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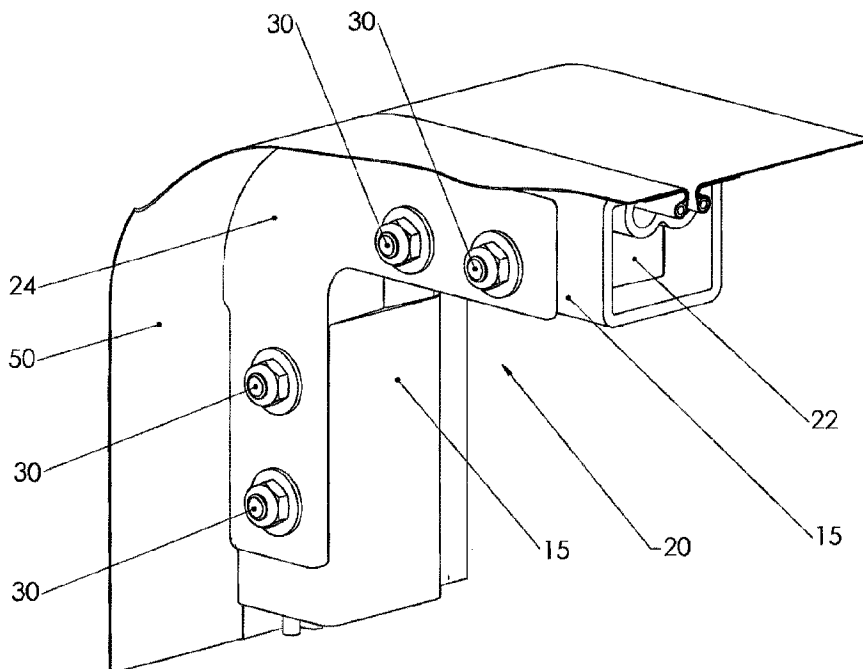
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(54) Title: CORNER TARP CONNECTOR SYSTEM



(57) **Abrégé/Abstract:**

The invention consists of a system for connecting tarps to a vehicle, but not limited to, comprising: a) frames for supporting tarps, the frame comprised of: i) one or more tarp connectors, each of the tarp connectors having a pair of channels for accepting a support pole and ii) one or more corner connector systems adapted to receive an end of one of the tarp connectors; b) a plurality of tarps, each tarp secured to the tarp connectors by wrapping the tarp around the support pole and inserting the support pole into the channel of the tarp connector, wherein the frames are combined with the tarps to create an enclosed cargo area for the vehicle.

ABSTRACT

The invention consists of a system for connecting tarps to a vehicle, but not limited to, comprising: a) frames for supporting tarps, the frame comprised of: i) one or more tarp connectors, each of the tarp connectors having a pair of channels for accepting a support pole and ii) one or more corner connector systems adapted to receive an end of one of the tarp connectors; b) a plurality of tarps, each tarp secured to the tarp connectors by wrapping the tarp around the support pole and inserting the support pole into the channel of the tarp connector, wherein the frames are combined with the tarps to create an enclosed cargo area for the vehicle.

CORNER TARP CONNECTOR SYSTEM

Field of the Invention

[0001] The present invention relates to the field of cover tarp systems, in particular, but not exclusively, for covering vehicle beds. In particular, it relates to corner connectors
5 used for securing the tarps in the corners.

Background of the Invention

[0002] Shipping of goods, both regionally and internationally, is conducted by several means, including rail, ship and, very often, truck. While container trucks or truck-trailer combinations are used, particularly in conjunction with rail or ship container shipping, in
10 many places and situations, a standard flatbed truck is used. In order to protect the shipped goods from exposure to the elements, they are typically covered with tarps. In order to ensure optimal shipping conditions, a system of securing the tarps to the flatbed is required. Generally, a series of frames are attached to the flatbed and then one or more tarps are attached to the frames to create an enclosed, roughly cuboid cargo
15 roughly area. The most common currently known means of securing the tarps to the frames involves flaps on the tarp which overlap the frame, generally using Velcro™ or similar means. The tarp is required to be modified to include the flaps, and after repeated use the flaps do not secure as well, suggesting a need for an improved method of securing the tarps.

20 In the cover systems used, the corner tarp connector either does not exist by having one continuous connector element or it causes complications in securing the tarps to the frames. In both cases the complexity of securing the tarp to the frames is present, particularly when one continuous tarp connector element is used.

[0003] U.S. Patent No. 4,902,064 issued to Tuerk *et al.* discloses a Conestoga-style tarp
25 system using frames which are attached to guide rails attached to the sides of the vehicle flatbed. The rearmost frame is designed to be tilted or leaned to provide tension to the tarp and to secure the frame. The tarp is a single tarp which is extended over the frames and supported by the tension created by the positioning of the rearmost frame. The Tuerk tarp system does not disclose any use of multiple tarps, nor any means of securing the
30 tarp to the individual frames or using the corner in the connection.

[0004] U.S. Patent No. 5,538,313 issued to Henning discloses a tarp system for a flatbed trailer including three sets of frame members (front, intermediate, rear) for supporting the tarp. The frame members are slidably mounted to guide rails running along the sides of the flatbed, thus enabling the frame members to be moved to different locations on the flatbed and for the entire assembly to be compressed or expanded as required to load and unload the vehicle. Henning is a modified version of the Tuerk system and is similarly design around a single tarp supported by tension created by frame positioning. There is no disclosure of any system using multiple tarps or any means of securing the tarps to individual frames or connecting the tarps by tarp connectors in the corners where the member of the structure meets.

[0005] U.S. Patent No. 5,080,423 issued to Merlot *et al.* discloses a segmented tarp cover system. The Merlot tarp is designed as a series of segmented tarp pieces which are extended to cover the top of a cargo container, such as a rail car or truck trailer. The Merlot system is designed solely for a top covering and does not disclose any means or method of covering the sides and ends of a cargo container or surface, neither is disclosed the way how you connect the tarp connectors in the corners where the members meets.

[0006] U.S. Patent No. 7,344,178 issued to Lowry *et al.* discloses a cover system for a trailer of a freight transport vehicle having a cargo space, the cover system having a pair of track brackets, tracks, generally U-shaped frame portions mounted to the trucks so that there is displacement of the frame portions as each member of the pair of trucks is displaced along the length of the members of the track and a flexible canopy supported by the frame members for covering or uncovering the cargo space. Further more in this patent is disclosed a corner bracket system compound from a corner bracket with a central body and a pair of tongues extending each side and pair of corner plates marching the central body. The tarp connector being a continuous component forming the frame not only takes away payload space, by having the poles extruded outside ,but also makes it difficult to assemble the tarpaulin at the formed corners of the frames.

[0007] U.S. Patent No. 5,924,759 and C.A. Patent No. 2,197,750 issued to DeMonte *et al.* discloses a retractable enclosure system for covering a bed of a truck, trailer or the like is provided, which includes a number of generally U-shaped frames for supporting a flexible cover, and elongate rails provided along each side of the bed. The rails each have a flat uppermost surface along which the frames move to extend or collapse the flexible cover. The frames span the bed having two vertical legs connected at an upper end by a central bight, and a guide assembly provided at the lower end of each leg. The guide assembly includes one or more supporting wheels which rotatably engage the upper surface of the rails and a guide wheel which rotatably engages the side of the bed and/or a portion of the rail to limit lateral movement of the supporting wheels. The DeMonte tarp system does not disclose any use of multiple tarps, nor any means of securing the tarp to the individual frames or using any kind of corner in the connection of the frames.

[0008] All the disclosed cover systems either do not enable the tarps to be secured direct into the tarp connectors or by having the poles of the extrusion from outside of the main profiles, they increase the width of the flatbed, risking violation of regulations or takes away available cargo space from the flatbed, making it less efficient. Nor is disclosed any means of how to securing the tarp to the individual frames in the corner the connection.

[0009] Even when the installation of the guide rails and tarp connectors is monitored to ensure compliance with width regulations; it is still common to have the tarp attachment means (flaps, buckles, etc.) on the exterior. These means may then extend beyond the legal width permitted for the cargo bed, and the driver/operator may not even be aware of the violation. Thus, there is a need for a corner tarp connector system without external tarp attachment means to ensure compliance with legal restrictions on vehicle width.

[0010] The above patents are illustrative of the limitations in the known art. In addition to the above-noted limitations, the corners of the frame protrude into the interior of the cargo area, reducing the amount of available space and imposing restrictions on loading. In the systems disclosed while the tarp is being secured to the frames it is very complicated to assemble the tarp assembly to the corner connections. There is a need in the tarp and trucking industry to address these limitations and needs.

[0011] It is an object of this invention to partially or completely fulfill one or more of the above-mentioned needs.

Summary of the Invention

[0012] The invention consists of a corner tarp connector system for connecting
 5 tarps to a vehicle but not limited to, comprising: a) a corner comprising: i) a main body, representing the strength of the corner structure, with opposite directed faces ii) one or more extended step portions part of the main body. These extended step portions are made such a way to accept the tarp connectors by sliding them through from inside while being assembled
 10 iii) each extended step portion has one or more holes to accept the fasteners that connect the corner system together with tarp connectors iiiii) an extended shape outward and around the main body producing closure for the tarp connectors, where this shape has a channel, allowing the tube with wrapped around tarp to slide through. b) a corner cap being able to assembled after the tarp, providing ease of mounting , comprising i) a main body with two outward step extensions ii) an outward and around the main body shape, having a channel to accept the tarp,
 15 adapted for the corner and the tarp connectors providing a full closure c) one or more compressible gaskets adapted to fit within the profile of the tarp connectors and corner system as a sealing element d) one or more side compressible gaskets adapted to seal the corner and corner cap e) Frames for supporting tarps, the frame comprised of: i) one or more tarp connectors, each of the tarp connectors having a pair of channels for accepting a support pole
 20 f) a plurality of tarps, each tarp secured to the tarp connectors by wrapping the tarp around the support pole and inserting the support pole into the channel of the tarp connector, wherein the frames are combined with the tarps to create an enclosed cargo area .

[0013] The invention further includes a method of connecting tarps to a vehicle,
 25 comprising: a) attaching frames to a vehicle, the frames comprised of: i) one or more tarp connectors, each of the tarp connectors having a pair of channels for accepting a support pole and ii) one or more corner connector systems adapted to receive an end of one of the tarp connectors; b) wrapping the tarps around the support poles, and c) inserting the support poles into the tarp connectors to create a cargo area for the vehicle enclosed by the tarps.

[0014] Preferably, the corner connector systems are detachably removable from the tarp connectors.

[0015] Other and further advantages and features of the invention will be apparent to those skilled in the art from the following detailed description thereof, taken in conjunction with the accompanying drawings.

[0015A] In one embodiment, there is provided a corner connector system for a system for connecting tarps to a vehicle. The corner connector includes a corner piece having a main body and a first portion extending from the main body, the first portion configured for insertion into a first tarp connector of a system for connecting tarps to a vehicle; and a cap having a main plate and a first plate extending from the main plate, the first plate configured to cover an exterior portion of the first tarp connector. The main body of the corner piece and the main plate of the cap each define at least one groove such that when the corner piece and cap are coupled together the grooves mate to form a channel for engaging and retaining at least one tube and tarp from the first tarp connector.

[0015B] In another embodiment, there is provided a system for connecting tarps to a vehicle. The system includes a plurality of tarps, each tarp being secured around a corresponding tube; and a plurality of frames. Each frame includes at least one tarp connector, each tarp connector having a pair of channels for accepting and retaining at least one tarp and its corresponding tube, and at least one corner connector system. Each corner connector system has a corner piece with a main body and a first portion extending from the main body into an interior of the at least one tarp connector; and a cap with a main plate and a first plate extending from the main plate, the first plate and covering an exterior portion of the at least one tarp connector proximate the first portion of the corner piece. The main body of the corner piece and the main plate of the cap each define at least one groove. The corner piece and cap are coupled together such that the grooves mate to form a channel for engaging and retaining the at least one tarp and

corresponding tube from the at least one tarp connector. The plurality of frames are combined with the plurality of tarps to create an enclosed cargo area for the vehicle.

[0015C] In another embodiment, there is provided a method of connecting tarps to a vehicle. The method includes securing each one of a plurality of tarps around a corresponding tube; and attaching a plurality of frames to a vehicle. Each frame includes at least one tarp connector, each tarp connector having a pair of channels for accepting and retaining at least one tarp and its corresponding tube, and at least one corner connector system. Each corner connector system has a corner piece with a main body and a first portion extending from the main body into an interior of the at least one tarp connector; and a cap with a main plate and a first plate extending from the main plate, the first plate and covering an exterior portion of the at least one tarp connector proximate the first portion of the corner piece. The main body of the corner piece and the main plate of the cap each defines at least one groove. The corner piece and cap are coupled together such that the grooves mate to form a channel for engaging and retaining the at least one tarp and corresponding tube from the at least one tarp connector. The method includes inserting the tarps and corresponding tubes into the tarp connectors and corner tarp connector system to create a cargo area for the vehicle enclosed by the tarps.

Brief Description of the Drawings

[0016] The invention will now be described in more detail, by way of example only, with reference to the accompanying drawings, in which like numbers refer to like elements, wherein:

- 5 Figure 1 is a front view of the corner tarp connector system with connected tarps according to the present invention;
- Figure 2 is a view of a section of corner tarp connector system on fastener location of Figure 1;
- Figure 3 is a perspective view of the corner connector system ;
- 10 Figure 4 is a perspective view of a complete frame including tarps assembled using tarp connectors and corner tarp connector systems of the present invention;
- Figure 5 is a perspective view of a complete frame using tarp connectors and corner tarp connector systems of the present invention;
- 15 Figure 6 is a back view of a complete frame assembled using tarp connectors and corner tarp connector systems of Figure 5;
- Figure 7 is a perspective view of the corner cap;
- Figure 8 is a side view of the corner cap;
- Figure 9 is a perspective view of the corner;
- 20 Figure 10 is a side view of the corner; and,
- Figure 11 is an exploded view of corner tarp connector system of the present invention.

Detailed Description of the Preferred Embodiments

[0017] A presently preferred embodiment of the inventive system presented herein consists of a system for securing tarps based on frames created by a combination of tarp connectors and corner tarp connectors system.

5 [0018] The corner tarp connector system **20** is shown in **Figures 1** and in a section cut in **Figure 2**. The tarp connector **15** comprises a frame creating an enclosure. A tarp support element **18** is formed in the frame on the inside of the enclosure and provides a pair of channels **16**. A gap **14** in the frame allows the tarps **50** to enter and exit the channels **16**.

10 [0019] In use, an end or section of the tarp **50** is wrapped around a tube **48**, preferably made of plastic, and the tube into the pole channel **16**. The gap **14** is dimensioned such that the tarp **50** is welded together and wrapped around to tube **48**, cannot pass through the gap **14**. The use of the tubes **48** eliminates the need for modifications to the tarp **50** to secure the tarp **50** to the tarp connector **15**.

15 [0020] At the corners, the tarp connector **15** is coupled to the corner tarp connector system **20** as shown in **Figure 3**, **Figure 4**, **Figure 5** and **Figure 6** to create a frame **10** to support the tarps and create an enclosed cargo area.

[0021] The corner connector system **20** is mainly formed from two pieces, the corner cap **24**, as shown in **Figures 7**, **Figure 8**, and **Figure 11** and corner **22**, as
 20 shown in **Figure 9** and **Figure 10** and **Figure 11**. A tarp connector gasket **26**, and side corner gasket **28** in compressed condition, is used to provide a sealed area at the corner tarp connector system, as shown in **Figure 11**. The Corner cap **24** is mounted as last component in the corner tarp connector system **20** to ease sliding of the tarp **50** in the corners while being assembled. The corner **22** has a
 25 main body **22a** providing the strength of the structure and faces **22d** providing enclosure between tarp connectors. The corner **22** having a main body **22a** has two step portions **22b** extended in both sides at the opposite direction. The step portions **22b**, while inserted into the tarp connectors within the inside tarp connector profiles **15a**, provides a capture of the corner tarp connector system **20**
 30 and tarp connectors **15**, step space **22c** allows the assembling of the corner **22** and

tarp connectors **15** . The corner cap **24** has a main body **24a** extended outward forming an enclosure with the corner , the extended steps **24b** in opposite direction are added to the main body **24a** providing a closure between the corner tarp connector system **20** and the tarp connector **15** of the frame **10**. The step

5 space **24c** is dimensioned such a way that the tarp **50** while tensioned does not have any constant with the extended step **24b**. In the preferred embodiment shown, one or more holes **22e** and **24e** respectively in the corner **22** and corner cap **24**, is provided for use in securing the tarp connectors **15** to corner tarp connector system **20**, preferably using a nut-and-bolt combination **30**.

10 **[0022]** When closed the corner tarp connector system **20** has a gap **11** dimensioned such a way that the gap does not allow the tarp **50** and tube **48** to come out, providing a securement of the tarp at the corners. The holes of face **12** of the tarp connectors are countersunk to accept the head of the fastener and sit either flat or under it, allowing the face **12** to be sealed against a seal element

15 when required.

[0023] The resulting frames **10** provide a maximum amount of interior space and a minimum amount of external space. The frames **10** are particularly useful for cargo shipment, such as lumber, which require no obstructions inside the cargo space to allow for optimal loading of cargo and maximum usage of space. The

20 minimum space amount externally allows, at the same time, a maximum possible internal space internally and is consistent with the width limitations imposed from ministry of transportation.

[0023] This concludes a description of a presently preferred embodiment of the invention. The forgoing description as has been presented for the purpose of the

25 illustration and is not intended to be exhaustive or to limit the invention to the precise form disclosed. Many modifications and variations are possible in light of the above teaching and will be apparent to those skilled in the art. It is intended the scope of the invention be limited not by this description but by the claims that follow.

Claims

1. A corner connector system for a system for connecting tarps to a vehicle, the corner connector comprising:

a corner piece having a main body and a first portion extending from the main body, the first portion configured for insertion into a first tarp connector of a system for connecting tarps to a vehicle; and
a cap having a main plate and a first plate extending from the main plate, the first plate configured to cover an exterior portion of the first tarp connector;
the main body of the corner piece and the main plate of the cap each defining at least one groove such that when the corner piece and cap are coupled together the grooves mate to form a channel for engaging and retaining at least one tube and tarp from the first tarp connector.

2. The corner connector system of claim 1, wherein

the corner piece has a second portion extending from the main body, the second portion configured for insertion into a second tarp connector of the system for connecting tarps to a vehicle; and wherein

the cap has a second plate extending from the main plate, the second plate configured to cover an exterior portion of the second tarp connector.

3. The corner connector system according to claim 1 wherein each of the first and second portions has a height less than a height of the main body of the corner piece, and wherein each of the first and second plates has a height less than a height of the main plate of the cap.

4. The corner connector system according to claim 3 wherein the coupling of the corner piece and the cap creates an asymmetrical corner connector system with the width of the first and second portions of the corner piece being greater than the width of the first and second plates of the cap.

5. The corner connector system according to claim 4, further comprising
 - a first face defined by transitions between the main body and the main plate to the respective first portion of the corner piece and the first plate of the cap, and
 - a second face orthogonal to the first face, the second face defined by transitions between the main body and the main plate to the respective second portion of the corner piece and the second plate of the cap.
6. The corner connector system according to any one of claims 2 to 5, wherein the first portion of the corner piece defines one or more holes, and wherein the first plate of the cap defines one or more holes which align with the one or more holes in the first portion of the corner piece when the corner piece and cap are coupled together, each of the one or more holes being configured to receive an attachment mechanism for attaching the corner connector system to the first tarp connector.
7. The corner connector system according to any one of claims 2 to 6, wherein the second portion of the corner piece defines one or more holes, and wherein the second plate of the cap defines one or more holes which align with the one or more holes in the second portion of the corner piece when the corner piece and cap are coupled together, each of the one or more holes being configured to receive an attachment mechanism for attaching the corner connector system to the second tarp connector.
8. The corner connector system according to any one of claims 1 to 7, further comprising one or more compressible gaskets inserted between the main body of the corner piece and the main plate of the cap when the corner piece and cap are coupled together.
9. A system for connecting tarps to a vehicle, comprising:
 - a plurality of tarps, each tarp being secured around a corresponding tube; and
 - a plurality of frames, each frame comprising:
 - at least one tarp connector, each tarp connector having a pair of channels for accepting and retaining at least one tarp and its corresponding tube, and
 - at least one corner connector system, each corner connector system having:

a corner piece with a main body and a first portion extending from the main body into an interior of the at least one tarp connector; and

a cap with a main plate and a first plate extending from the main plate, the first plate and covering an exterior portion of the at least one tarp connector proximate the first portion of the corner piece;

the main body of the corner piece and the main plate of the cap each defining at least one groove, the corner piece and cap being coupled together such that the grooves mate to form a channel for engaging and retaining the at least one tarp and corresponding tube from the at least one tarp connector;

wherein the plurality of frames are combined with the plurality of tarps to create an enclosed cargo area for the vehicle.

10. The system for connecting tarps to a vehicle according to claim 9 wherein:

the corner piece of the at least one corner connector system has a second portion extending from the main body into the interior of a second tarp connector; and wherein

the cap of the at least one corner connector system has a second plate extending from the main plate and covering an exterior portion of the second tarp connector proximate the second portion of the corner piece.

11. The system for connecting tarps to a vehicle according to claim 10 wherein for the at least one corner connector system, each of the first and second portions has a height less than a height of the main body of the corner piece, and wherein each of the first and second plates has a height less than a height of the main plate of the cap.

12. The system for connecting tarps to a vehicle according to claim 11 wherein for the at least one corner connector system, the coupling of the corner piece and the cap creates an asymmetrical corner connector system with the width of the first and second portions of the corner piece being greater than the width of the first and second plates of the cap.

13. The system for connecting tarps to a vehicle according to claim 12,
wherein the at least one corner connector system further comprises:
a first face defined by transitions between the main body and the main plate to the
respective first portion of the corner piece and the first plate of the cap, and
a second face orthogonal to the first face, the second face defined by transitions
between the main body and the main plate to the respective second portion of
the corner piece and the second plate of the cap, and
wherein the first face abuts an end of the at least one tarp connector, and
wherein the second face abuts an end of the second tarp connector.
14. The system for connecting tarps to a vehicle according to claim 13, further comprising one or
more compressible gaskets between the first face of the corner connector system and the end of
the at least one tarp connector, and one or more compressible gaskets between the second face of
the corner connector system and the end of the second tarp connector.
15. The system for connecting tarps to a vehicle according to any one of claims 9 to 14, further
comprising one or more compressible gaskets inserted between the main body of the corner piece
and the main plate of the cap of the at least one corner connector system.
16. The system for connecting tarps to a vehicle according to any one of claims 9 to 14, wherein
the at least one tarp connector is detachably removable from the at least one corner connector
system.
17. The system for connecting tarps to a vehicle according to any one of claims 9 to 16, wherein
each tarp is secured to the corresponding tube by welding.
18. The system for connecting tarps to a vehicle according to any one of claims 9 to 14, wherein
the at least one tarp connector is secured to the at least one corner connector system by a washer,
nut and bolt.

19. A method of connecting tarps to a vehicle, comprising:

securing each one of a plurality of tarps around a corresponding tube;

attaching a plurality of frames to a vehicle, each frame comprising

at least one tarp connector, each tarp connector having a pair of channels for accepting and retaining at least one tarp and its corresponding tube, and at least one corner connector system, each corner connector system having:

a corner piece with a main body and a first portion extending from the main body into an interior of the at least one tarp connector; and

a cap with a main plate and a first plate extending from the main plate, the first plate and covering an exterior portion of the at least one tarp connector proximate the first portion of the corner piece;

the main body of the corner piece and the main plate of the cap each defining at least one groove, the corner piece and cap being coupled together such that the grooves mate to form a channel for engaging and retaining the at least one tarp and corresponding tube from the at least one tarp connector;

inserting the tarps and corresponding tubes into the tarp connectors and corner tarp connector system to create a cargo area for the vehicle enclosed by the tarps.

20. The method according to claim 19, wherein the tarp connectors are detachably removable from the corner connector systems.

21. The method of claim 19 or 20 further comprising securing each one of the plurality of tarps around the corresponding tube by welding or sewing.

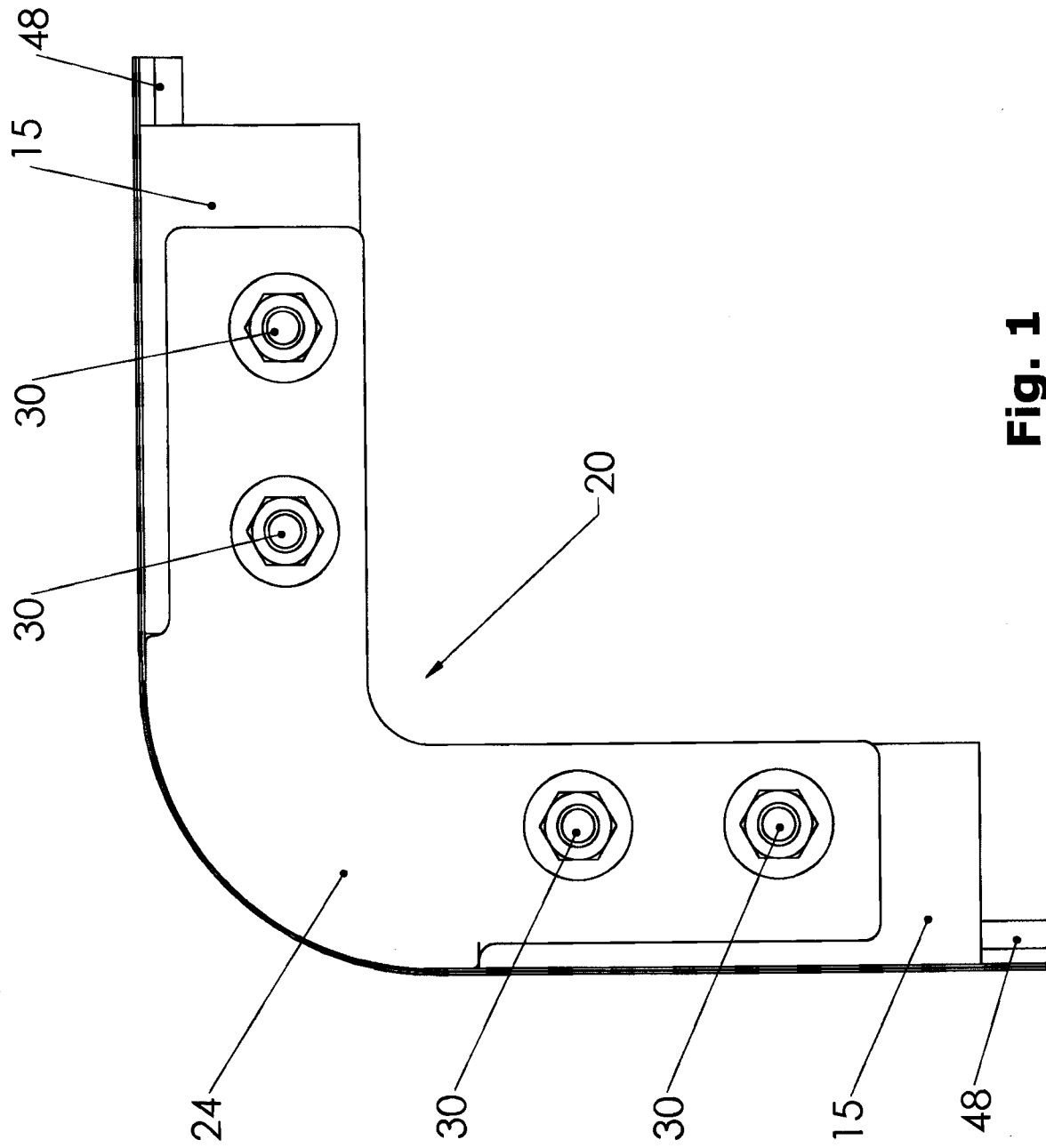


Fig. 1

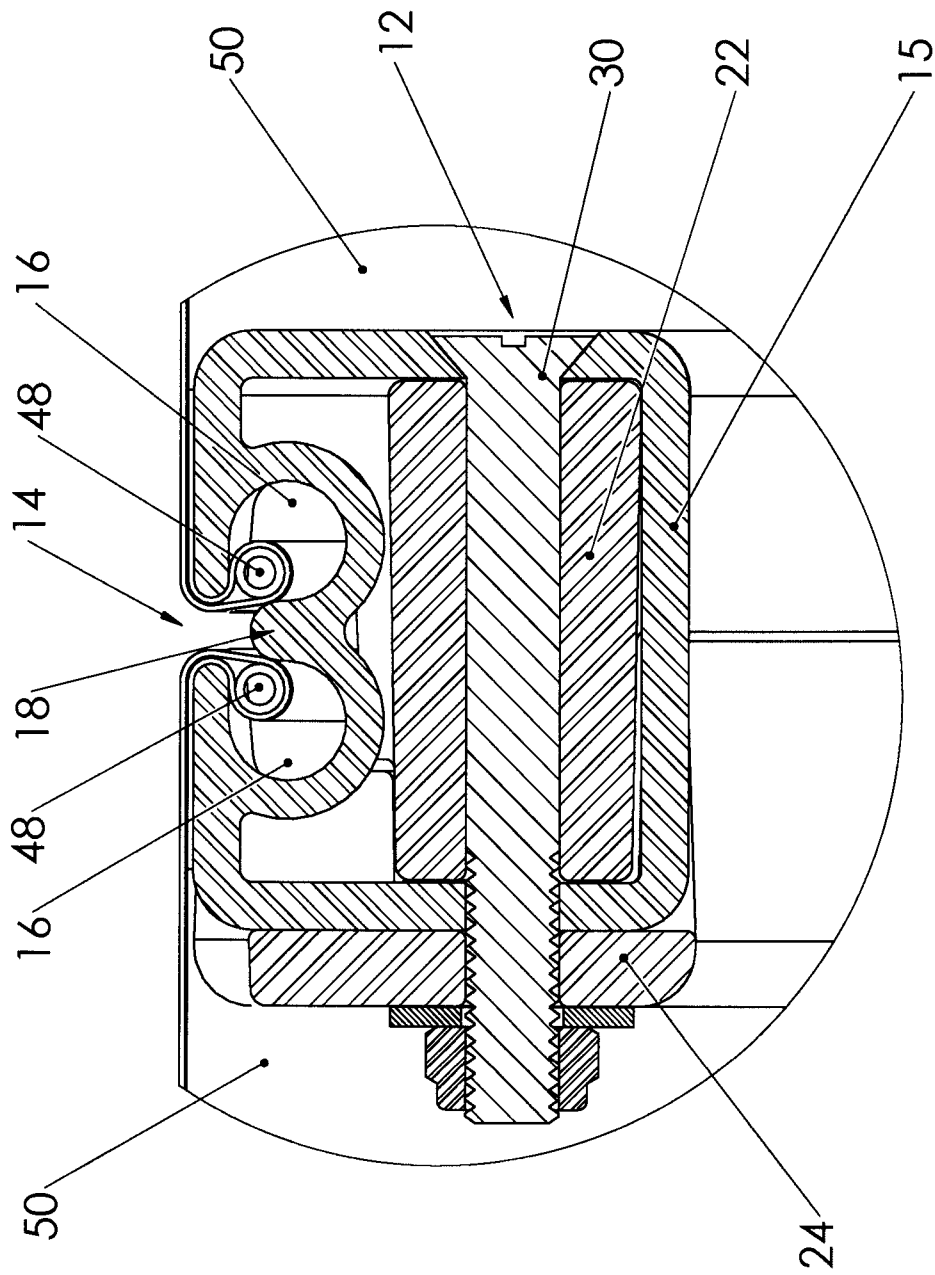


Fig. 2

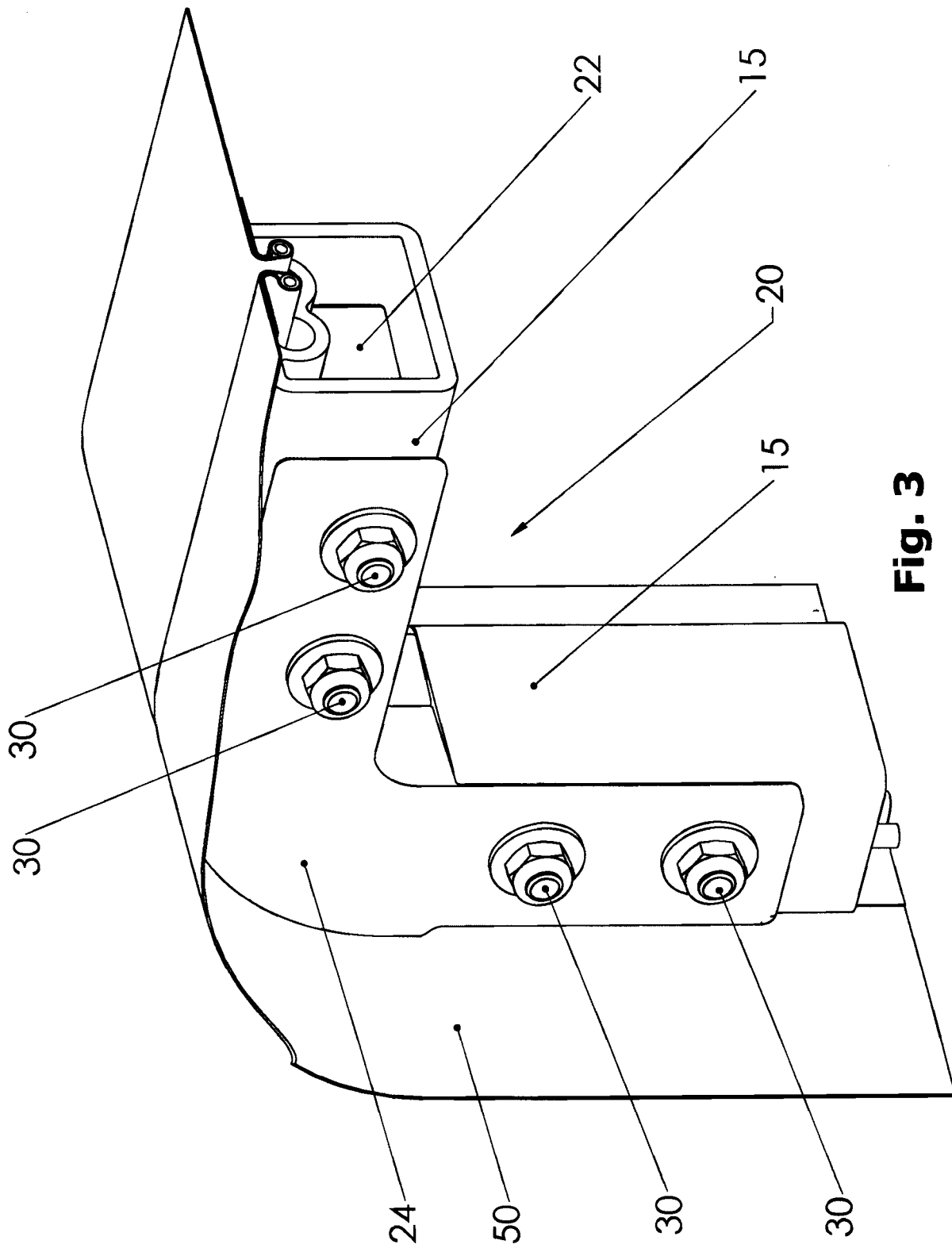


Fig. 3

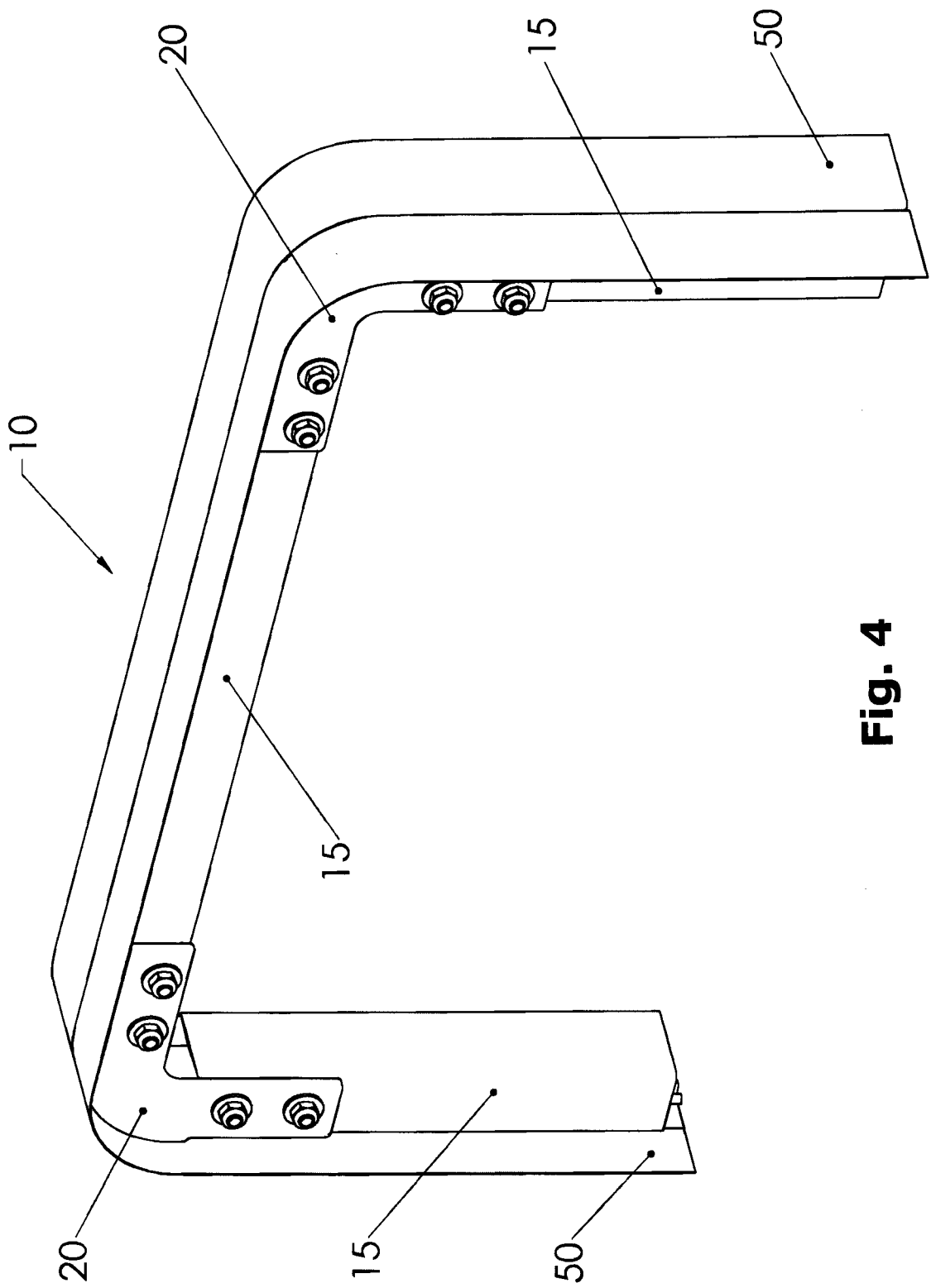


Fig. 4

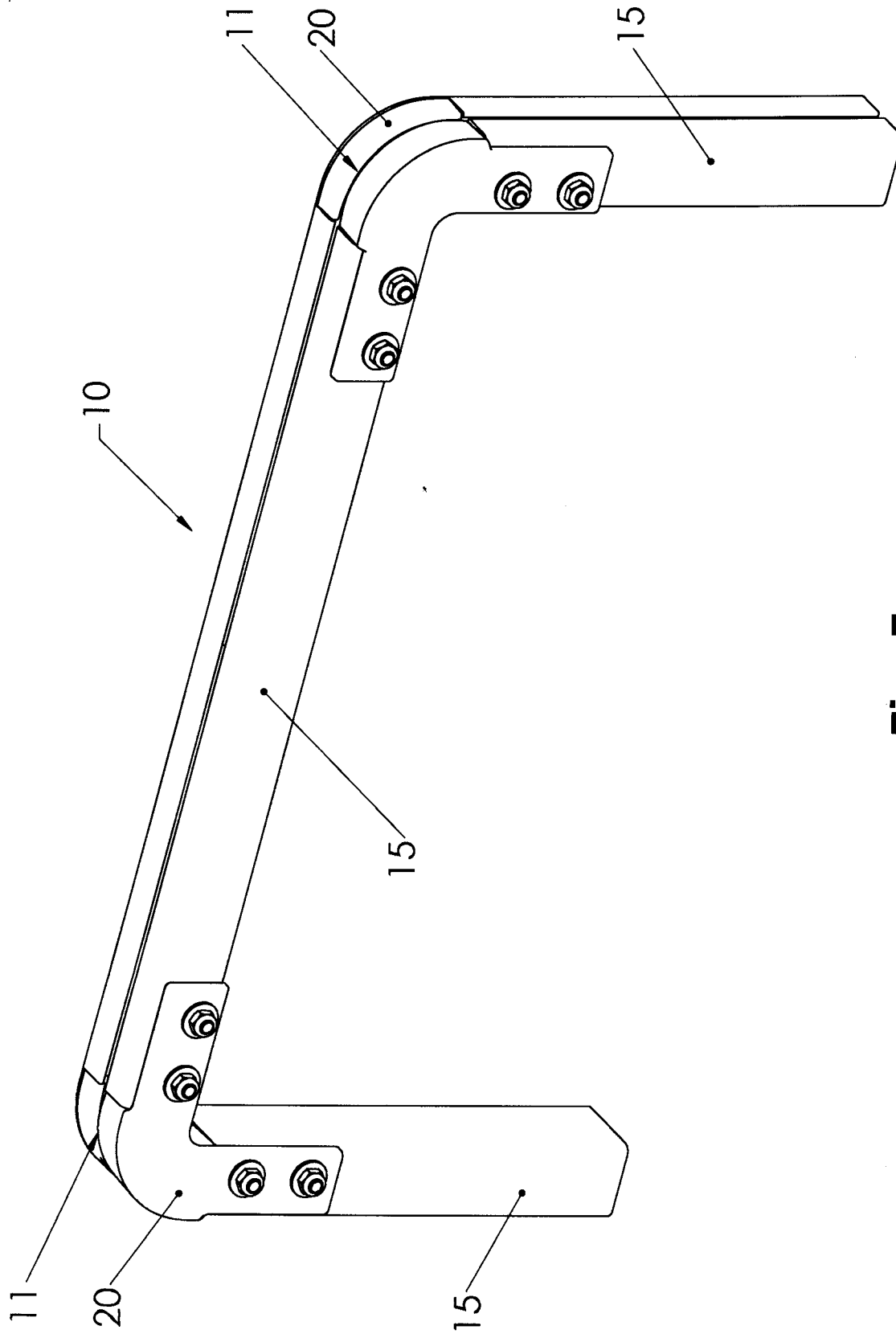


Fig. 5

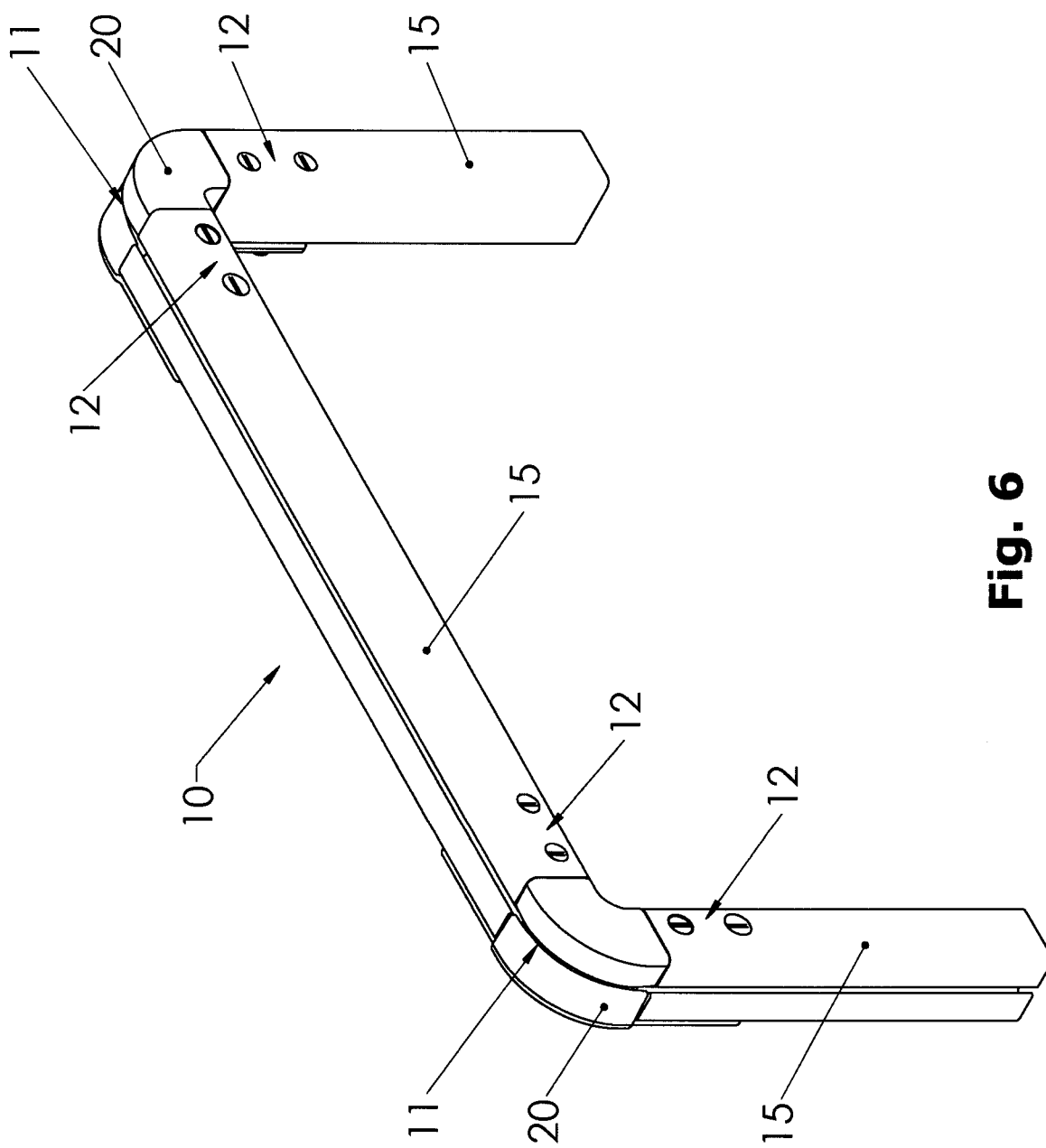


Fig. 6

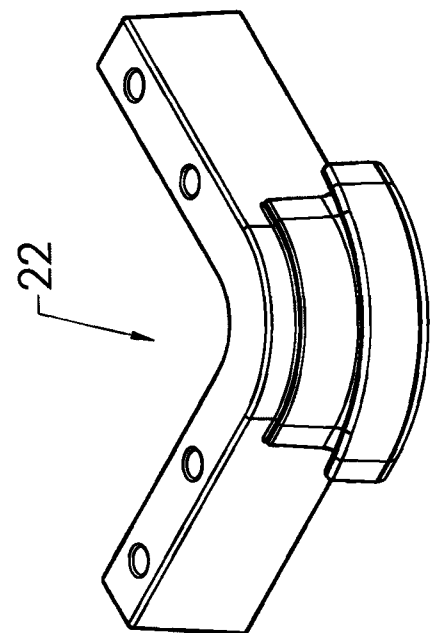


Fig. 9

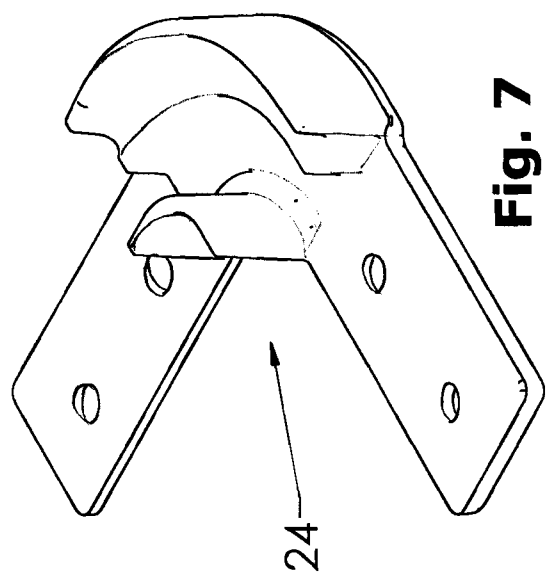


Fig. 7

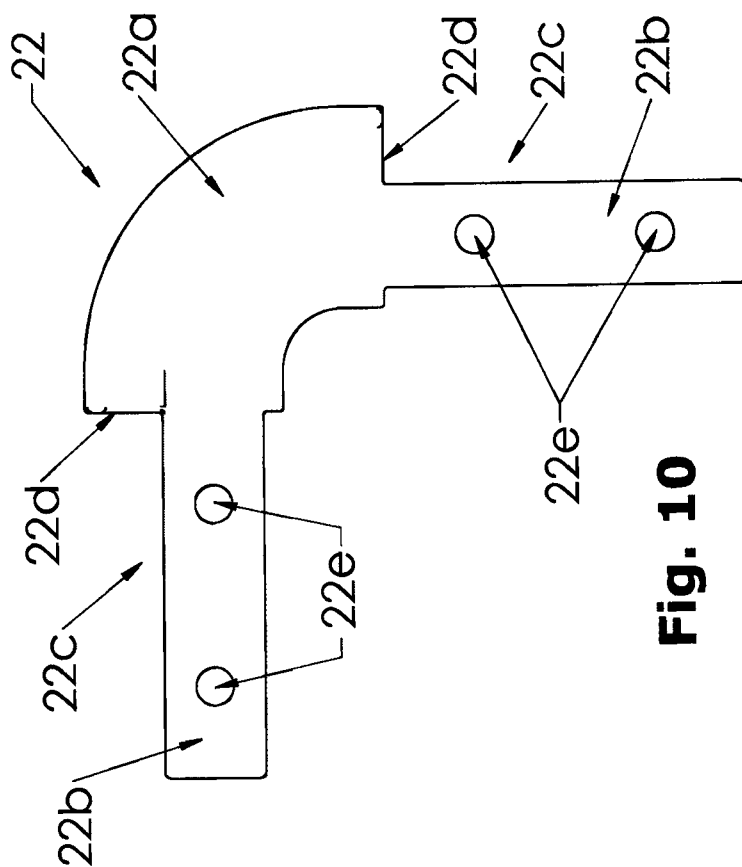


Fig. 10

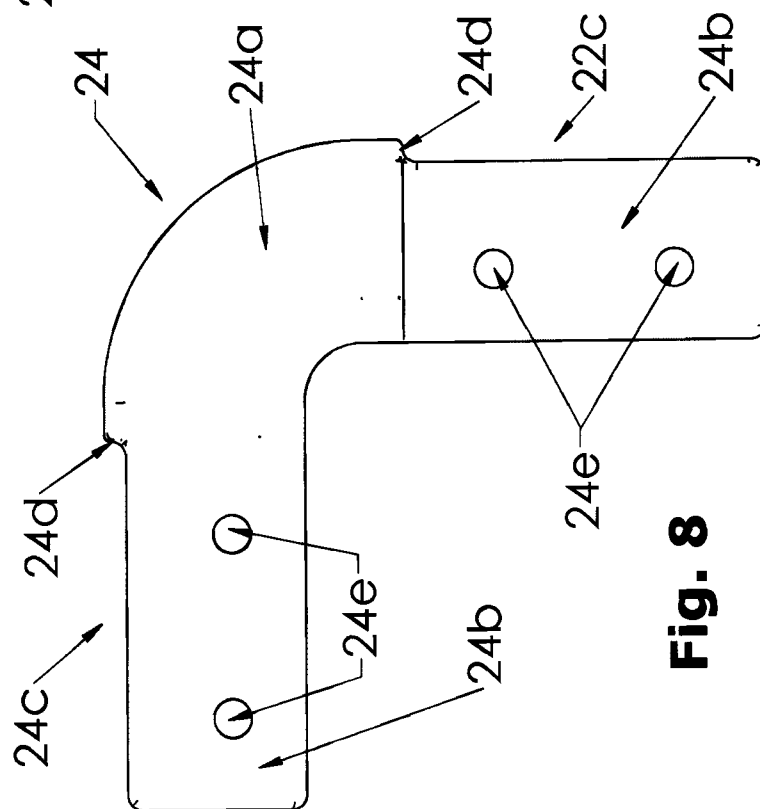


Fig. 8

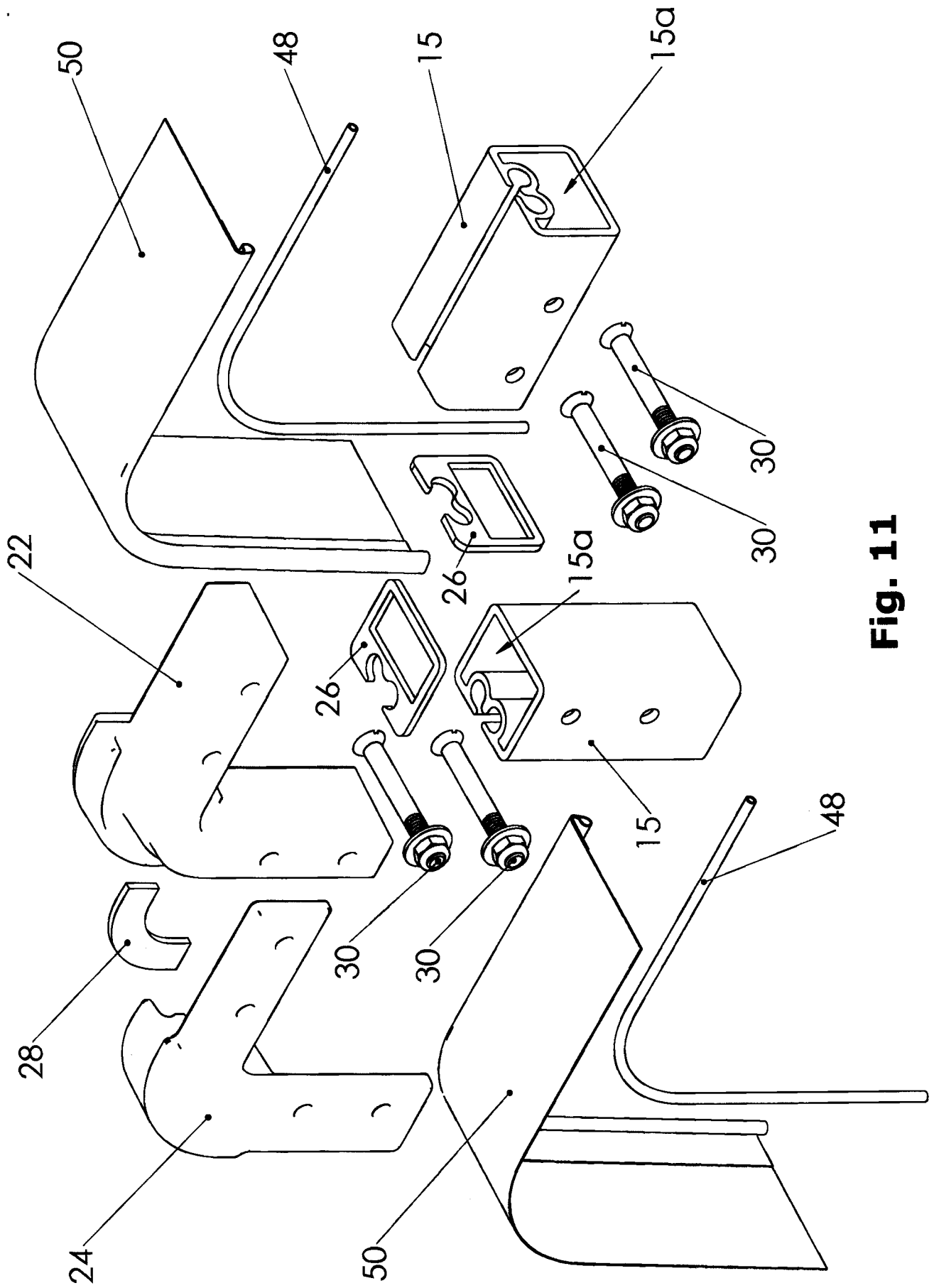


Fig. 11

