direction of the track, from which position the vehicle can be moved longitudinally of the track as desired. It will be appreciated that such access means facilitates access and prevents damage to the track.

[0088] In practice, the ties 11 will not all be of the same height and they may be wholly or partly covered in ballast. Accordingly the surface with which the leading foot is engaged may not be planar but the flexible connection provided between the ramp elements described hereinbefore accommodates such variables.

[0089] If it is desired simply to drive a load over one or more rails then, of course, the same equipment is used as described hereinbefore but the load is not rotated when in position on the short bridges 41 or 45.

[0090] In some circumstances, it may not be desirable or possible to place the ramp means sufficiently close to a rail. An adaptor means shown at 80 in Figures 4 and 5

may then be provided. The adaptor means 80 comprises a plurality of discrete adaptor elements 81. The number of adaptor elements 81 may be varied to provide the desired length of the adaptor means 80, for example to be generally the same length as an associated ramp means as hereinbefore described.

[0091] As show in Figures 4 and 5, each adaptor element 81 comprises an upper surface 82, side surfaces 83, a first end surface 84 and a second end surface 85. The lower part of the adaptor element 81 may be completely or partially closed by a metal sheet. The depth of the second end surface 85 is less than that of the first end surface 84, and the lower edges of the side surfaces 83 are inclined in a direction downwardly away from the lower edge of the second end surface 85. A recess is thus defined below the adaptor element 81 at the end of the adaptor element 81 to be disposed adjacent a railway rail.

[0092] Attached to each adaptor 81 at the upper and lower edges of the first end surface 84 and the lower edge of the second end surface 85 are tubes 86, 87 and 88 respectively. Tubes 86, 87, and 88 have a central passage which is a clearance fit on associated connecting means D1 D2 D3 respectively so that the adaptor elements 81 are angularly flexibly mounted relative to each connecting means. Each tube 86, 87, 88 projects either side of the adaptor element 81 and ends in a flange part 86a, 87a, 88a which abuts a corresponding flange part of a tube of an adjacent adaptor element 81 to maintain the adaptor elements at a desired spacing.

[0093] In the present example, the connection means D1, D2 and D3 comprise spiral flexibly wound steel wires. If desired, however, the connecting means may comprise of other suitable elongate members and may be relatively flexible or rigid.

[0094] Projecting from each adaptor element 81 is a rail engagement element 90. The rail engagement element 90 is attached adjacent to the lower end of one of the side surfaces 83 by an inclined part 91. A transverse part 92 projects from the inclined part 91 generally outwardly of the adaptor element 81. At the end of the transverse part 92 is provided a rail engagement part 93 which extends at approximately right angles to the transverse part 92. The rail engagement part 93 is adapted to be received in a recess at the side of a rail 10 as shown in Figure 1, defined by the base plate 12, vertical web 13 and rail head 14 of the rail 10.

[0095] An further engagement means comprising an engagement element 94 is provided attached to the tube 87. The engagement element 94 comprises a transverse part 95 and an upwardly directed part 96. The engagement element 94 extends substantially across the width of the adaptor element 81 such that when a plurality of the adaptor elements 81 are disposed in operational relationship to one another, the engagement elements 94 abut as shown in Figure 5.

[0096] A adaptor means is partially shown in Figure 5 disposed in operational relationship to an ramp means

15 as herein described and a railway rail 10. The ramp means 15 is provided disposed at a distance from the railway rail 10. Disposed between the rail 10 and the access element 15 is an adaptor means 80 comprising a plurality of adaptor elements 81. The ends of the rail engagement elements 90 are received in the recess formed by the base plate 12, web 13 and rail head 14 of the rail 10. A lower part of the ramp elements 17, comprising the tube 27, is received in the recess formed by the engagement element 94, and the end surface 84. The upper surface 82 of each adaptor element 81 thus provides a surface generally at the height of the top of the rail head 14.

[0097] Such an adaptor means may preferably be used when the rails are of the so-called 'bullhead' type. 'Bullhead rails' are attached to ties conventionally by means of fish plates. The fish plates ramp means being disposed sufficiently close to the rails. However, the recess defined by the adaptor elements is adapted to avoid engaging said fish plates.

[0098] The adaptor means may of course be used to avoid any other suitable obstacle.

[0099] Where it is desired to provide a generally level load support surface, filler means may be used. The filler means comprises a plurality of filler elements each having a generally planar upper surface to provide a load support surface. The filler elements may be connected together by like connecting means to those described herein with reference to the ramp means, adaptor means or long bridge means, such that the filler elements are angularly flexibly mounted relative to the connecting means. Filler means may be located for example between a ramp means and a rail, or between a pair of rails, and may be engaged with an adaptor means, or a short bridge member, or a long bridge means as described herein. A plurality of adjacent filler means may be used to provide a load support surface having a desired area.

[0100] To facilitate approach of a load to the access means described hereinbefore, the access means may be provided with flexible mats which, as best shown in Figure 6, comprise a plurality, for example four, conventional metal chains, comprising interlinked closed loops 50, of conventional nature. The end loops at least at one end of the mat are provided with hooks 51 which can be hooked over the connecting means of the leading end of the associated ramp means, for example over the separating tubes 33. Intertwined with the chain loops 50 is a flexible member in the form of a spirally wound wire 52 and the resultant loops 53 at at least one end may likewise be provided with hook members 54, similar to the hooks 51, which may be hooked to the connecting means alternatively to the hooks 51. The provision of such flexible and rugged mats facilitates passage of a load over ground which may be uneven and/or boggy and the provision of the hooks 51 and 54 or any other suitable connecting means, whereby the mats are connected to the ramp means, ensures that the mats stay in

position.

**[0101]** It is preferred that the mat is orientated so that the chain elements extend in the longitudinal direction of the track so that as a load approaches the track in a transverse direction the chain is engaged by the wheels or the track of the load to facilitate grip.

**[0102]** If it is desired to traverse the load across a structure which is wider than a rail, for example a cable trough, such as shown at 60 in Figure 7, then a pair of ramp means comprising discrete ramp elements 15 as described hereinbefore, are provided on opposite sides of the trough 60, and over the trough 60 is provided a long bridge means 61 which comprises a plurality of bridge elements 62 each of which is of generally channel configuration comprising side walls 63 in which pairs of tubes 64 are welded and which provide clearance passages for connecting means 65. The connecting means 65 and clearance passages in the tubes 64 and the manner of connection of the bridge elements 62 thereto is exactly the same as described hereinbefore in connection with the connecting means C1-C3 of the ramp elements 15.

**[0103]** The long bridge elements have a generally flat support portion 66 and inclined support portions 67 at opposite ends. Slots 68 are provided in the side walls 63 adjacent the respective leading end of each bridge element and the slots 68 are adapted to engage over the projecting parts 69 of the tubular elements 26 provided at the upper trailing end of each ramp element. If desired, a suitable latch means, such as a pivoted hook member, not shown, may be provided in association with each recess to prevent upward displacement of each long bridge member away from its associated ramp element.

**[0104]** The flexible connection between the long bridge elements enables the bridge elements to be adapted to engage with the flexibly connected ramp elements 15.

**[0105]** An alternative configuration of the long bridge means is shown in Figure 8, crossing a cable trough 60 as in Figure 7. The long bridge means shown at 100 comprises a plurality of long bridge elements 101, each long bridge element 101 comprising a generally flat support portion 102 with inclined portions 103 at either side. The support portion 102 and inclined portions 103 are of generally channel shaped cross section. Extending downwards from the inclined section 103 are vertical elements 104 which are similarly of channel shaped cross section. Disposed at the lower end of each vertical element 104 is a foot part 105 comprising a transversely extending part attached 106 to the lower end of the vertical element 104. The transversely extending part 106 extend generally outwardly of the bridge section 101. Provided at the end of the transversely extending part 106 is an upwardly extending part 107. The upwardly extending part 107, transversely extending part 106 and vertically extending part 104 define a channel in which a part of a tube 27 which provides the

lower part of an ramp means is as herein described is received Movement between the ramp means 15 and bridge elements 107 are prevented in a direction generally transverse to the cable trough 60.

**[0106]** Each bridge element 102 comprises a side wall 108 in which tubes 109 are provided. The tubes 109 provide clearance passages for connecting means 110. The connecting means 110 is passed through the tubes 109 to connect the bridge elements 101 in like manner as described herein connection with the bridge elements element 62 of Figure 7.

**[0107]** If it is desired to protect a rail head from damage by crossing loads utilising ramp assemblies as described hereinbefore but without the use of a short bridge, for example, when it is desired to run a railway load along the track whilst leaving the ramp assemblies in position, a shield element of generally channel configuration is provided as shown at 70 in Figure 9. The shield may be provided with feet parts 71 having out turned flanges 72 for engagement with a clip 73 or a clip retaining means 74 associated with a tie 11. The feet parts 71 with out turned flanges 72 may be disposed at any desired suitable position longitudinally of the sleeve. The feet part are disposed on the appropriate side of a clip 73 or retaining means 74 to prevent longitudinal movement between the shield and a railway line in a longitudinal direction according to the direction in which a shield is intended to be moved when a load is, for example, rotated thereon. It will be appreciated that on a railway track in such a rotating situation the shields would tend to be urged in opposite directions.

**[0108]** Although one particular construction of the access means and its various components has been described hereinbefore, it should be appreciated that if desired the details of construction may be varied from that described hereinbefore so long as the features of flexible connection of discrete elements of the access means are provided.

**[0109]** Where short bridges are provided, although the elements are not coincident in longitudinal extent to each ramp element the connection between the short bridges and the ramp means permits a degree of flexibility and the short bridges may extend over, for example, only some of the plurality of ramp elements that a desired degree of flexibility and conformity is achieved.

**[0110]** By providing attachment means between the connecting elements C1-C3 and the ramp elements 17, longitudinal location between the connecting elements C1-C3 and the transverse elements is maintained to prevent the ramp elements pivoting relative to the connecting elements and causing the effect commonly known as "lozenging". For this purpose it is preferred that the location means are provided at or adjacent the mid-point of each ramp element.

**[0111]** A gap may be provided between adjacent tube ends and/or the separating elements so that the flexibility between adjacent ramp elements may be adjusted. For example, a relatively narrow gap or indeed no gap at

all may be provided at the inboard end particularly at the inboard foot end whilst a relatively wide gap with, or without, a separating member may be provided at an outboard end to facilitate variable terrain configurations. The engagement of the ramp means with the rail clips may take place via the tubes. 5

[0112] By providing the stop means at least at one end of a connection by means of a clamp element the ramp means can be dis-assembled to permit replacement or repair of a ramp element without the need to perform a further swaging or crimping operation. 10

[0113] If desired the ramp means may be of a length to span two, or more than two, ties.

[0114] If desired two, or more than two ramp means, disposed end to end longitudinally of the rail, may be connected together and the connection may be a flexible connection. 15

[0115] Although in the illustrated example all the elements, including the connecting elements and swages have been described as being made of metal and are preferably made of steel. 20

[0116] If desired, some or all of the components may be made of synthetic plastics material and suitable means, such as an adhesive or softening and adhesion by heating, may be employed to connect the various components together as necessary. 25

[0117] If desired, the access means described herein may be used in combination with other means as desired to provide a support surface of required extent and character. For example, ramp means may be used in combination with timber baulks, or alternative bridge means may be used to extend between transversely spaced means according to expedient (a), or expedient (d), or expedient (g). Other suitable combinations of the access means described herein and additional means may be envisaged. Any suitable combination of one or more of the expedients described herein may be used with or without said additional means. 30

[0118] The features disclosed in the foregoing description, or the following claims, or the accompanying drawings, expressed in their specific forms or in terms of a means for performing the disclosed function, or a method or process for attaining the disclosed result, as appropriate, may, separately, or in any combination of such features, be utilised for realising the invention in diverse forms thereof. 40 45

## Claims

1. An access means comprising at least one of the following expedients; 50

a) ramp means comprising a plurality of discrete ramp elements and connecting means flexibly connecting said elements together to provide a support part for a load, 55

b) a short bridge member comprising an outwardly facing support surface for a load and

projecting therefrom on each of two transversely opposite sides thereof a plurality of longitudinally spaced locating parts,

c) a long bridge means comprising a plurality of discrete bridge elements and connecting means flexibly connecting said bridge elements together to provide a support part for a load each bridge element being provided with mounting means,

d) an adaptor means comprising a plurality of discrete adaptor elements and connecting means flexibly connecting said adaptor elements together to provide a support part for a load, wherein each adaptor element comprises a rail engaging means for engaging a part of a railway rail and further engagement means,

e) a flexible mat comprising a plurality of flexible longitudinally extending elements and a plurality of flexible transversely extending elements, the longitudinally extending elements being connected to the transversely extending elements,

f) a shield member comprising a channel section element adapted to be mounted on a railway rail,

g) filler means comprising a plurality of discrete filler elements and connecting means flexibly connecting said filler elements together to provide a support part for a load.

2. An access means according to claim 1 comprising at least expedient (a) wherein the discrete ramp elements have a clearance opening in which the connecting means is received and wherein the connecting means comprises an elongate element in connecting relationship with the discrete ramp elements.

3. An access means according to any one of the preceding claims comprising at least expedient (a) wherein connecting means are disposed one at a plurality of locations of each discrete element.

4. An access means according to any one of the preceding claims comprising at least expedient (a) wherein the connecting means comprises a flexible element.

5. An access means according to any one of the preceding claims comprising at least expedient (a) wherein each discrete ramp element has a connecting means disposed one at each of three locations on each element.

6. An access means according to any one of the preceding claims comprising at least expedient (a) wherein each ramp element comprises first and second foot parts which are spaced apart in a



transverse direction of the access means, the elements being disposed side-by-side in a longitudinal direction of the access means and wherein the support part of each element extends in a direction inclined upwardly from said first foot part towards a position disposed above the second foot part.

7. An access means according to claim 6 wherein connecting means are disposed adjacent each of said first and second foot parts and a third connecting means is disposed adjacent said upper end of the support part.

8. An access means according to claim 6 or claim 7 wherein each ramp element has a first limb, an upper part of which provides said support part, and a second limb extending transversely relative to the first limb at the end of the first limb which provides the upper end of the support part, the end of the first limb remote from the second limb and the lower end of the second limb being provided with said first and second foot parts.

9. An access means according to any one of claims 6 to 8 wherein each pair of adjacent discrete ramp elements is separated adjacent at least one, and preferably adjacent the first, foot parts, by a separating member.

10. An access means according to any one of claims 6 to 9 wherein each discrete ramp element is of generally inverted channel section the side walls of the channel increasing in depth in the direction away from the end provided with the first foot part.

11. An access means according to any one of the preceding claims comprising at least expedient (a) wherein the upper surface of the support part is generally planar and is provided with a plurality of longitudinally extending ribs at spaced positions along the transverse extent of the ramp means.

12. An access means according to any one of the preceding claims comprising at least expedient (a) wherein the connecting means is provided with a stop at each end.

13. An access means according to any one of the preceding claims comprising at least expedient (a) wherein a desired one or more of the discrete ramp elements is provided with a locating means, whereby each discrete element is located in a direction longitudinally of the connecting means.

14. An access means according to any one of the preceding claims comprising at least expedient (b) wherein the locating means are adapted to cooperate with a connecting means of a ramp means

according to expedient (a), and/or an adaptor means according to expedient (d), and/or a filler means according to expedient (g).

15. An access means according to any one of the preceding claims comprising at least expedient (b) wherein each locating part of the short bridge member is of generally hook configuration comprising a pair of spaced upper and lower limbs interconnected by a transversely extending part.

16. An access means according to any one of the preceding claims comprising at least expedient (b) wherein the short bridge member comprises an engagement means to engage a rail, the engagement means comprising a channel-shaped element adapted to receive a railhead.

17. An access means according to any one of the preceding claims comprising at least expedient (c) wherein the mounting means is adapted to cooperate with a connecting means of a ramp means according to expedient (a), and/or an adaptor means according to expedient (d), and/or a filler means according to expedient (g).

18. An access means according to any one of the preceding claims comprising at least expedient (c) wherein the mounting means comprises a recess adapted to receive a portion of the ramp means.

19. An access means according to any one of the preceding claims comprising at least expedient (c) wherein the mounting means comprises a hook part extending outwardly from the bridge element to engage a lower part of the ramp means.

20. An access means according to any one of the preceding claims comprising at least expedient (c) wherein the support part of the long bridge means has a generally planar upwardly facing surface and the upwardly facing surface has a plurality of transversely spaced ribs each rib extending in a longitudinal direction.

21. An access means according to any one of the preceding claims comprising at least expedient (d) wherein the rail engagement means of the adaptor means comprises a transverse part and a rail engagement part adapted to be received in a recess provided on the side of said railway rail and wherein the further engagement means is adapted to engage a ramp means according to expedient (a).

22. An access means according to any one of the preceding claims comprising at least expedient (d) wherein the adaptor means is provided with a part

of reduced depth adjacent the railway rail.

23. An access means according to any one of the preceding claims comprising at least expedient (e) wherein one of said elements of the mat comprises metal wire comprising a plurality of spirally wound strands, whilst the other of the elements comprises a chain comprising a plurality of rigid, pivotally interconnected, loops, wherein locating means are provided on at least one end of at least one of said transversely extending elements or longitudinally extending elements. 5 10
24. An access means according to any one of the preceding claims comprising at least expedient (f) wherein the shield is provided with at least two feet on opposite sides thereof adapted to engage a base plate of a railway rail. 15
25. An access means according to any one of the preceding claims in combination with a railway rail. 20
26. An access means according to any one of the preceding comprising a pair of ramp means according to expedient (a) disposed in transversely spaced relationship and interconnected by a long bridge means according to expedient (c), the mounting means of the long bridge means being in operative mounting relationship with the ramp means. 25 30

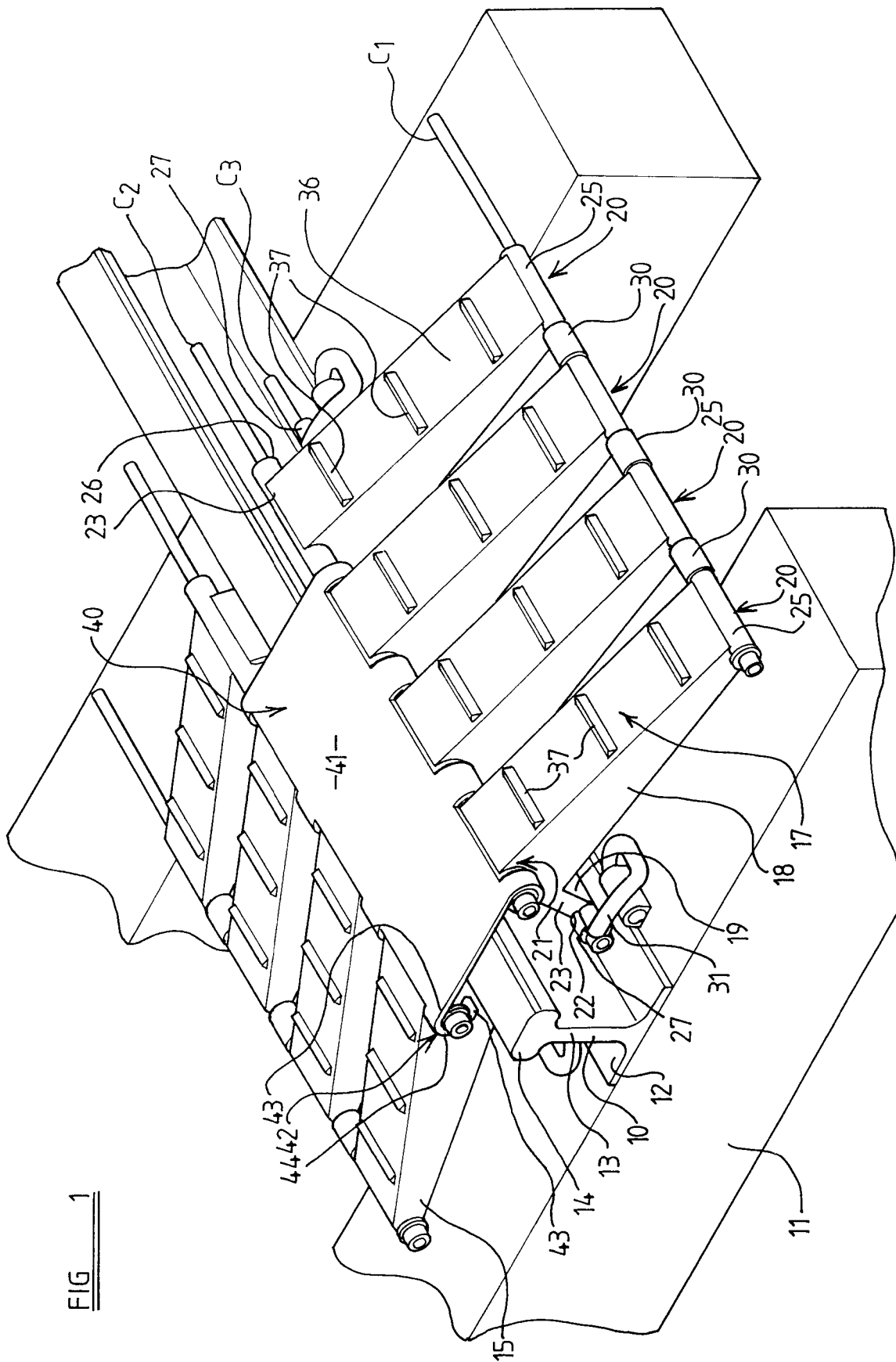
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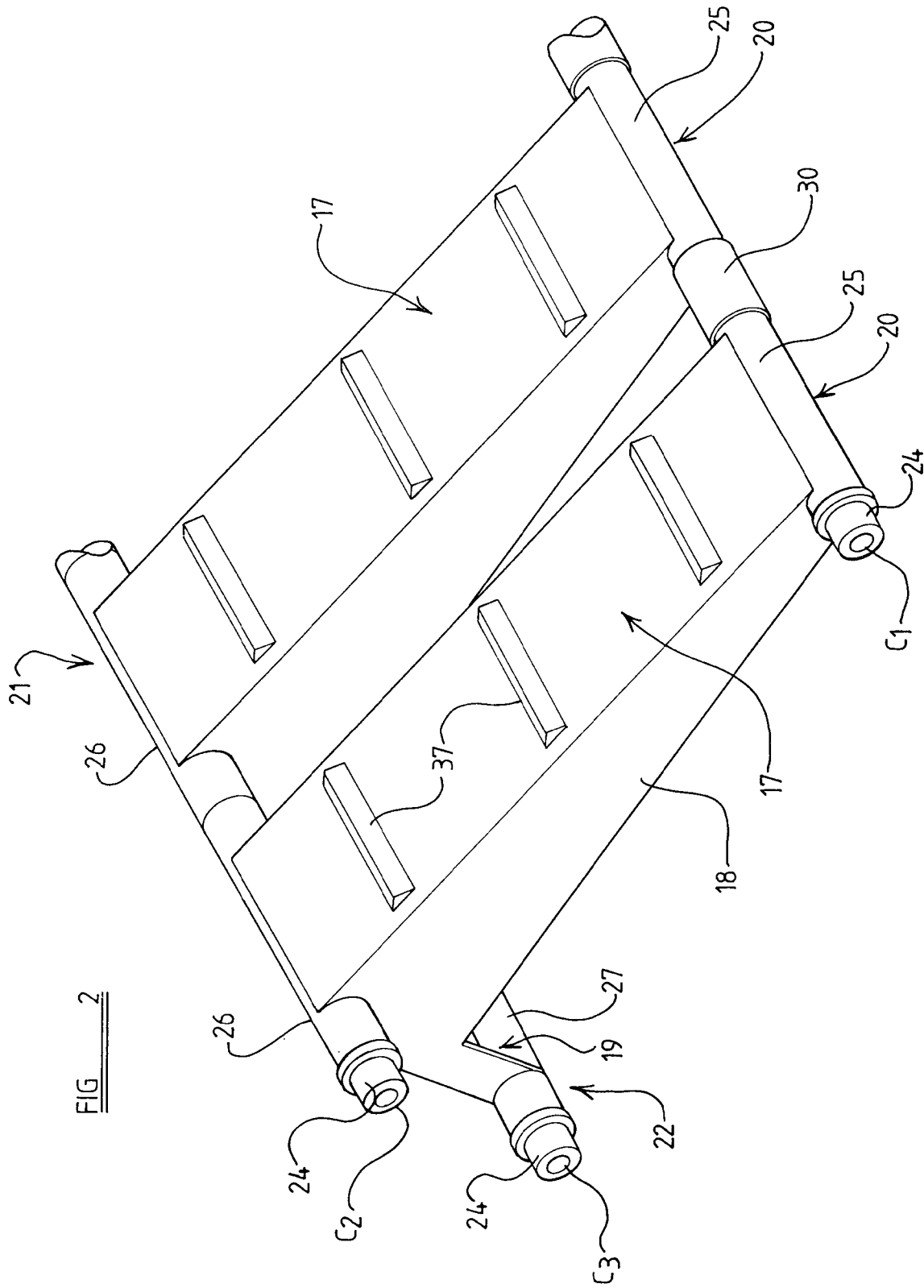
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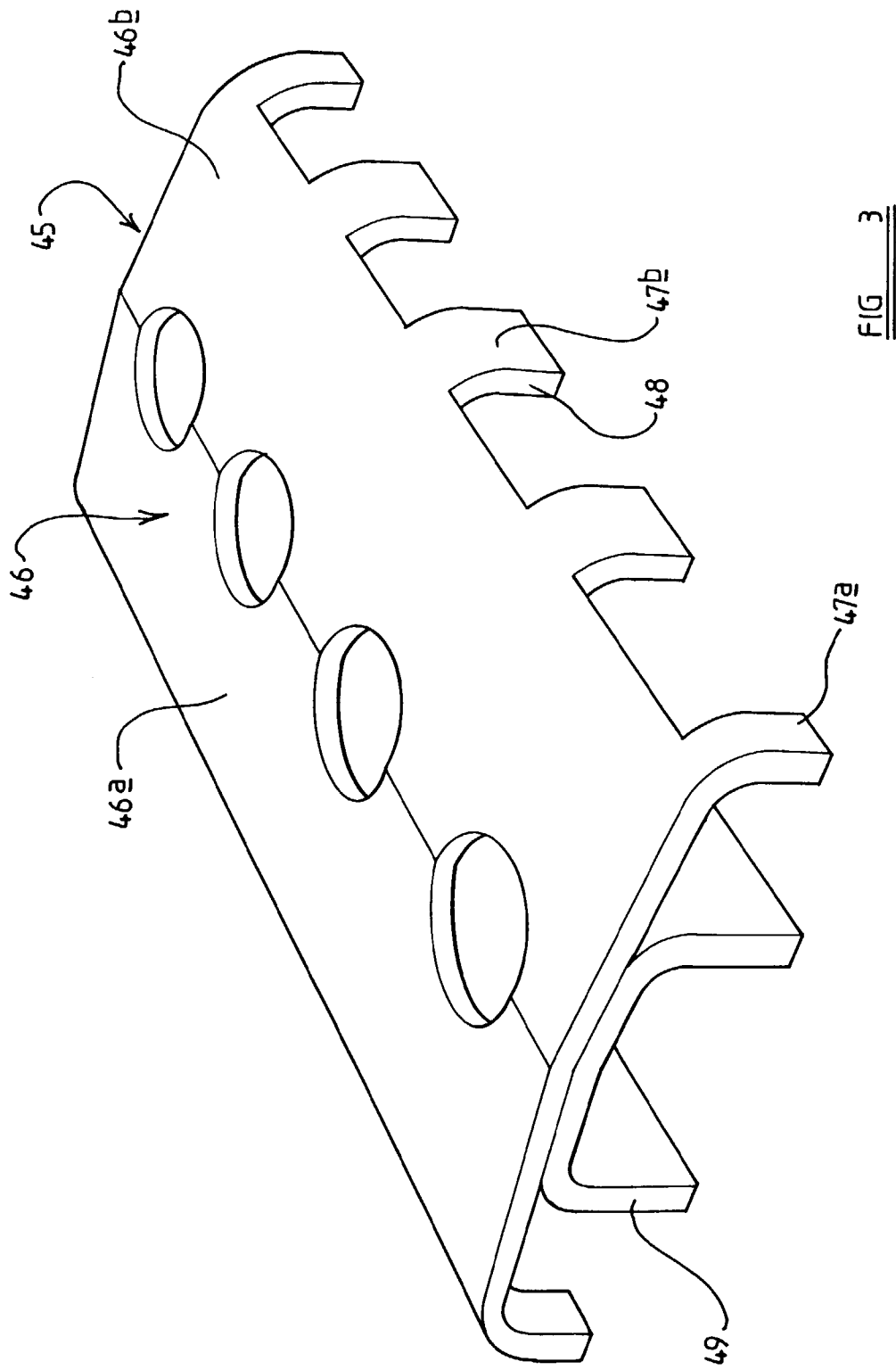
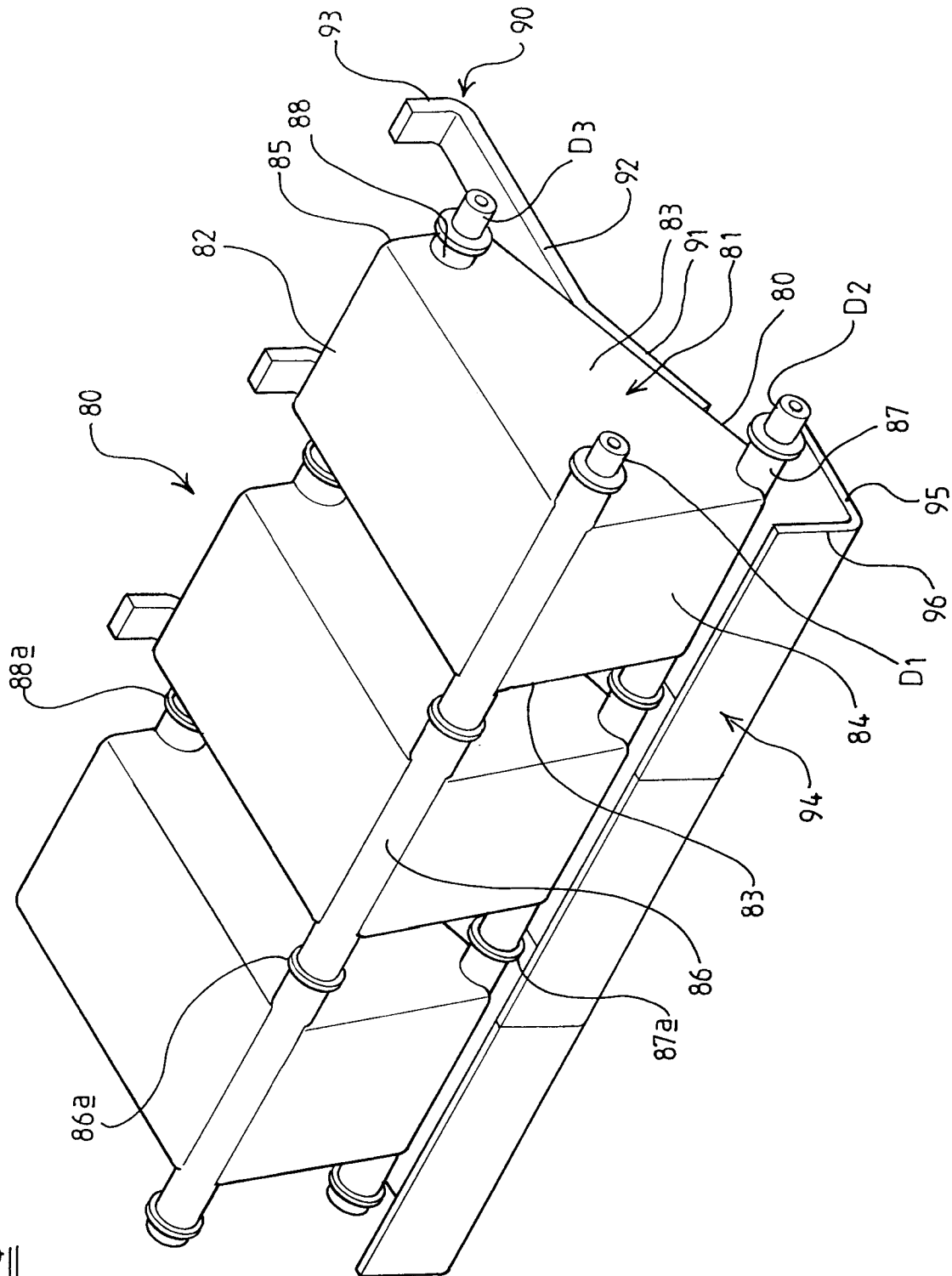


FIG 4



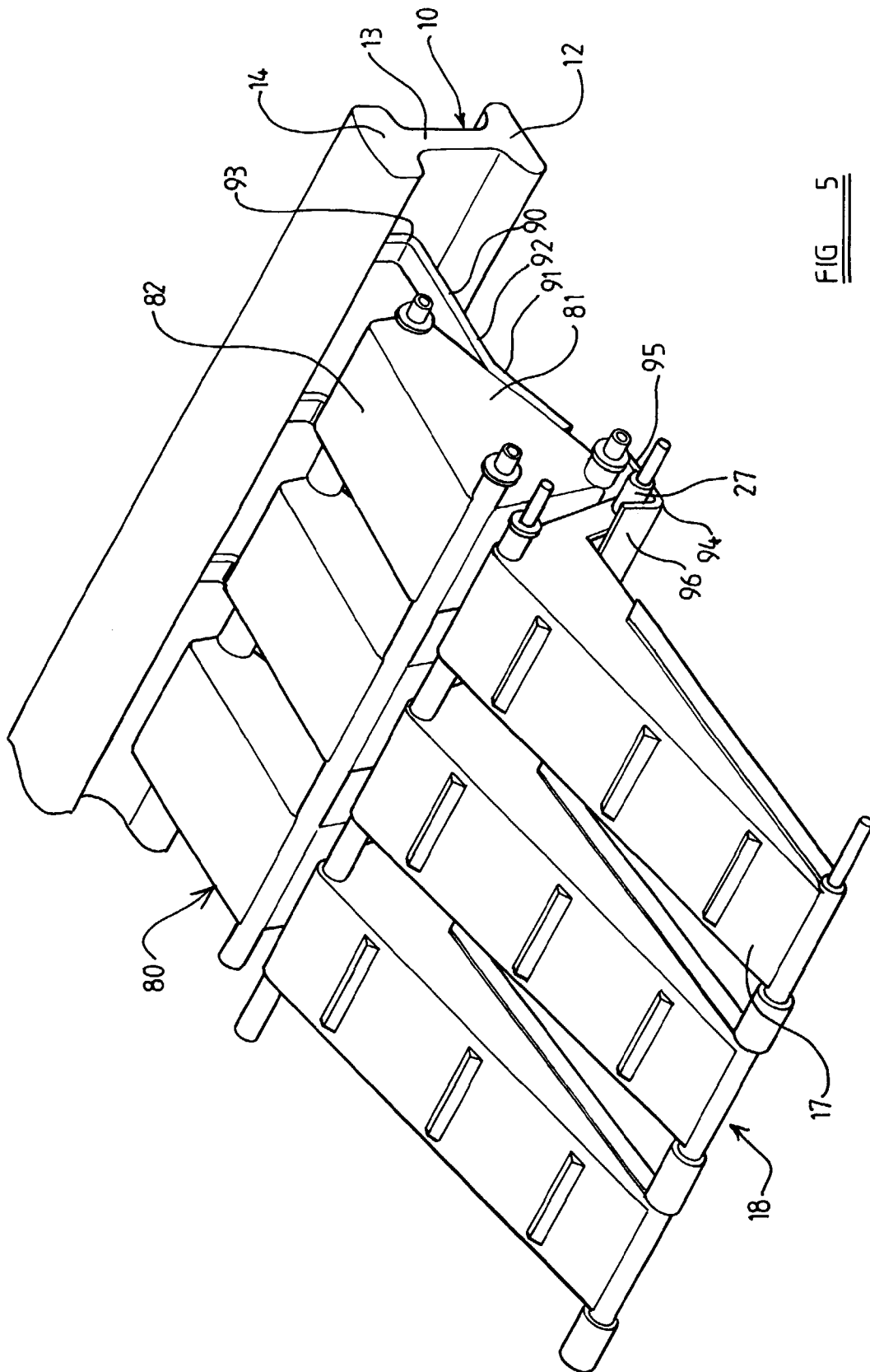


FIG. 5

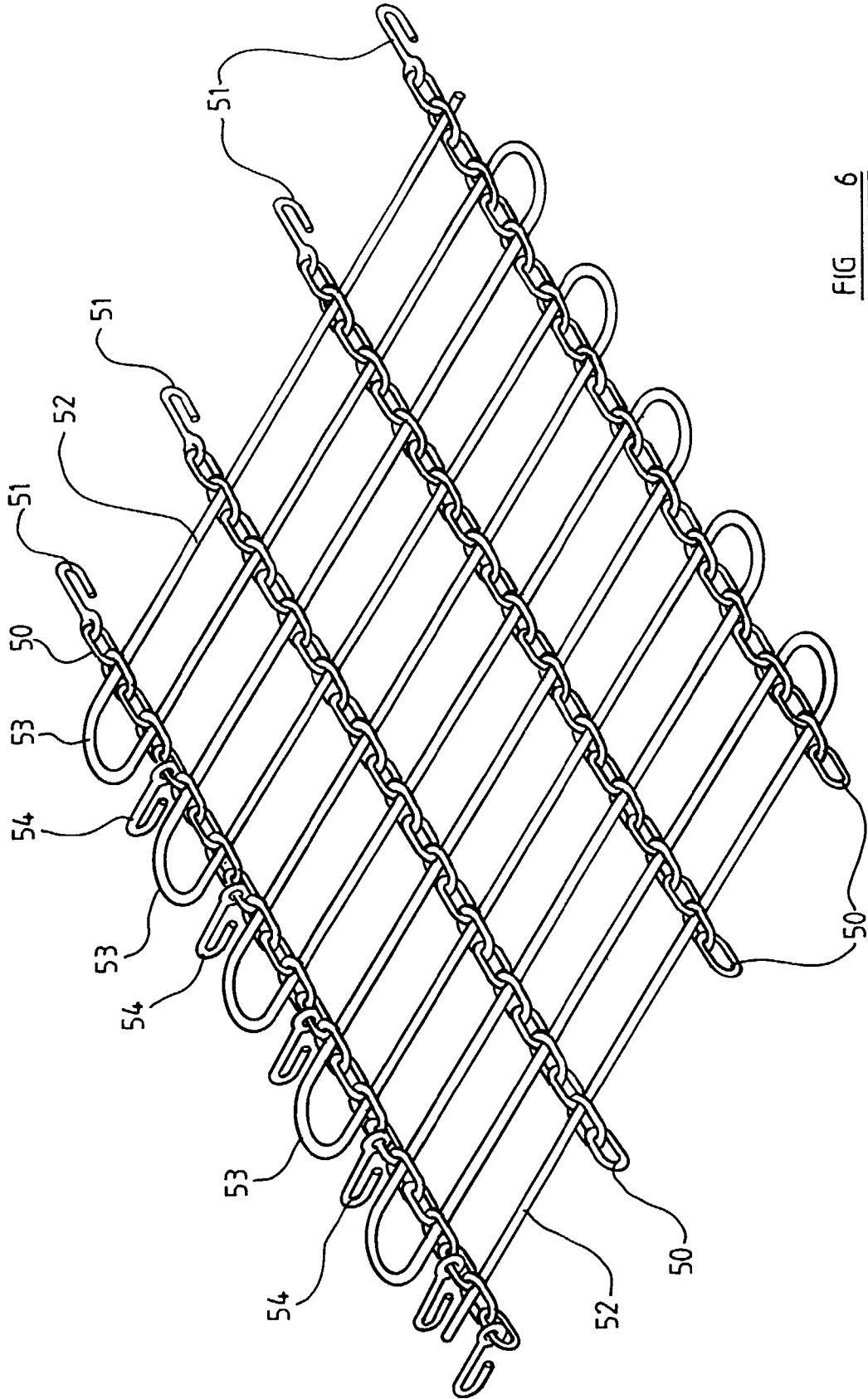
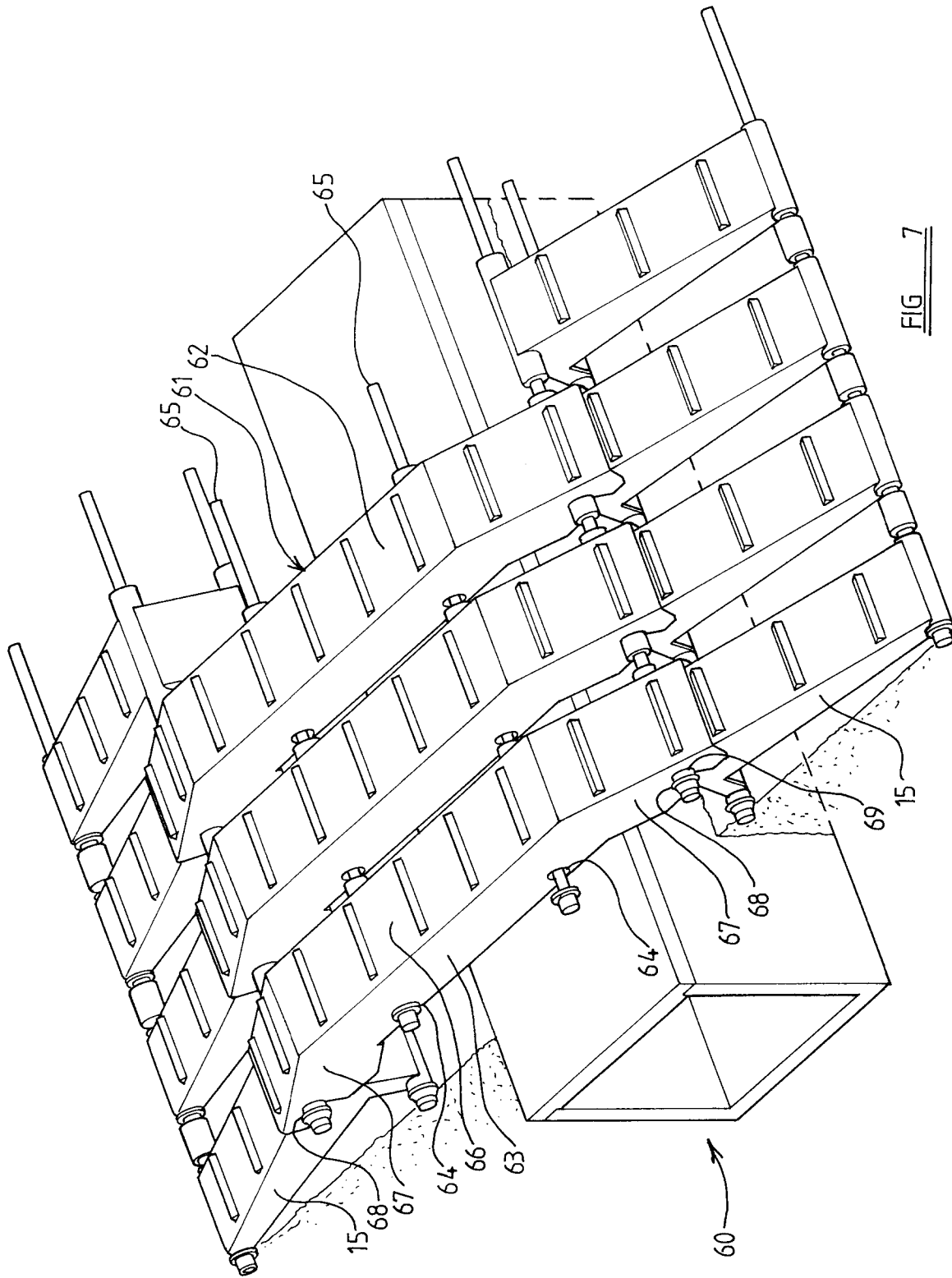


FIG 6





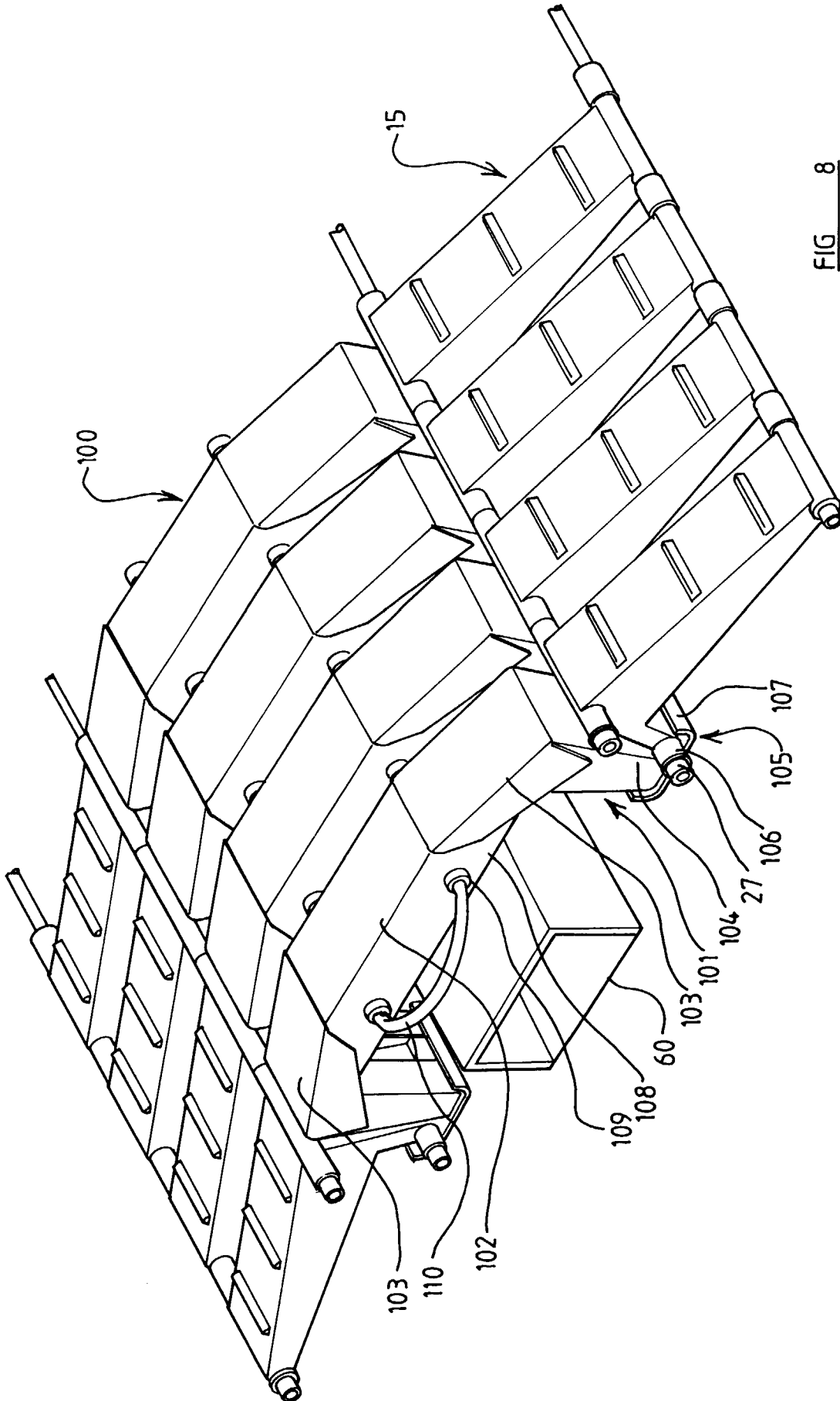


FIG. 8

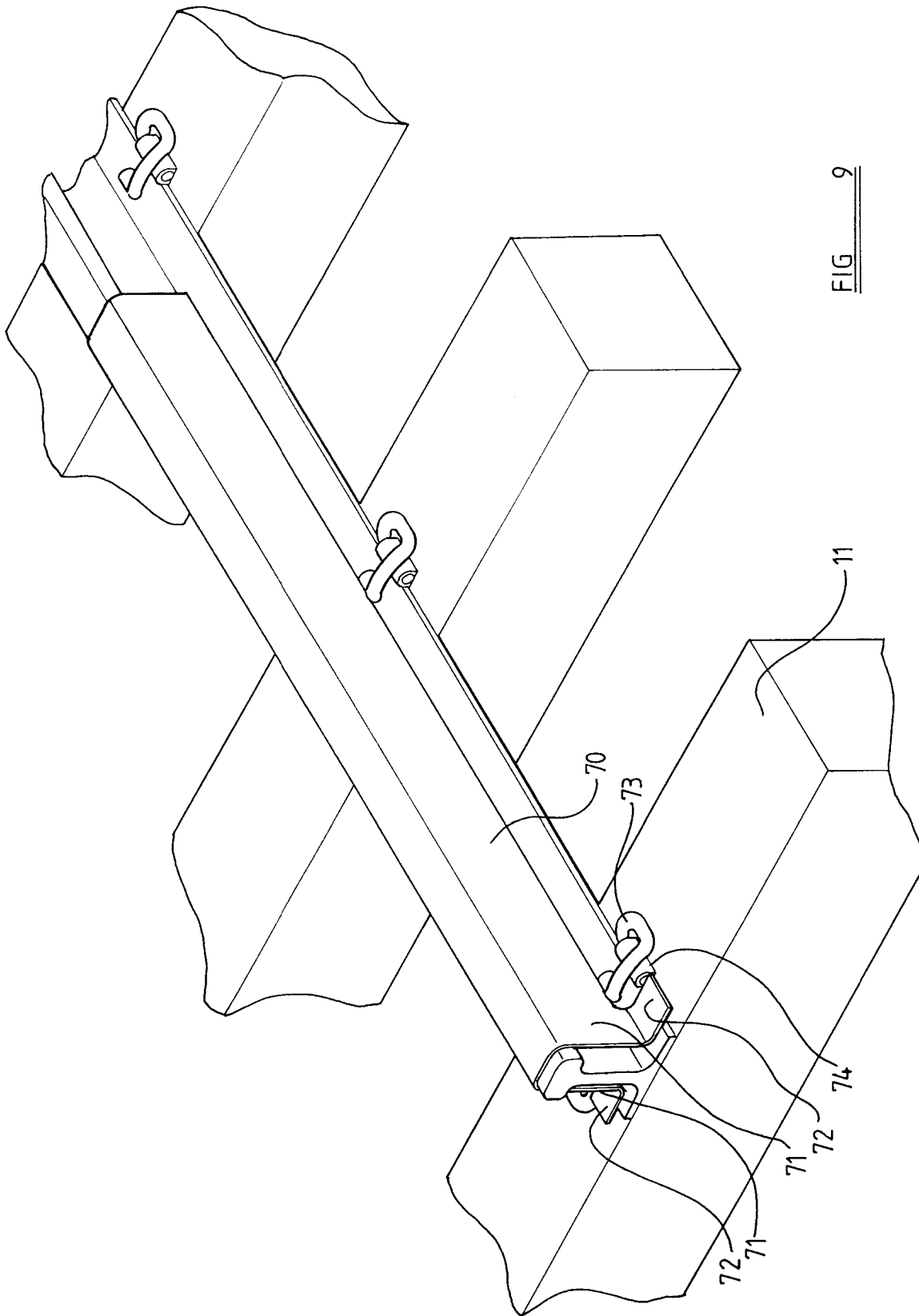


FIG. 9