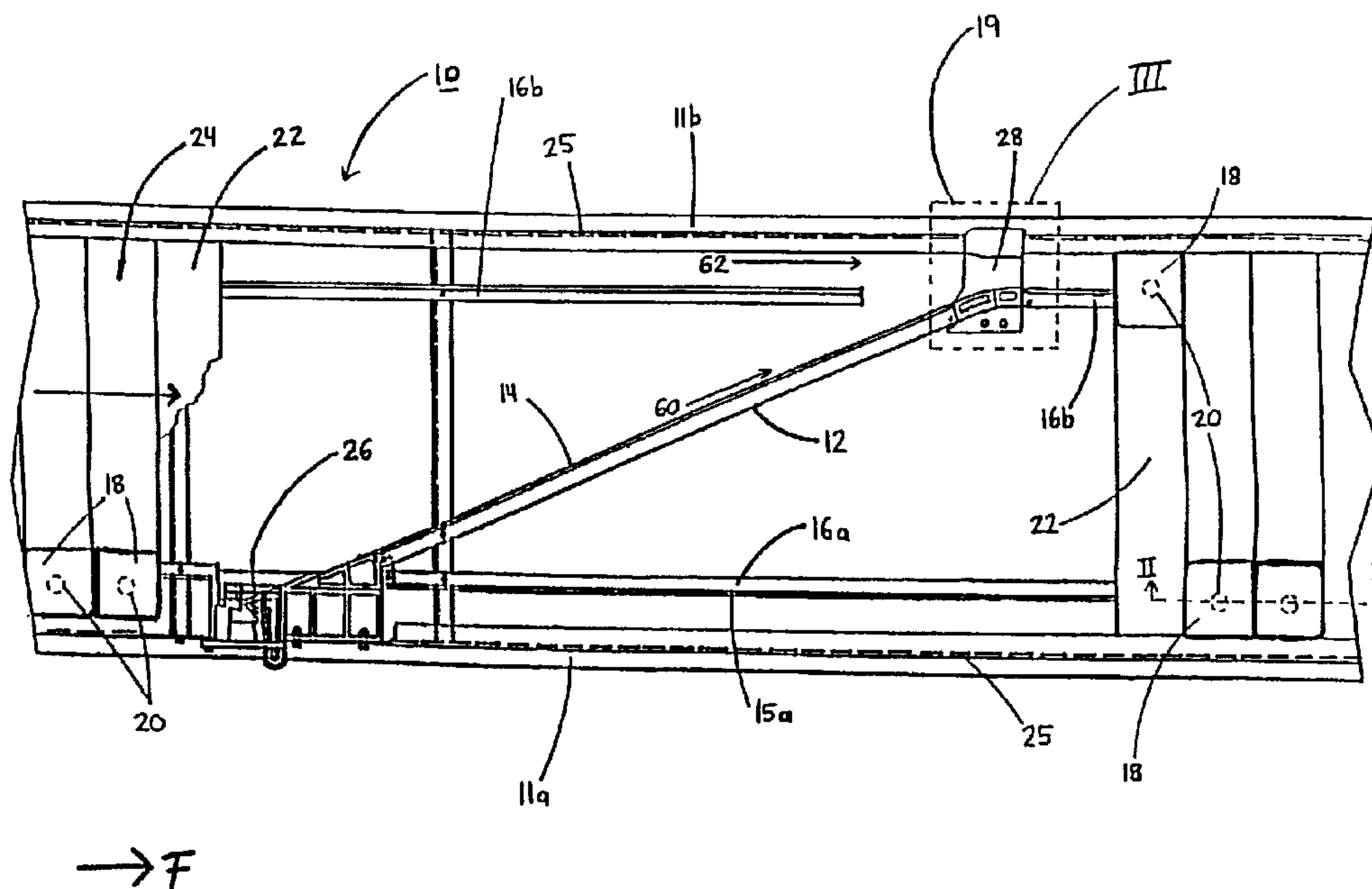




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(54) Titre : DISPOSITIF DE TRI POUR CHARGES ISOLEES ET SON PROCEDE DE MISE EN ACTION
(54) Title: ITEM SORTING DEVICE AND METHOD FOR THE OPERATION THEREOF



(57) **Abrégé/Abstract:**

The invention relates to an item sorting conveyor, specially for parcels, small packages and containers, comprising a conveyor surface (24) moving in the direction of conveyance, consisting of multiple interspaced and interconnected conveyor surface members (supporting profiles 22); multiple deflecting elements (18) which can be displaced sideways in relation to the direction of conveyance (F) along at least one of the conveyor surface members (supporting profile 22); a network of lateral guide tracks (16a, b) and deflection tracks (12) which are placed below the conveyor surface (24) and in which guiding elements (20) extending downwards from the deflection elements (18) can be guided, and a device for reducing noise and wear and tear (27), which is located in the bifurcation area (19) between the first guiding track (60) and the second guiding track (62). In order to provide a sorting conveyor with reduced wear and tear and noise, at least one attracting member (basic element 28, magnet arrangement 44) for the guiding elements (20) of the deflection elements (18) should be placed in the bifurcation area in such a way that the guiding elements (20) which are guided along the first guiding track (16) are attracted by a force of attraction on the end of the deflection track (12) against the inertia of the guiding elements (20) onto the guiding surface (14) of the deflection track (12).





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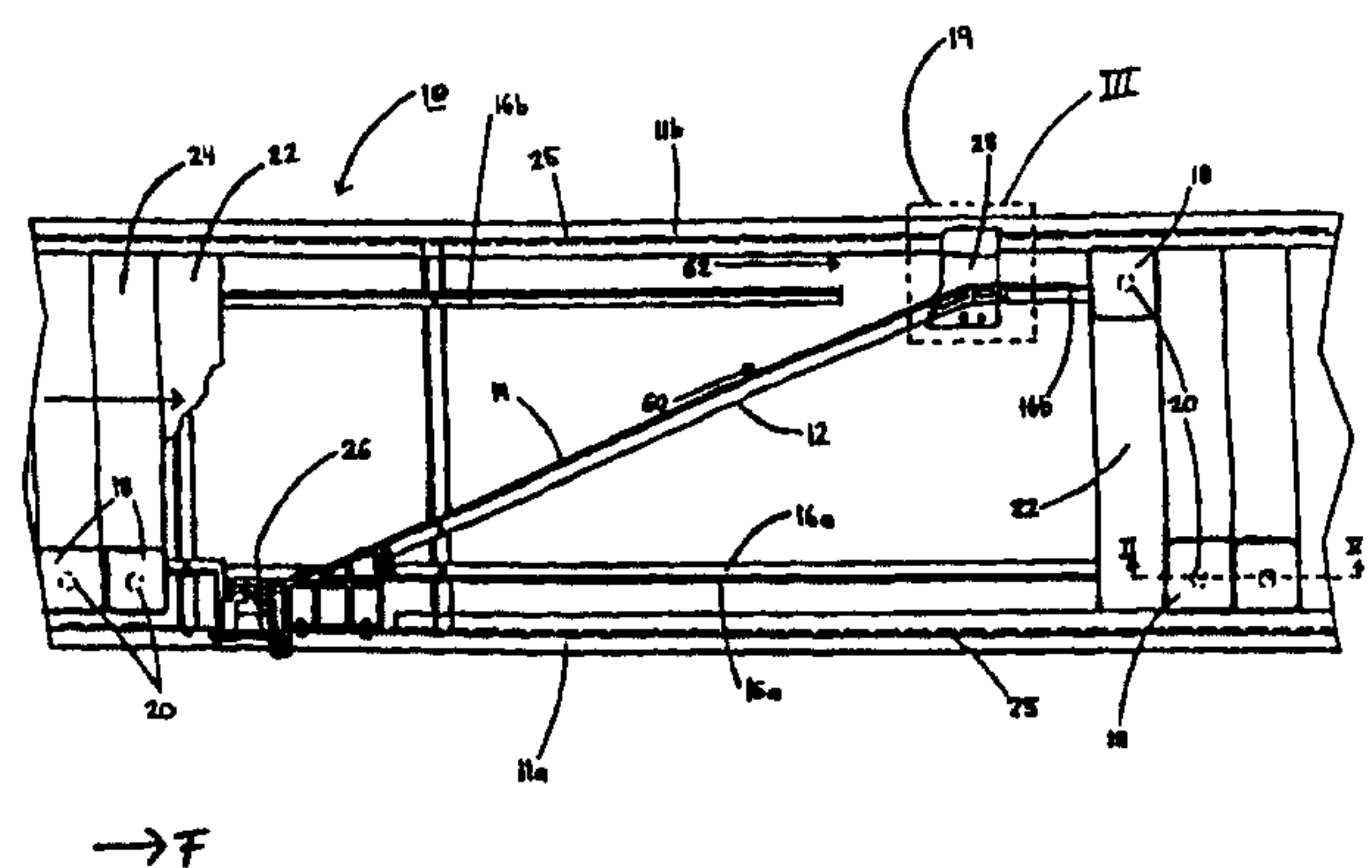
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(54) Title: ITEM SORTING DEVICE AND METHOD FOR THE OPERATION THEREOF

(54) Bezeichnung: SORTIERVORRICHTUNG FÜR STÜCKGUT UND VERFAHREN ZU DEREN BETRIEB

(57) Abstract

The invention relates to an item sorting conveyor, specially for parcels, small packages and containers, comprising a conveyor surface (24) moving in the direction of conveyance, consisting of multiple interspaced and interconnected conveyor surface members (supporting profiles 22); multiple deflecting elements (18) which can be displaced sideways in relation to the direction of conveyance (F) along at least one of the conveyor surface members (supporting profile 22); a network of lateral guide tracks (16a, b) and deflection tracks (12) which are placed below the conveyor surface (24) and in which guiding elements (20) extending downwards from the deflection elements (18) can be guided, and a device for reducing noise and wear and tear (27), which is located in the bifurcation area (19) between the first guiding track (60) and the second guiding track (62). In order to provide a sorting conveyor with reduced wear and tear and noise, at least one attracting member (basic element 28, magnet arrangement 44) for the guiding elements (20) of the deflection elements (18) should be placed in the bifurcation area in such a way that the guiding elements (20) which are guided along the first guiding track (16) are attracted by a force of attraction on the end of the deflection track (12) against the inertia of the guiding elements (20) onto the guiding surface (14) of the deflection track (12).



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Item Sorting Device and Method
For The Operation Thereof

Description

5 The present device relates to an item-sorting conveyor, especially for parcels, small packages, and containers.

10 Sorting conveyors of this kind, which have deflection elements that can be moved along supporting profiles and can be moved transversely over the conveyor surface so as to move items from the conveyor surface onto an adjacent branch conveyor are known, for example, from EP 0484151 A1. These sorting conveyors have a conveyor surface that is formed by a series of supporting profiles such as tubes or supporting rods that are arranged so as to be
15 parallel and spaced apart from each other, and on which the items that are to be conveyed are supported. A deflection element is associated with at least one of the supporting profiles, and this can move along the supporting profile and thus transversely to the direction of conveyance of the
20 sorting conveyor. In the event that an item that is being conveyed on the conveyor is not to be diverted, the deflection elements are moved to one side of the conveyor surface in the rest position, without acting on the item. In the event that an item is to be diverted, the deflection elements are moved
25 sideways from their former rectilinear path of movement and move obliquely along the supporting profile so as to move the items being conveyed laterally at the side of the deflection elements onto an adjacent branch conveyor, a holding area, or another area of the conveyor surface.

30 Activation and control of the deflection elements is effected by way of a network of guide and branch tracks that are interconnected through switches and arranged beneath the conveyor surface. Each of these switch elements has a guiding element that extends downward from the deflection element and
35 is preferably in the form of a pin on which there is a guide

roller; this roller fits into the guide tracks or branch tracks that are arranged adjacent to it. Within the areas of the sorting conveyor into which no items are to be deflected, the guide tracks run parallel to the direction of conveyance of the sorting conveyor, and are arranged in the area beneath the sides of the conveyor surface. These lateral guide tracks prevent the deflection elements being moved transversely to the direction of conveyance of the sorting conveyor. As a result of this, the deflecting elements are guided along one of the two sides of the conveyor surface. Within those areas of the sorting conveyor into which the items are to be deflected, there is a branch track arranged beneath the conveyor surface, and this is oriented diagonally to the direction of conveyance of the sorting conveyor. A switch element connects the side guide tracks to the branch track and is intended to divert preselected guide elements from the lateral guide tracks onto the deflection track. When an item that is to be deflected reaches the deflection area of the sorting conveyor, the switch element is reset and the deflection element is redirected from the guide track that runs in the direction of conveyance, along one side of the conveyor, onto a guide track that runs diagonally to the direction of conveyance of the conveyor. Because of this, the deflection elements move obliquely to the direction of conveyance and transversely across the conveyor surface and move the items that are being conveyed adjacent to the deflection elements on to the adjacent branch conveyor or into a holding area. Additional details referring to the operation of a sorting conveyor of this kind are described in US Patent 5,127,510, to the publication of which reference is made herewith.

It is a disadvantage that noise and wear problems occur with sorting conveyors of this kind. These problems are caused by the pins and guide rollers of the guiding elements striking the guiding surfaces of the lateral guide tracks or another stop surfaces, once the deflection elements have been moved transversely across the conveyor surface. The movement of the sorting conveyor, or of its supporting profiles, in the •

direction of conveyance, combined with the guiding elements being directed into the diagonal deflection track generates a force component in the deflection elements that is transverse to the direction of conveyance. This component acts on the driving elements only while they are being guided in the deflection track. However, after they leave the deflection track the inertial forces, which are similarly oriented, once again act on the guiding elements. Because of these inertial forces, once they leave the deflection track, the guiding elements are moved in their diagonal orientation until the pins and the guide rollers of the guiding elements strike the lateral guiding surfaces of the lateral guide tracks.

Since the conveyor reaches speeds of up to 2.75 metres per second (540 ft/minute) or more, and since seven deflection elements are arranged one behind the other for each meter of conveyor length, the result is that the number of collisions between the guiding elements and the conveyor guiding surface of the lateral guide tracks is extremely large. In addition to the noise problem caused by these collisions, they also cause increased amounts of wear on the lateral surfaces of the lateral guide tracks and the pins and guide rollers of the guide elements, with the result that frequent replacement becomes necessary.

One possible way of controlling this problem is to arrange a curved recess in the guiding surfaces of the lateral guide tracks in the area in which the guiding elements impact as they come from the deflection tracks. Because of this, the guiding elements of the deflection elements are not stopped directly; rather, they are deflected more gradually into the desired direction parallel to the direction of conveyance of the sorting conveyor because of this curved recess. However, this solution is not entirely satisfactory since the resulting wear and the tractive forces acting on the guiding elements cannot be eliminated, but only reduced. Furthermore, it is an added disadvantage that because of the curved recess, the guiding element is acted upon by an inertial force that is oriented against the diagonal direction of deflection and, for

this reason, when introduced into the lateral guiding tracks it strikes its opposite side wall. Moreover, additional installation space is required for the arrangement of the curved recess, which extends downstream in the direction of conveyance, after the end of the deflection track on the lateral guide track. For this reason, an additional deflection track cannot be arranged so as to be directly adjacent to a deflection track.

Another possible solution to this problem is to make the lateral guide tracks of the sorting conveyor from a plastic that is highly resistant to impact, or by arranging a plastic covering on the innermost side of the lateral guide tracks. Certainly, wear on the guiding elements of the deflection elements and on the guiding surfaces of the lateral guide tracks can be reduced by doing this, although it does not eliminate the noise problem; all that will change will be the pitch of the noise that is generated.

Proceeding from the prior art, it is the objective of the present invention to create a sorting conveyor and a method for operating this, said conveyor reducing the wear on the guiding elements and the lateral guide tracks in a structurally simple manner and which also reduces the emission of noise in the area where the deflecting track merges with the guide tracks and which, at the same time, requires no additional installation space along the guide track.

This objective has been achieved by an item-sorting conveyor having the features set out in Patent Claim 1. A method for the operation of a sorting conveyor is described in Patent Claim 15. The distinguishing features set out in the secondary Claim 2 to 14 describe advantageous configurations of the apparatus according to the present invention.

The present invention is distinguished by a sorting conveyor and a method for operating this, which prevent the guiding elements that are moved further on diagonally to the direction of conveyance by inertial forces after having left the deflection track from striking the lateral guiding surfaces of the lateral guide tracks. It is advantageous that the

solution that is proposed does not require additional installation space along the guide track, so that an additional switch element and another deflection track can be arranged so as to follow another deflection track as closely as possible,
5 as viewed in the direction of conveyance.

The sorting conveyor according to the present invention is distinguished by at least one attracting device that is arranged in the transition area from a deflection track to a guide track of a sorting conveyor. Thus, the sorting
10 conveyor has a conveyor surface that extends in the direction of conveyance, which is formed from multiple conveyor surface parts that are interconnected, on each of which there is a deflection element. The attracting element for the deflection element is on the sorting conveyor in the vicinity of the
15 bifurcation area, between a first guide track that is set at an angle to the direction of conveyance, and a second guide track that is parallel to the direction of conveyance of the sorting conveyor and laterally adjacent to one side of the conveyor surface of the sorting conveyor. The attracting element for
20 the guiding element is sufficiently close to the first guide track to eliminate the inertial forces of the guiding element that is being moved along the first guide track, which act on the guiding elements. This means that the guiding elements are essentially protected against colliding with the side surfaces
25 of the lateral guide track or other stop surfaces of the sorting conveyor. In addition, the attracting element for the guiding elements is arranged far enough away from the second guide track that the guiding elements that are moved along the second guide track are not deflected from their path by the
30 attracting element. It is preferred that the attracting element be configured as a magnet system.

The method for operating a sorting conveyor according to the present invention is characterized in that because of at least one attracting element for the deflection elements, which
35 is arranged at one end of a deflection track that runs beneath the conveyor surface and guides the deflection elements across the conveyor surface transversely to the direction of

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conveyance, the guiding elements are also directed by the guide surface that is continuous from the deflection track into the lateral guide track in the end area of the deflection tracks. The attracting element for the
5 deflection elements is intended to cancel out the inertial forces acting on the deflection elements so that the guiding elements do not collide with the side surfaces of the lateral guide track that runs parallel to the direction of conveyance, and that is opposite the end of the deflection
10 track.

In accordance with one aspect of the present invention, there is provided item-sorting conveyor, especially for parcels, small packages, and containers, this consisting of a conveyor surface that can be moved in the
15 direction of conveyance, that consists of a multiplicity of interspaced and interconnected conveyor surface parts, of a multiplicity of deflection elements, that can be moved at least along one of the conveyor-surface parts for a transverse movement relative to the direction of conveyance,
20 of a network of lateral guide tracks and deflection tracks in which guide elements that extend downwards from the deflection elements can be guided, the deflection tracks being oriented at an angle to the long side of the conveyor surface in order to apply a laterally oriented force to the
25 deflection elements so as to move said deflection elements obliquely across the conveyor surface to the other long side of the conveyor surface, the deflection tracks each forming a first guiding track and the lateral guide tracks each forming a second guiding track that is oriented essentially
30 parallel to the long side of the conveyor surface and of an element to reduce noise and wear that is arranged in the bifurcation area between the first guiding track and the second guiding track, characterized in that at least one attracting element that contains at least one magnet is
35 arranged for the guiding elements of the deflection elements is arranged in the bifurcation area in such a way that the

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guiding elements that are moving along the first guiding track are attracted by an attractive force at the end of the deflection track on the guiding surfaces of the deflection track and the guiding elements that are moved along the
5 second guiding track are scarcely diverted from their path by the attractive forces of the attracting element.

The present invention will be described in greater detail below, on the basis of two embodiments shown in the drawings appended hereto. These drawings show the
10 following:

Figure 1: A plan view of a sorting conveyor;

Figure 2: A cross section through Figure 1, along the section line II-II;

Figure 3: An enlargement of part of Figure 1, from
15 the bifurcation area designated III in Figure 1;

Figure 4: A perspective view of the base element shown in Figure 3, the magnet system not being shown;

Figure 5: A section through Figure 3, on the section line V-V;

20 Figure 6: An exploded view of a magnet system;

Figure 7: A plan view of a sorting conveyor as in Figure 3, in a further embodiment.

Figure 1 is a plan view of a conveyor 10 that is used for sorting items, this having deflection elements 18
25 and a conveyor surface 24 that is shown cut away in the centre area in order to reveal the structural elements that are arranged beneath said conveyor surface 24. The conveyor surface 24 is assembled from conveyor surface elements such as, for example, bar-like supporting profiles 22 that are
30 interspaced and interconnected and parallel to each other and arranged transversely to the direction of conveyance F

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so as to form an endless conveyor surface 24. The supporting profiles 22 are connected at their ends through tractive means 25, preferably

chains, and these move the supporting profiles 22 in the direction of conveyance F. Deflection elements 18 are arranged along one of the two long sides 11a and 11b of the conveyor surface 24, at least at the start of the conveyor 10, and these
5 are so connected to supporting profiles 22 as to permit movement of the deflection element 18 along the supporting profile 22, and thus transversely to the direction of conveyance F.

Figure 2 is a cross-section along the section line
10 II-II shown in Figure 1; this drawing shows two supporting profiles 22, each with a deflection element 18 that is slid on from one side. The deflection elements 18 have an upper deflection part 22 by which the individual items can be moved sideways from the conveyor surface 24, a middle gliding part 74
15 that in general encloses the outer periphery of the longitudinal profile 22, and a lower foot section 70 with an adjacent guiding element 20 that extends downward. This guiding element 20 comprises a pin 21 that extends downwards and a guide roller 23 that is concentric with and encloses
20 this, and which is preferably configured as a ball bearing. The deflection elements 18 are moved in the direction of conveyance F by its guiding elements 20 that fit into lateral guide tracks 16a, 16b that run along the long sides 11a and 11b of the conveyor surface 24 and beneath the conveyor surface 24. Any
25 lateral movement of the deflection elements 18 is prevented by the lateral guide tracks 16a and 16b.

If an item is to be moved off the conveyor 10 onto an adjacent branch conveyor (not shown herein), the guiding elements 20 of the deflection elements 18 are diverted from the
30 second guiding track 62 that is formed by the guide tracks 16a and 16b through a switch element 26 into an adjacent deflection track 12 that is arranged obliquely to the direction of conveyance F, on its guiding surface 14 that forms a first guiding track 60 for the guiding elements 20. The deflection
35 elements 18 are moved by the combined forward movement of the conveyor 10 with the supporting profiles 22 in the direction of conveyance F and the guiding of the guide rollers 22 of the

guiding element 20 onto the guiding surface 14 of the deflection track 12 transversely to the conveyor surface 24 and obliquely across the conveyor surface 24 at an angle to the direction of conveyance F. At the end of the deflection track 12, the guiding elements 20 that are guided along the deflection track 12 reach a bifurcation area 19 in which the deflection elements 18 are once again directed into the lateral guide tracks 16a and 16b. The switch elements 26 discussed heretofore are not considered to be central to the present invention, so that the invention can also be used in conveyors that have another version of the switch elements 26.

A noise and wear reducing element 27 is arranged within the bifurcation area 19 (see Figure 3); essentially, this comprises a base element 28 that incorporates a magnet arrangement 44. At one end, the base element 28 is connected to the deflection track 12 and at the other end it is connected to the lateral guide track 16b. The base element 28 incorporates a guide channel 30 that is defined on the side that is opposite the deflection track 12 by an outer surface 30 and on the opposite side is defined by an inside surface 34 (see Figure 3 and 4). In addition, the inside surface 34 has a circular curved part 36 that makes a transition to become a rectilinear straight part 38 at a connection point 39. The base element 28 is secured to the conveyor 10 by connectors 40 in the form of bolts in such a way that the end of the curved part 36 that is upstream in the direction of conveyance F lines up with the guiding surface 14 of the end of the deflection track 12. The base element 28 is also oriented such that the end of the straight section 38 that is located downstream becomes the guiding surfaces 15b of the lateral guide track 16b and subtends an angle with this. In one preferred embodiment, the base element is made of urethane. A line L indicates the intended extension of the guiding side 15b of the lateral guide tracks 16b in the bifurcation area 19. A gap G is left between the line L and the inside surface 34 of the guide channel 30 at the connection point 39; the significance of this gap will be discussed in greater detail below.

Adjacent to the curved part 36 of the base element 28 there is a recess 42 to which a magnet arrangement 44 is secured (see Figures 5 and 6). The magnet arrangement 44 incorporates a lower pole plate 52, a magnet holder 48 with openings 54 in which the magnets 46 are inserted and which is arranged above the lower pole plate 52; a fastener 49 for the magnet holder 48 is arranged on the magnet holder 48 and the upper pole plate 50. The upper pole plate is arranged above the magnets 46, the magnet-up holder 48 and the faster 49 for the magnet holder 48. The magnet arrangement 44 accommodates the magnets 46 with their magnet holder 48 that is arranged between the upper and the lower pole plates 50 and 52. The individual layers of the magnet arrangement 44 are held together by non-magnetic connectors 56 such as screws or bolts and secured to the base element 28. The connecting elements 56 are inserted into bores 58 in the base element 28 (see Figure 3). In one preferred embodiment, the upper and the lower pole plates 50 and 52 are of steel, and the magnet holder 48 and the fasteners 49 for the magnet holder 48 are of a non-magnetic material such as aluminum. Other non-magnetic materials such as plastics can be used. The connecting elements 56 are similarly of a non-magnetic material that, in the preferred embodiment, is stainless steel, since this does not essentially interfere with the magnetic field generated by the magnet arrangement 44. In the same way, in the preferred embodiment the magnets 46 are of neodymium, iron and boron (Nd-Fe-B). Magnets of this kind are produced by Ugimag Inc., Indiana, USA, item number F 0034-00121. If more than one magnet is arranged in the magnet arrangement 44, it is preferred that the magnets be configured so that their poles are all oriented in the same direction.

When the conveyor 10 is operating, the guide elements move in the guide channel 30 of the base element 20 of the noise and wear reduction element 27 from two possible guiding tracks 60, 62. A first guiding track 60 is defined on one side by the guiding surface 14 of the deflection track 12 against which the guiding elements 20a is lying as in Figure 3. The guiding element 20a shown in Figure 3 is situated in the end

area of the first guiding track 60, in which the deflection element 18 is guided obliquely across the guiding surface 24. A second guiding track 16 runs along the long side 11b of the conveyor surface 24 in which the guiding element 20b is moved.

5 The guiding elements 20 that follow the second guiding track 62 have possibly arrived previously by way of another first guiding track 16 and are now moving essentially parallel and adjacent to the one side 11b of the conveyor surface 24. The guiding elements that are being guided along the first guiding
10 track 60 enter the guide channel 30 adjacent to the curved part 36 of the inside surface 34 of the guide channel 30. When this occurs, the guiding element 20 is attracted by the magnets 46 and contact with the curved part 36 is maintained as the guiding element 20 is being moved along the curved part 36.
15 Because of the guide rollers 23 of the guiding element 20 that are in contact with the curved part 36, the direction of movement of the guiding element 20 is continuously converted from a direction that is transverse to the direction of conveyance F into a direction that runs in the direction of
20 conveyance F. This prevents the guiding element 20 from colliding with the outside surface 32 of the guiding element of the guide channel 30 or another stop surface, and this in its turn ensures that noise and wear problems caused by collisions of this sort are eliminated.

25 A guiding element 20 that has entered the guide channel 30 from the second guiding track 62 has possibly been moved already further upstream along a deflection track 20 or, in the case of a conveyor 10 from which items can be deflected to both sides, it is in a position to deflect an item on to the
30 opposite side of the conveyor 10. In either case, it is essential that this guiding element 20 be moved through the guided channel 30 of the base element 20 without being deflected by the magnets 46. Were the guide elements 20 to be attracted by the magnets 46, it would then collide with the
35 inner surface 34 of the guide channel 30, thereby generating noise and increasing the rate of wear on the guide roller 23 and the base element 28. This problem has been eliminated by

leaving a lateral gap G between the line L, defined by an intended extension of the guiding surfaces 15b of the lateral guide track 16b, and the connection point 39, between the curved part 36 and the straight part 38. Since the line L also describes the inner guiding surfaces 15b of the second guiding track 62, the gap G represents the smallest possible spacing of the guide elements 20, which are moved along the second guiding track 62, to the magnets 46.

The smaller the gap G, the closer the guiding elements 20 on the second guiding track 60 can approach to the magnets 46, and the stronger the magnetic force that acts on these guiding elements 20. From this it follows that if the gap G is too small, the deflecting elements 20 on the second guiding track 62 will experience sufficient attractive force to cause them to leave their usual linear path of movement and possibly collide with the inside surface 34 of the guide channel 30, and thereby generate noise and cause wear, which is undesirable.

On the other hand, if the gap G is made too large, a greater force will be applied to the guiding elements 20 transversely to the direction of conveyance F, as they are being moved along the straight part 38 of the inside surface 34. This force is brought about by the slightly angled orientation of the straight part 38 relative to the lateral guide tracks 11a and 11b. Since this transverse force is applied to the deflection elements 18 upstream, after the magnets 46, it cannot be reduced by the magnets 46 and thus leads disadvantageously to the guiding elements 20 striking the guiding surfaces 15a and 15b of the lateral guide tracks 16a and 16b.

Figure 7 shows an alternative embodiment of the element for reducing noise and wear 27'; this incorporates a base element 28' with a shorter curved section 36' of the inside surface 34' of the guide channel 30'; its magnet arrangement 44' consists essentially of only two magnets 46. In this embodiment, a smaller number of magnets 46 is used since the angle between the deflection track 12' and the long side

11b of the conveyor 10 is smaller than in the previous embodiment. In the previous embodiment, which incorporates three magnets, this angle is 30° degrees. In the present embodiment with two magnets, this angle is 20°. Because of this
5 smaller angle, two magnets 46 are sufficient to achieve the change of the direction of movement of the deflection elements 18 from the direction of the deflection rail 12 into the direction of the lateral guiding tracks 16b since the length of the curved part 36' is shorter because of the smaller angle.

10 Even though the present invention has been described heretofore with reference to two embodiments, this is not to be taken as restricting the present invention to these two embodiments alone. As an example, the execution of the present invention is not restricted to the use of only two or three
15 magnets. The number of magnets depends only on the particular configuration of the conveyor. The magnets can be in the form of electromagnets or permanent magnets, as may be desired. Neither is the present invention confined to the arrangement of magnets along a curved part of the deflection or guiding
20 tracks. The magnets can also be arranged along other guiding surfaces.

The present invention can also be used for other types of conveyor than the one described in this application. The invention can be used in every type of conveyor that has
25 parts that can be moved transversely to the direction of conveyance, which are guided by tracks or similar structural elements that are arranged beneath the surface of the conveyor. In addition, the guiding and deflection tracks can be curved instead of linear, as shown herein.

30 Neither is the use of the noise and wear-reducing element restricted to the arrangement at the end of the deflection track as shown in Figure 1. It is also possible to use guide tracks that are arranged along the conveyor in order to return the deflection elements to the opposite side for a
35 further deflection manoeuvre. If the conveyor surface has reached the end of the conveyor it begins its return travel opposite to the direction of conveyance back to the beginning

of the conveyor; this usually takes place beneath the conveyor surface. In order to ensure that the conveyor surface that has been returned arrives at the beginning of the conveyor with its deflection elements on the side that is desired for the forward
5 motion of the conveyor surface, it is essential to be able to change the deflection elements during the return travel of the conveyor surface from one long side of the conveyor to the other long side. This changeover is effected in the same way as the forward motion of the conveyor surface, mainly by using
10 deflection tracks and, possibly, not necessarily by the use of switch elements. In exactly the same way as during the forward motion of the conveyor surface, the problem of noise generation and increased wear occurs because of the impact of the guiding elements on the guiding surfaces of the lateral guide tracks
15 and can thus be prevented by the use of elements according to the present invention that are used to reduce noise and wear, as provided for by the present invention.

CLAIMS:

1. Item-sorting conveyor, especially for parcels, small packages, and containers, this consisting of a conveyor surface (24) that can be moved in the direction of conveyance (F), that consists of a multiplicity of interspaced and interconnected conveyor surface parts, of a multiplicity of deflection elements (18), that can be moved at least along one of the conveyor-surface parts for a transverse movement relative to the direction of conveyance (F), of a network of lateral guide tracks (16a,b) and deflection tracks (12) in which guide elements (20) that extend downwards from the deflection elements (18) can be guided, the deflection tracks (12) being oriented at an angle to the long side (11a, b) of the conveyor surface (24) in order to apply a laterally oriented force to the deflection elements (18) so as to move said deflection elements obliquely across the conveyor surface (24) to the other long side (11a, b) of the conveyor surface (24), the deflection tracks (12) each forming a first guiding track (60) and the lateral guide tracks (16) each forming a second guiding track (62) that is oriented essentially parallel to the long side (11a, b) of the conveyor surface (24) and of an element to reduce noise and wear (27) that is arranged in the bifurcation area (19) between the first guiding track (60) and the second guiding track (62), characterized in that at least one attracting element that contains at least one magnet (46) is arranged for the guiding elements (20) of the deflection elements (18) is arranged in the bifurcation area (19) in such a way that the guiding elements (20) that are moving along the first guiding track (60) are attracted by an attractive force at the end of the deflection track (12) on the guiding surfaces (14) of the deflection track (12) and the guiding elements (20) that are moved along the second guiding track (62) are scarcely diverted from their path (62) by the attractive forces of the attracting element.

2. Sorting conveyor as defined in Claim 1, characterized in that the magnet (46) is a permanent magnet.

3. Sorting conveyor as defined in Claim 1 or Claim 2,
5 characterized in that the attracting element comprises a lower pole plate (2), a magnet holder (48) with a number of openings (54) that corresponds to the number of magnets (46), this being arranged on the lower pole plate (52) with the magnet (46) being installed in the openings (54), and an upper pole plate
10 (50) that is arranged on the magnet holder (48), the upper pole plate (50), the magnet holder (48), and the lower pole plate (52) being secured to each other and to the conveyor (10) in the bifurcation area (19).

15 4. Sorting conveyor as defined in Claim 3, characterized in that the magnet holder (48) is manufactured from non-magnetic material.

5. Sorting conveyor as defined in Claim 3 or Claim 4,
20 characterized in that the magnet holder (48), the lower pole plate (52) and the upper pole plate (50) are connected to the conveyor (10) and to each other by connectors (56) that are manufactured from non-magnetic material.

25 6. Sorting conveyor as defined in Claim 4 or Claim 5, characterized in that the non-magnetic material is stainless steel.

7. Sorting conveyor as defined in claim 4 or Claim 5,
30 characterized in that the non-magnetic material is aluminum.

8. Sorting conveyor as defined in one of the Claims 2 to 7, characterized in that the magnet is manufactured from a combination of neodymium, iron, and boron.

35

9. Sorting conveyor as defined in one of the Claims 2 to 8, characterized in that the deflection track (12) ends in the

area of a long side (11a, b) of the conveyor (10) and is connected through a base element (28) with a lateral guide track (16a, b) that forms the second guiding track (62), the base element (28) forms a curve area in the course of the first
5 guiding track (60) and at least one magnet (46) is arranged on the base element (28) in a position bordering on the curved area so that in order to guide the guiding elements (20) along the curved area, a magnetic force from the magnet (46) acts on the guiding element (20) that is being moved along the first
10 guiding track (60).

10. Sorting conveyor as defined in Claim 9, characterized in that the base element (28) incorporates a guide channel (30) for the guiding element (20), the inner surface (34) of which
15 that is adjacent to the deflection track (12) has in as viewed in the direction of conveyance (F) has a curved part (36) that makes a transition to become a straight part (38).

11. Sorting conveyor as defined in one of Claims 1 to 10,
20 characterized in that the guiding element (20) consist of a pin (21) with an upper and a lower end and a guide roller (23) that is installed on the upper end of the pin (21), the guide roller (23) being held by magnetic attractive force by the attracting element along the first guiding track (60).

25
12. Sorting conveyor as defined in one of Claims 1 to 11, characterized in that the second guiding track (62) is formed by lateral guide tracks (16a, b) that are parallel to and run below the long sides (11a, b) of the conveyor (10).

30
13. Sorting conveyor as defined in one of the Claims 1 to 12, characterized in that a gap (G) between the intended extension (line L) of the inner guiding surface (15b) of the lateral guide tracks (16a, b) and the connecting roller (39)
35 between the curved part (36) and the straight part (38) of the guide channel (30) is so selected that the guiding elements (20) that are being moved along the second guiding track (62)

are essentially not diverted from their movement in the direction of conveyance (F).

14. Method for operating a sorting conveyor, in particular as defined in one of the Claims 1 to 13, this consisting of a conveyor surface (24) that can be moved in the direction of conveyance (F) and that consists of a multiplicity of interspaced and interconnected conveyor surface parts, of a multiplicity of deflection elements (18), that can be moved at least along one of the conveyor-surface parts for a transverse movement relative to the direction of conveyance (F), of a network of lateral guide tracks (16a,b) and deflection tracks (12) in which guide elements (20) that extend downwards from the deflection elements (18) can be guided, the deflection tracks (12) being oriented at an angle to the long side (11a, b) of the conveyor surface (24) in order to apply a laterally oriented force to the deflection elements (18) so as to move said deflection elements obliquely across the conveyor surface (24) to the other long side (11a, b) of the conveyor surface (24), the deflection tracks (12) each forming a first guiding track (60) and the lateral guide tracks (16) each forming a second guiding track (62) that is oriented essentially parallel to the long side (11a, b) of the conveyor surface (24) and of an element to reduce noise and wear (27) that is arranged in the bifurcation area (19) between the first guiding track (60) and the second guiding track (62), characterized in that at least in the bifurcation area (19) between the first guiding track (60) and the second guiding track (62) an attractive force that acts in the direction of the guiding surface (14) of the first guiding track (60) is applied to the guiding elements (20) that are being moved along the first guiding track (60) by an attracting element that incorporates at least one magnet (46).

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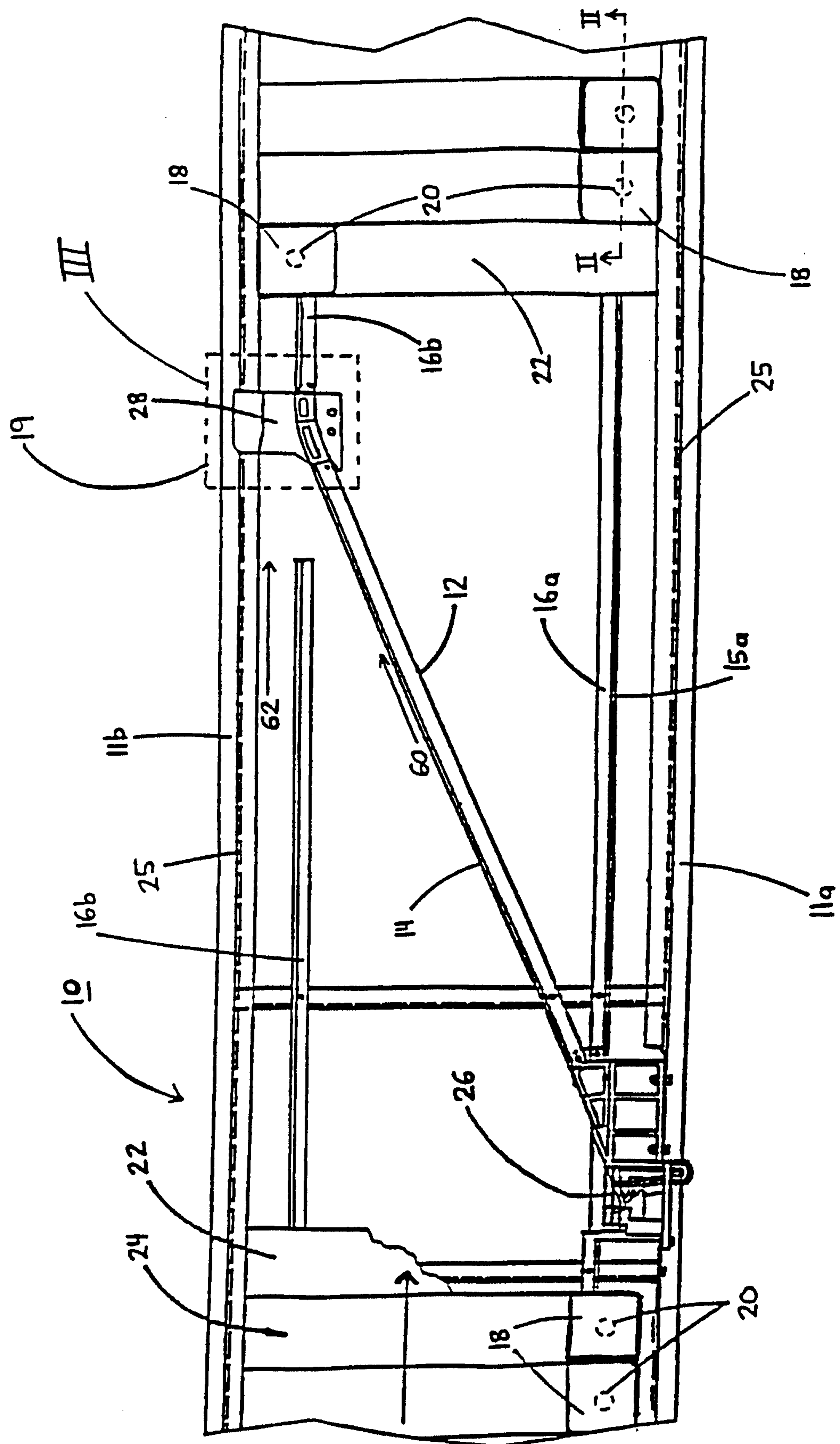


Fig. 1

→ F

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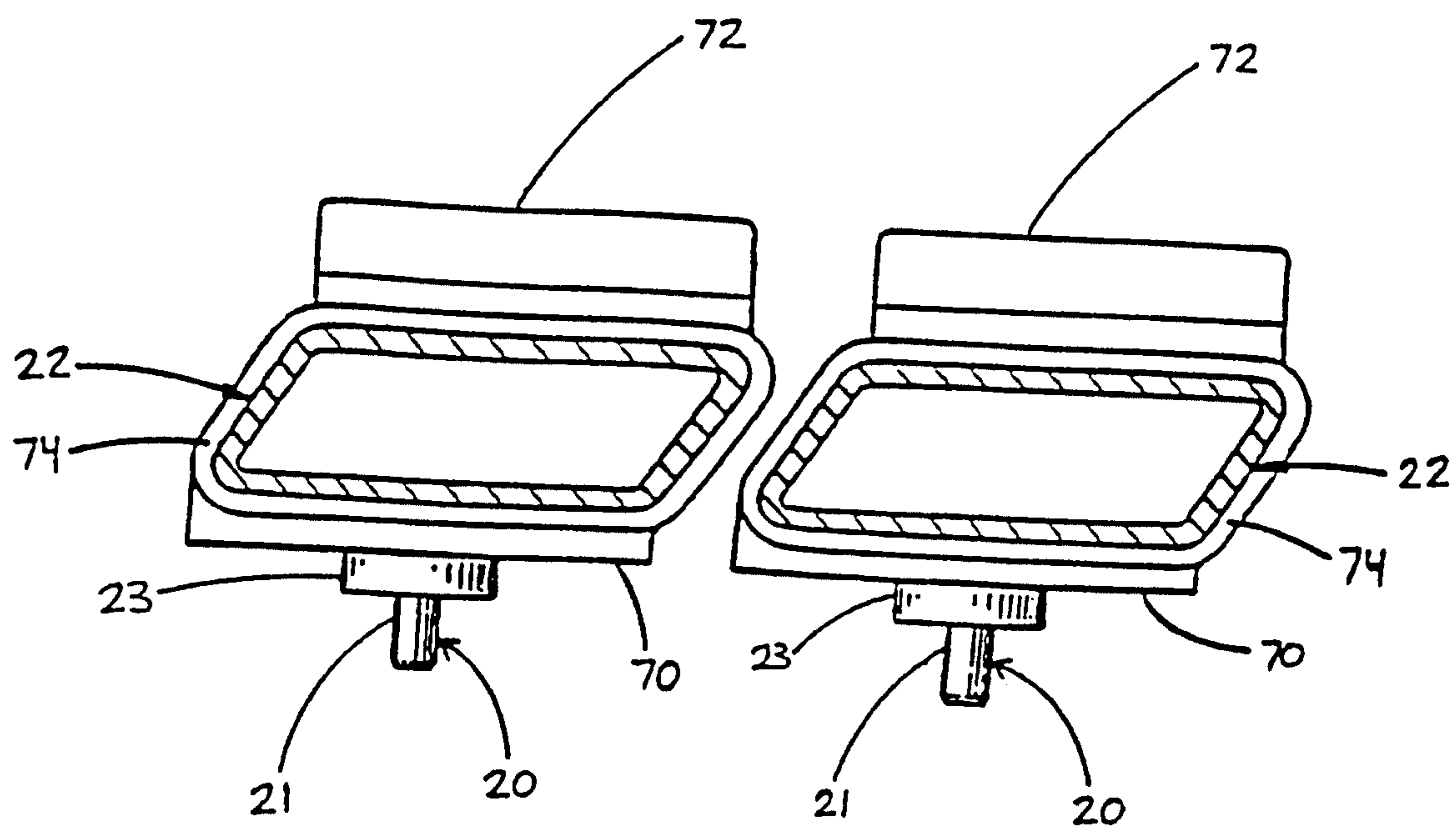


Fig. 2

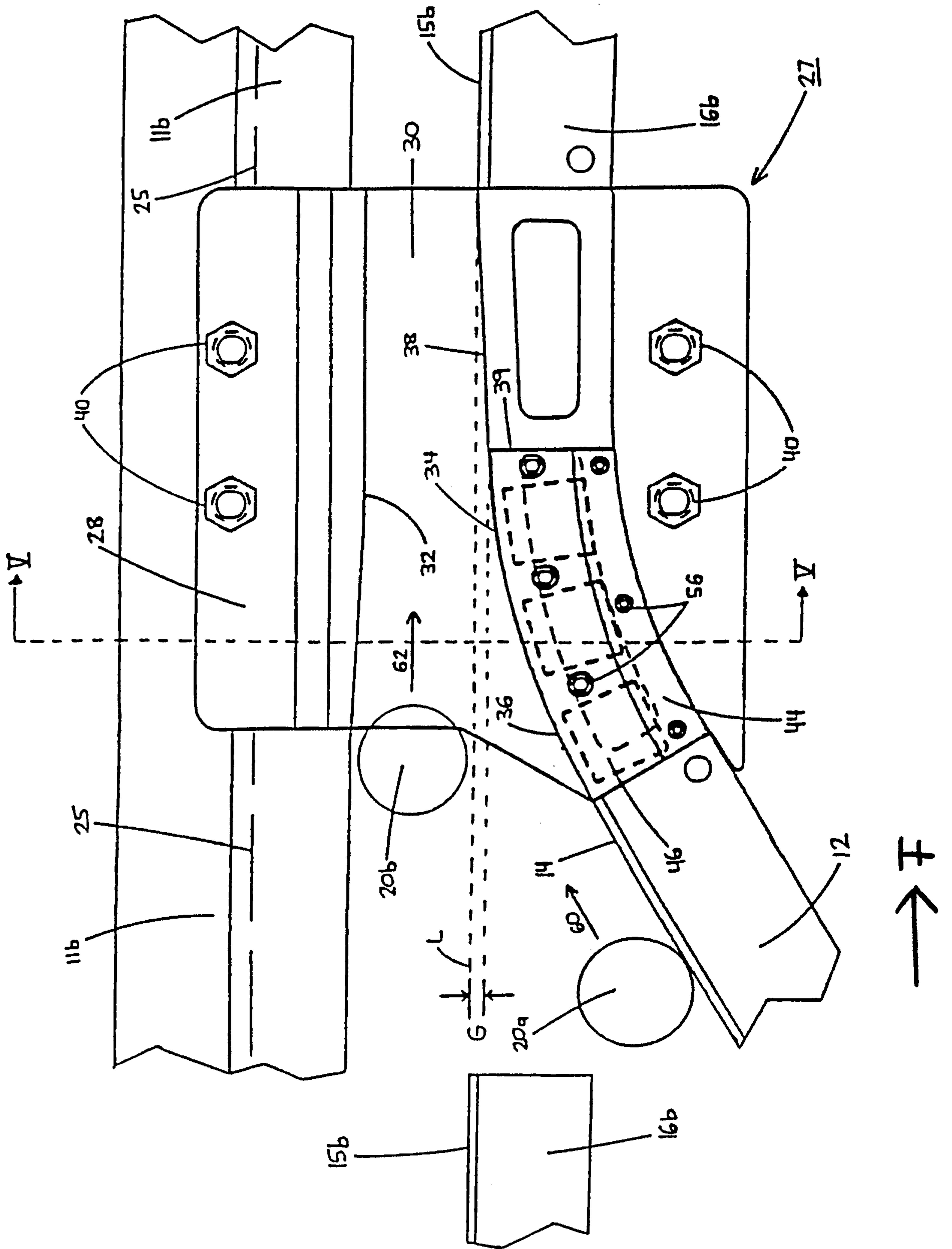


Fig. 3

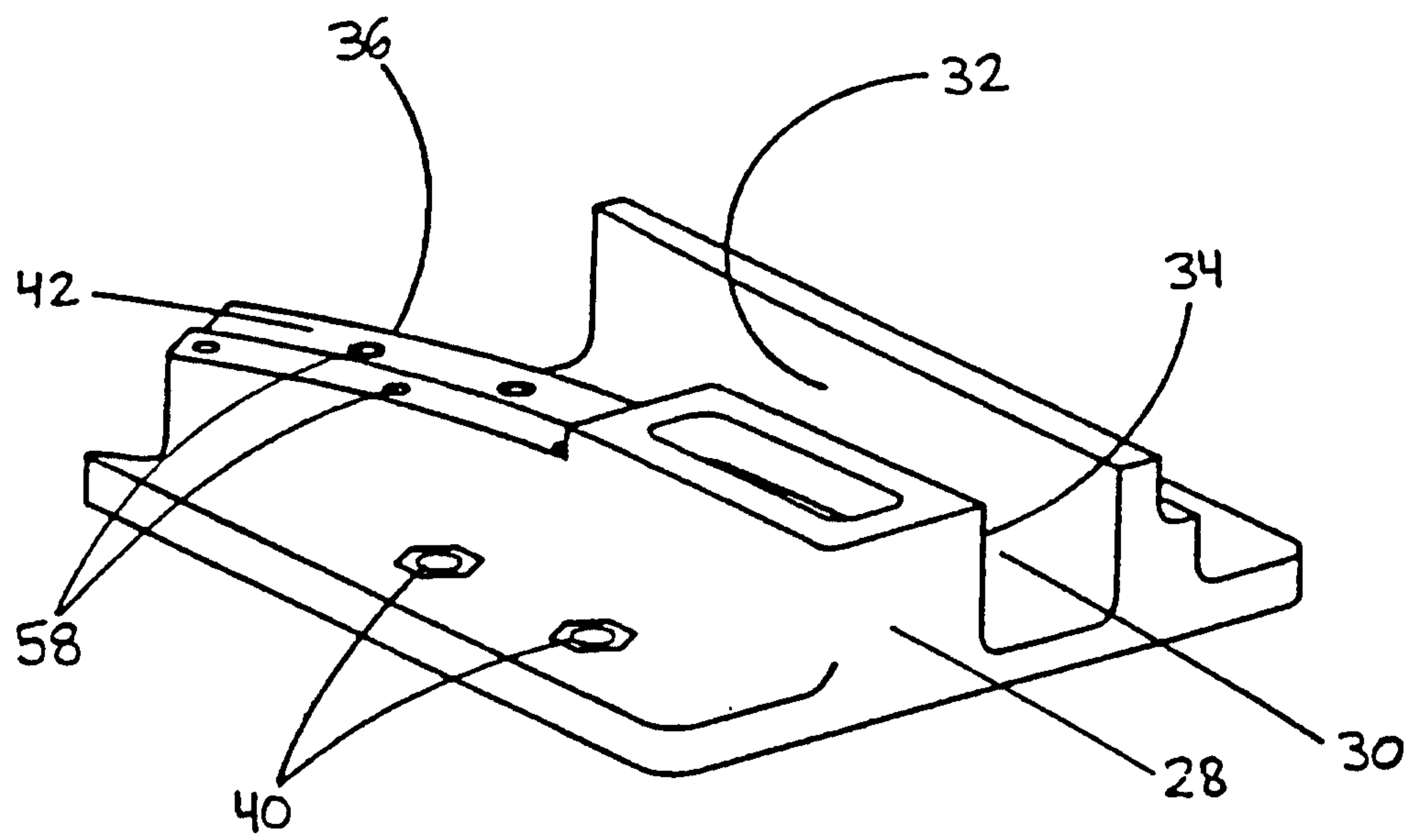


Fig. 4

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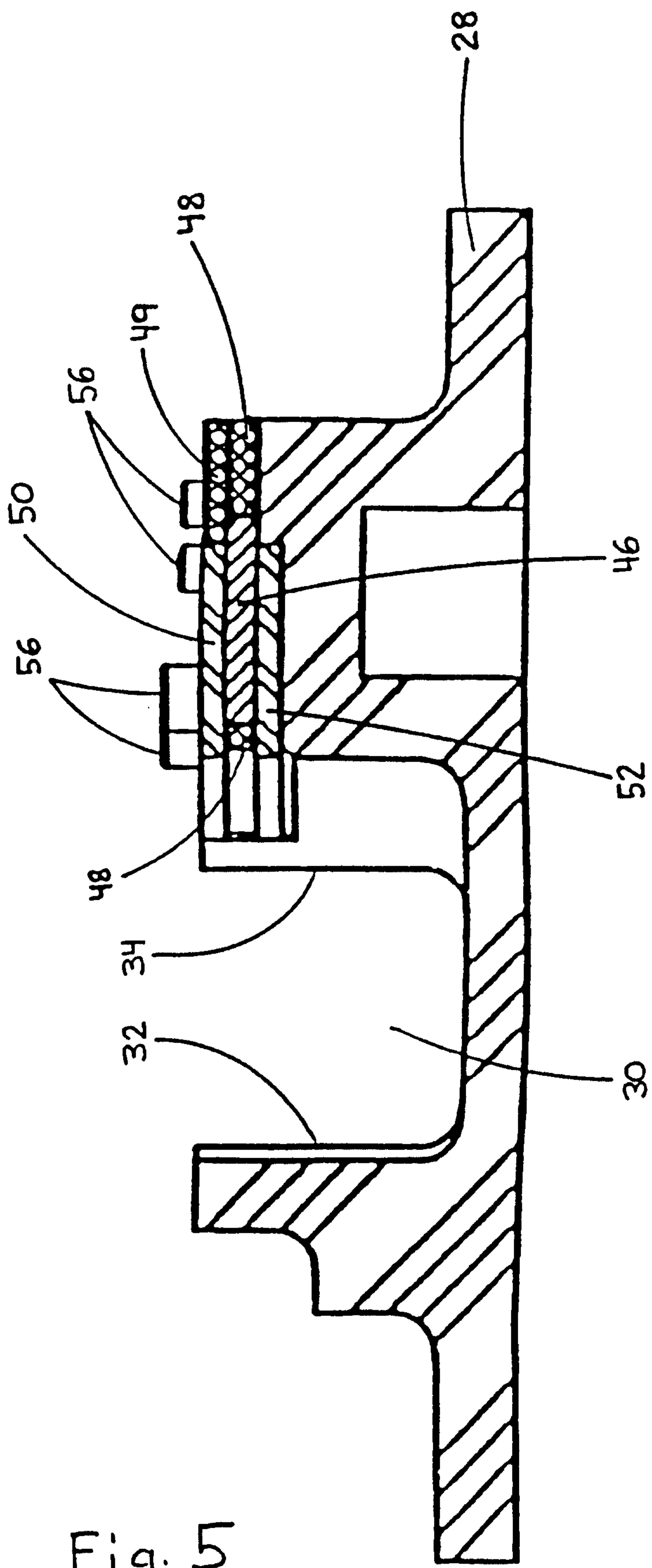


Fig. 5

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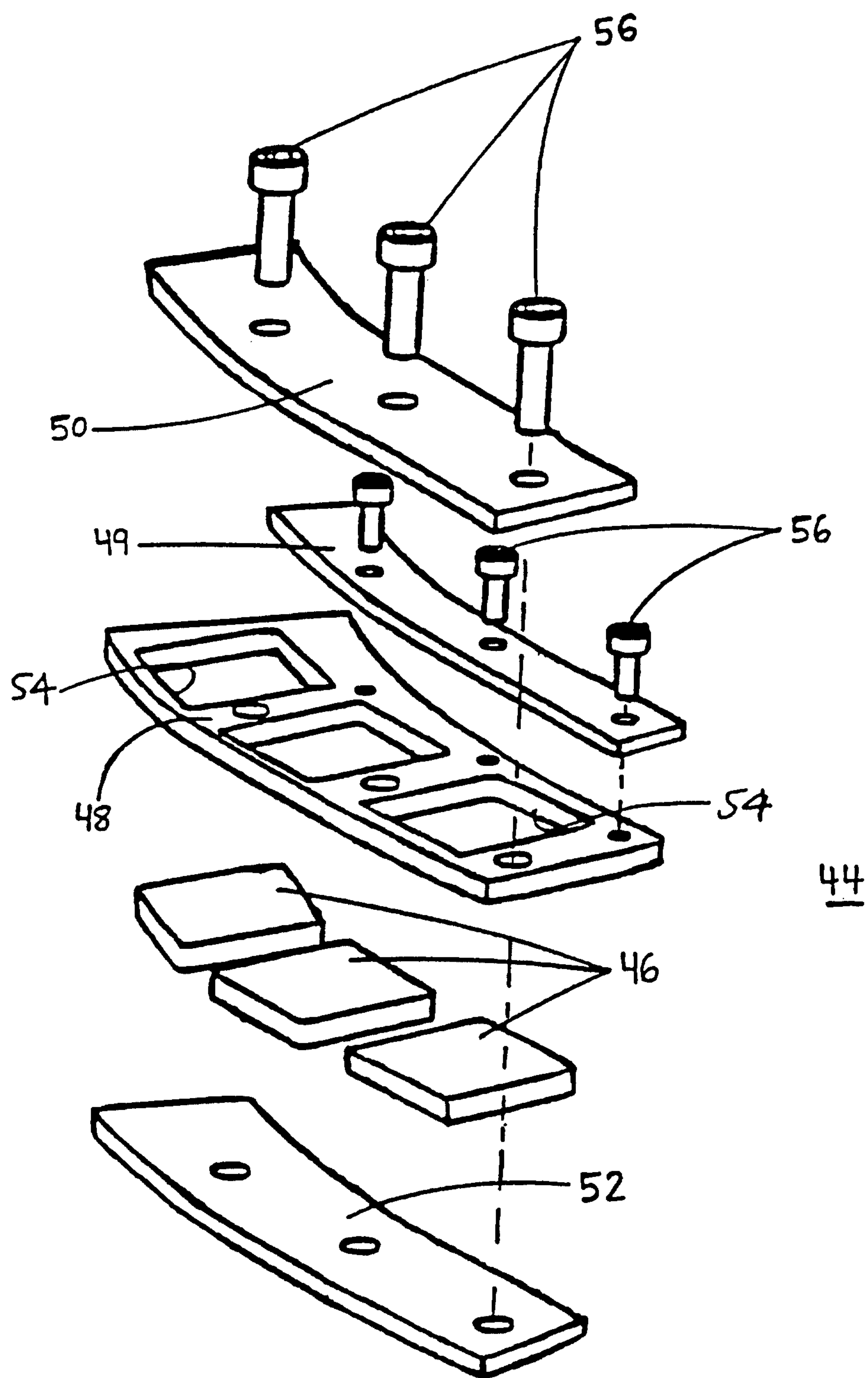


Fig. 6

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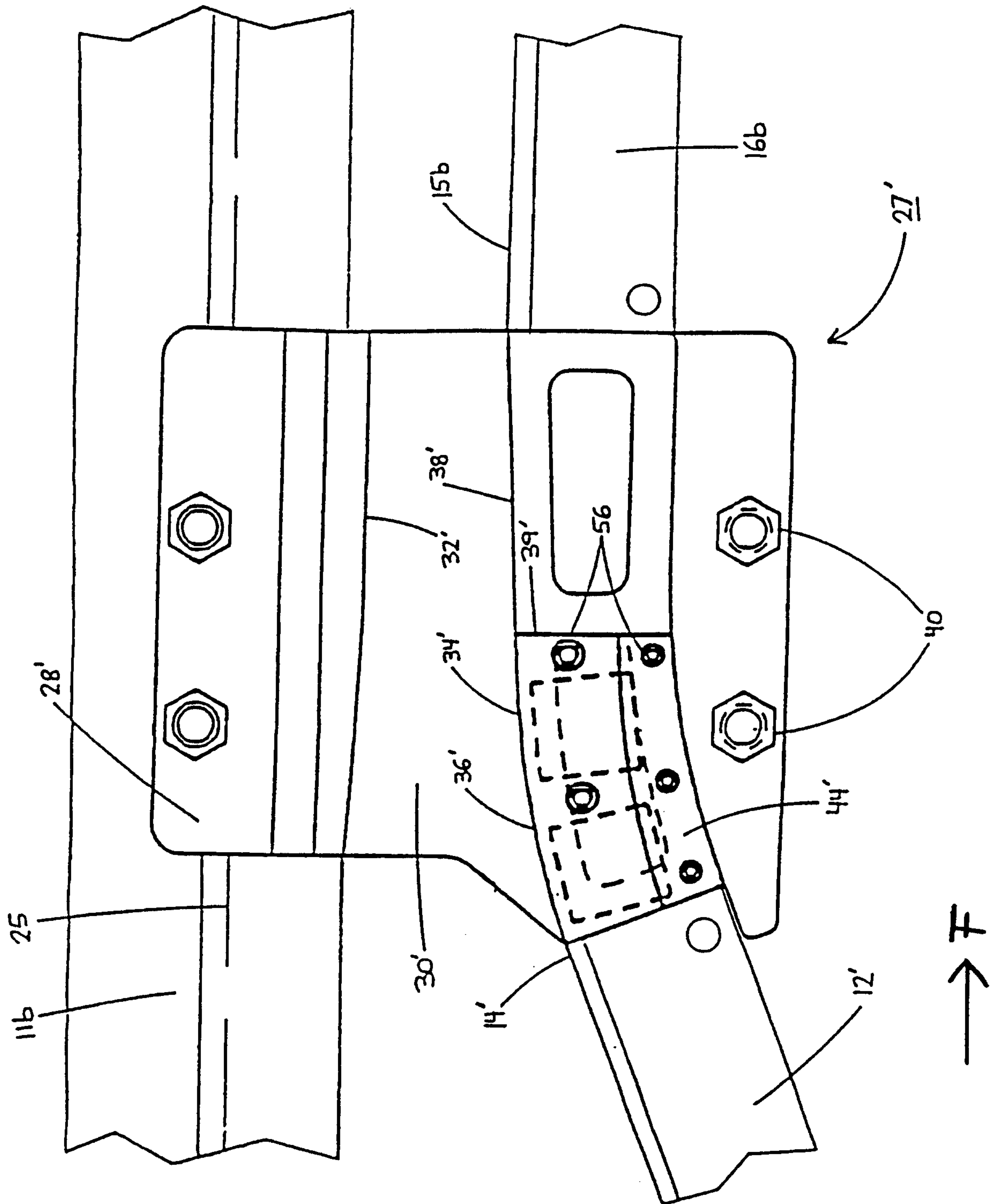


Fig. 7

