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CA 2859432 A1 2015/02/19

(21) 2 859 432

(12) DEMANDE DE BREVET CANADIEN
CANADIAN PATENT APPLICATION

(13) A1

(22) **Date de dépôt/Filing Date:** 2014/08/15

(41) **Mise à la disp. pub./Open to Public Insp.:** 2015/02/19

(30) **Priorité/Priority:** 2013/08/19 (CA2,823,938)

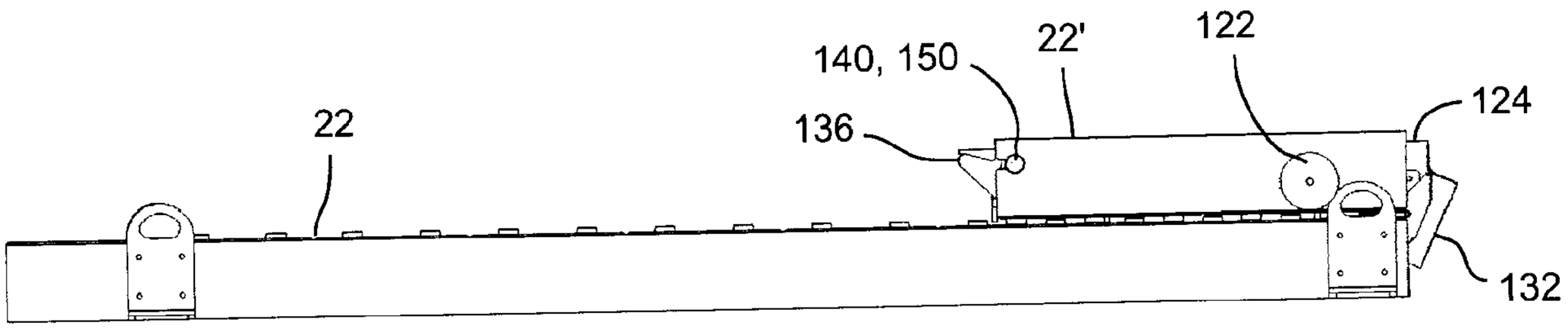
(51) **Cl.Int./Int.Cl.** ***B60P 1/43*** (2006.01),
B62D 33/08 (2006.01)

(71) **Demandeur/Applicant:**
MICHAUD, MICHEL, CA

(72) **Inventeur/Inventor:**
MICHAUD, MICHEL, CA

(74) **Agent:** THERIAULT, MARIO D., P. ENG.

(54) **Titre : PLATEFORME DE PROLONGEMENT PLIANTE ET ENSEMBLE DE RAMPES POUR CAMIONNETTE**
(54) **Title: FOLDABLE EXTENSION DECK AND RAMP ASSEMBLY FOR PICKUP TRUCK**



(57) **Abrégé/Abstract:**
The foldable truck bed extension deck and ramp assembly are mountable in a short-box pickup truck. The bed extension deck and ramp assembly have a comparable length to a full-size pickup truck box when deployed for use, and are jointly foldable to fit into a short-bed pickup truck with its tailgate closed when not used. The bed extension deck has a strong upper surface to resist deformation in rough use. The ramp member can be deployed with its front end matching the surface of the extension deck so that a vehicle can be driven along the ramp member and onto the deck surface without encountering any transition step.

ABSTRACT OF THE DISCLOSURE

The foldable truck bed extension deck and ramp assembly are mountable in a short-box pickup truck. The bed extension deck and ramp assembly have a comparable length to a full-size pickup truck box when deployed for use, and are jointly foldable to fit into a short-bed pickup truck with its tailgate closed when not used. The bed extension deck has a strong upper surface to resist deformation in rough use. The ramp member can be deployed with its front end matching the surface of the extension deck so that a vehicle can be driven along the ramp member and onto the deck surface without encountering any transition step.

TITLE: FOLDABLE EXTENSION DECK AND RAMP ASSEMBLY FOR PICKUP TRUCK

FIELD OF THE PRESENT INVENTION

The present invention pertains to the field of truck ramps stowed inside truck-bed liners, and more particularly, it pertains to foldable bed extension deck and ramp assemblies for use in short-box pickup trucks.

BACKGROUND OF THE PRESENT INVENTION

Modern pickup trucks have extended cabs capable of sitting five passengers comfortably. The boxes of these modern pickup trucks have a length of 6 ft.-6 in., basically. These short boxes cannot transport trail-type or mountain-type snowmobiles with lengths of 11 and 13 feet respectively, even with the tailgate in the open position. Similarly, lumber and other residential construction materials are sold in 8, 10 and 12 foot lengths. Transporting these materials in a short-box pickup truck can sometimes be a challenge. For these reasons, it is believed that modern short-box pickup trucks have created a market need for truck bed extension decks that can be used to transport material and equipment that is best transported in a conventional 8-foot truck box.

Conventional ramps for use with pickup trucks have a length of 8 feet. It is generally accepted that an 8-foot ramp provides an easy slope for loading a vehicle in the truck box. Short truck boxes are inherently associated with shorter ramps and a steeper climbing angle for loading sport or gardening equipment in the truck box. This inconvenience also points to a market need for truck bed extension decks that can be used to transport material

and equipment that is best transported in a conventional 8-foot truck box.

In another aspect of truck bed liners, the most important factor in the design of a truck ramp and truck-bed liner or extension deck, is a weight-to-strength ratio of the deck itself. A truck owner does not want to carry extra weight in his truck and to spend unnecessary fuel. On the other hand, the buyer of a truck bed liner and ramp assembly wants this equipment to be strong, durable, usable and safe. In that point of view, a frame that is made of flat bars mounted on their edges offers the best weight-to-strength ratio, when compared to hollow structural tubing or structural angles of a same weight per foot for example. Despite this advantage, it is believed that a framing system made of flat bars in a truck bed liner has not been used in the past.

A number of truck-bed liners with and without ramps have been found in the prior art. It is believed that the following documents provide a good inventory of these previous inventions:

US Patent 4,573,731 issued to H. L. Knaack et al., on Mar. 4, 1986;

US Patent 4,601,632 issued to J.H. Agee on July 22, 1986;

US Patent 4,624,619 issued to M.L. Uher on Nov. 25, 1986;

US Patent 4,685,857 issued to M.N. Goeser et al., on Aug. 11, 1987;

US Patent 4,722,109 issued to E.E. Mountz on Feb. 2, 1988;

US Patent 4,733,898 issued to S.D. Williams on Mar. 29, 1988;

US Patent 4,900,217 issued to J.N. Nelson on Feb. 13, 1990;

US Patent 4,990,049 issued to J.F. Hargrove on Feb. 5, 1991;

US Patent 5,257,894 issued to H.K. Grant on Nov. 2, 1993;

US Patent 5,393,192 issued to J.C. Hall et al., on Feb. 28, 1995;

US Patent 5,468,114 issued to S.J. Hickerson on Nov. 21, 1995;

US Patent 5,533,771 issued to S. Taylor et al., on July 9, 1996;

US Patent 5,570,989 issued to M. Belanger on November 5, 1996;

US Patent 5,795,125 issued to C.D. Walkden on Aug. 18, 1998;

US Patent 5,863,173 issued to R.A. Bremner on Jan. 26, 1999;

US Patent 6,464,274 issued to F.L. Mink et al., on Oct. 15, 2002;

US Patent 6,484,344 issued to S.M. Cooper on Nov. 26, 2002;

US Patent 7,128,357 issued to N.C. Carroll on Oct. 31, 2006;

CA Patent 1,033,313 issued to J. L. Glassmeyer on June 20, 1978;

CA Patent 1,284,564 issued to D. Manning et al., on June 04, 1991;

CA Patent Appl. 2,076,255 published by G.O. Alexander on Feb. 18, 1994;

It is believed that a market need exists in the field of truck accessories for a foldable bed extension deck and ramp assembly having a good weight-to-strength ratio, and that can be mounted in a short-box pickup truck to provide the same advantages as those of a full size truck box, while preserving the integrity of the tailgate of the pickup truck.

SUMMARY OF THE PRESENT INVENTION

In the present invention, there is provided a foldable truck bed extension deck and ramp assembly that are mountable in a short-box pickup truck. The bed extension deck and ramp assembly according to the present invention have a comparable length to a full-size pickup truck box when deployed for use, and are jointly foldable for storage into a short-bed pickup truck with its tailgate closed.

In a first embodiment of the present invention, the bed extension deck and ramp assembly are foldable over a right angle to fit inside a short bed pickup truck with its tailgate closed. In a second embodiment of the present invention, the bed extension deck and ramp assembly are foldable

over a straight angle to fit inside a short bed pickup truck with its tailgate closed, and so as to be completely concealed from view inside the truck box, such as under a tonneau cover for example, when not in use.

The bed extension deck and ramp member assembly also have other features that are advantageous to pickup truck owners. The bed extension deck has a strong upper surface to resist deformation in rough use. The ramp member can be deployed with its front end matching the height of the surface of extension deck so that a vehicle can be driven along the ramp member and onto the deck surface without encountering any transition step.

More specifically, in a first aspect of the present invention, there is provided a truck bed extension deck and a ramp member that is telescopically mounted inside the bed extension deck. The bed extension deck has a channel on each side thereof. The ramp member has two sides, a front end and a dolly mounted on each side, near the front end. Each of the dollies has a pair of closely spaced casters mounted thereon. Each of these dollies are guided for movement along a lower flange of one of the channels inside the bed extension deck. Each dolly also has an arm extending backward from the pair of casters. Each arm is pivoted to a respective side of the ramp member at a distance from the front end of the ramp member.

Each channel has a guide block mounted to a web thereof at a distance from the lower flange at the rear end thereof. At the rear end of its travel, each dolly is movable to precisely fit between the guide block and the lower flange of the channel. In this position, each dolly is held firmly between the guide block and the lower flange of the channel when upward or downward forces are applied to the arms of the dolly.

Because the ramp member is pivoted to the arms of the dollies, at a distance from the front end thereof, the front end of the ramp member, in use, extends higher than the dollies to match the level of the floor surface on the bed extension deck. Equipment may be rolled onto the ramp member and deck surface without encountering a transition step at the rear edge of the bed extension deck.

In a second aspect of the present invention, there is provided a truck bed extension deck and a ramp member telescopically mounted inside the bed extension deck. The bed extension deck has a top plate; a channel on each side thereof and a structural frame system extending between the channels and the top plate.

The structural frame system comprises transverse flat bars extending across the channels and longitudinal flat bars extending across the transverse flat bars. The structural frame system also comprises angle joiners and fasteners retaining each end of one of the longitudinal flat bars to one of the transverse flat bars; and angle clips affixed exclusively to the longitudinal flat bars and the top plate for retaining the top plate to the structural frame.

The transverse flat bars are held against canting by the longitudinal flat bars. A deformation or sagging in the top plate is not transmitted to the transverse flat bars, and does not reduce the tensile strength of these transverse flat bars.

In a third aspect of the present invention, there is provided a truck bed extension deck having a ramp member telescopically mounted inside the bed extension deck. The bed extension deck has a front segment and a rear segment. The rear segment is joined to the front segment by a first hinge

such that the rear segment is foldable upwardly relative to the front segment.

Similarly, the ramp member has a front portion and a rear portion. The rear portion is joined to the front portion by a second hinge such that the rear portion is foldable upwardly relative to the front portion.

The ramp member also has a pair of lock bars movably mounted thereto, extending in the ramp end section and in the end of the ramp member, such as dead bolts, for preventing a folding movement of the ramp end section relative to the ramp member.

In yet another characteristic, a bar locking mechanism including a handle are included on the ramp end section for locking a position of the lock bars when the ramp assembly is in use.

This brief summary has been provided so that the nature of the invention may be understood quickly. A more complete understanding of the invention can be obtained by reference to the following detailed description of the preferred embodiments thereof in connection with the attached drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an elevation side view of a modern short-box pickup truck, with the first preferred bed extension deck installed and stowed therein;

FIG. 2 is a cross-section side view of the short box of the pickup truck shown in **FIG. 1**, with the first preferred bed extension deck and ramp

assembly mounted in the truck box in a deployed mode;

FIG. 3 is an enlarged side view of a segment along the ramp member in the first preferred bed extension deck and ramp assembly, showing a latch along the ramp member;

FIG. 4 is an end view of the ramp member;

FIG. 5 is a perspective top and rear view of the first preferred bed extension deck and a cut-away view through the cover plate of the first preferred extension deck, showing the framing arrangement inside the extension deck;

FIG. 6 is an enlarged side view of the framing arrangement inside the first preferred extension deck, as seen in detail **circle 6** in **FIG. 5**;

FIG. 7 is a cross-section side view through the first preferred extension deck illustrating the position of the ramp member relative to its dolly and pivot assembly when the ramp member is deployed for use;

FIG. 8 is a side view through the bed extension deck illustrating the ramp member in a horizontal alignment ready to be stowed inside the first preferred bed extension deck;

FIG. 9 is an enlarged cross-section side view of a short box of a pickup truck with the first preferred bed extension deck mounted therein and illustrated in a deployed mode;

FIG. 10 is another enlarged cross-section side view of a short box of a pickup truck with the first preferred bed extension deck and ramp assembly mounted therein and shown in a folded stowed position;

FIG. 11 is an enlarged view of the detail **circle 12** in **FIG. 10**, showing the first preferred extension deck and ramp assembly in an intermediate position during folding;

FIG. 12 is another enlarged view of the detail **circle 12** in **FIG. 10**, showing the first preferred extension deck and ramp assembly in the folded or stowed position;

FIG. 13 is a perspective view of the bed extension deck and ramp assembly according to the second preferred embodiment of the present invention;

FIG. 14 is a perspective view of the ramp end section of the ramp assembly with its lock bars extended;

FIG. 15 is a side view of the second preferred bed extension deck and ramp assembly in a horizontal alignment, ready to start the stowing process;

FIG. 16 is a side view of the second preferred bed extension deck and ramp assembly in a horizontal alignment, with the ramp member thereof stowed inside the foldable deck segment and the bed extension deck;

FIG. 17 is an enlarged side view of the ramp end section of the ramp assembly with the lock bars extended and the bar locking mechanism in a release mode;

FIG. 18 is a side view of the second preferred bed extension deck and ramp assembly in a horizontal alignment, with the end section inserted inside the deck extension and the foldable deck extension being partly folded;

FIG. 19 is a side view of the second preferred bed extension deck and ramp assembly in a horizontal alignment, with the foldable deck extension and ramp assembly being completely folded flat over the bed extension deck;

DETAILED DESCRIPTION OF THE FIRST AND SECOND PREFERRED EMBODIMENTS

There are two preferred embodiments of the present invention presented herein. The first and second preferred embodiments of the bed extension deck and ramp assembly according to the present invention are described herein below with reference to the attached drawings.

Referring firstly to **FIG. 1,** a modern short-box pickup truck **20** is illustrated therein as a reference, to better understand the foldable bed extension deck and ramp assembly according to the first preferred embodiment of the present invention.

This short-box pickup truck **20** has the preferred bed extension deck mounted therein in a folded mode, such that the tailgate of the short-box truck can be closed. The foldable segment **22'** of the bed extension deck is visible in **FIG. 1**. As it will be understood, the first preferred bed extension deck has a length of slightly under 6 feet in a folded mode, and a total length of about 8 feet when extended over the tailgate of the truck in a deployed mode. For clarity, only the box portion **24** of that pickup truck **20** is illustrated in subsequent drawings included herein.

Referring to **FIG. 2**, the bed extension deck **22** is preferably fastened to the floor of the box **24** of the pickup truck by brackets **26** bolted to the front end of the deck **22**. The floor **28** of the truck box **22** is shown in cross-section shading in **FIG. 2**. Also in **FIG. 2**, it can be appreciated that the ramp member **32** is telescopically mountable into the bed extension deck **22**. In this illustration, the ramp member **32** is shown in an extended, deployed mode. Although the box **24** is a short box, the ramp member **32** has a length of about 8 feet or more in a deployed mode.

As it will be better explained later, the bed extension deck **22** has a piano-type hinge **34** thereon retaining a foldable rear segment **22'** to a fix front segment **22**. Similarly, the ramp member **32** has a piano-type hinge **36** thereon retaining a foldable rear portion **32'** to a front portion **32**. The foldable rear segment **22'** and portion **32'** have a respective length of 2 feet or more.

In **FIGS. 3** and **4**, it can be seen that a pair of latches **38** are used to stiffen the ramp member **32** in use. The latches **38** are mounted to both portions **32'** and **32** to prevent folding of these portions about the hinge **36** in use. The capacity of each latch **38** is preferably one ton or more.

The ramp member **32** has a shoulder **40** along both side edges thereof. These shoulders **40** are used for enclosing the latches **38** within the width of the ramp member and serve as guides for guiding the ramp member **32** inside the bed extension deck **22**. The ramp member **32** also has a pair of handles **42**, or handle-openings as illustrated, on its rear end to push and pull the ramp member **32** in and out from the bed extension deck **22** by hand.

Referring now to **FIGS. 5** and **6**, the structural frame system of the bed extension deck **22** will be explained. The bed extension deck **22** has two structural channels **50** forming its sides; a first metal plate **52** on top, and optionally a second metal plate **54** closing the bottom of the bed extension deck. The preferred channels **50** are nominal 6 inch channels with 2 inch flanges.

A front vertical guard plate **56** is preferably provided along the front end of the deck **22** to protect the front end of the truck box against damage from equipment loaded on the deck **22**. The foldable segment **22'**of the extension deck **22** is separated from the front segment **22** along cut line **58**. As it will be understood, the top and bottom plates **52**, **54** and the structural frame system **60** are also separable at line **58**.

Below the top plate **52**, there is provided an array of flat bars mounted on edge and jointly forming the structural frame system **60** of the bed extension deck **22**. The structural frame system **60** is made of transverse flat bars **62**, which extend the full width of the bed extension deck **22**, between the channels **50**. These transverse flat bars **62** are spaced apart about 16 to 24 inches.

The transverse flat bars **62** provide substantially the entire structural strength of the bed extension deck **22** to prevent a transverse deflection of the deck **22**. A series of longitudinal flat bars **64** are mounted between the transverse flat bars **62**, also at spacings of about 16 to 24 inches. The longitudinal flat bars **64** are precisely cut at a right angle, and are precisely fitted between the transverse flat bars **62**. The longitudinal flat bars **64** are held to the transverse flat bars **62** by means of angle joiners **66** and rivets **68**. The preferred flat bar dimensions for both the longitudinal flat bars **64**

and the traverse flat bars **62** are 2.5 inch high by 1/4 inch thick. The preferred angle size for the angle joiners **66** is 2.5 inch by 2.5 inch by 1/4 inch thick. The preferred material of construction of all structural members, sheets and top plate of the bed extension deck and ramp assembly is aluminum.

It will be appreciated that the longitudinal flat bars **64** and angle joiners **66** prevent the transverse flat bars **62** from canting under load, thereby maintaining their full strength despite sagging of the top plate **52**.

Another important feature in the preferred bed extension deck **22** is that the top plate **52** is fastened to the array of flat bars **60** by means of rivets (not shown) and angle clips **70** that are affixed exclusively to the longitudinal flat bars **64**. The reason for the mounting of the angle clips **70** to the longitudinal flat bars **64** is to further prevent the canting of the transverse flat bars **62** when the top plate **52** is sagging under load.

Although the structural frame system **60** of the bed extension deck **22** has been described herein, the structure of the ramp member **32** is built in a similar manner as the bed extension deck **22** and therefore, the advantages described herein-above also apply to the ramp member **32**.

The forward end of the ramp member **32** has a dolly **80** mounted to each side thereof; only one side is visible in **FIGS. 7** and **8**. Although only one dolly is visible, it is believed that the person skilled in the art will understand the structure, mounting and operation of these dollies from the following description.

The views in **FIGS. 7** and **8** is a longitudinal cross-section view through the flanges of the near side channel **50**. The dollies **80** are rolling along the bottom flanges of these channels **50** and are guided sideways against the web of these channels.

For reference purposes, the frame portion **60** of the bed extension deck **22** is represented by the dimension '**A**' and the ramp storage compartment under the frame portion, is represented by dimension '**B**' as seen in **FIG. 8**.

The front end of the ramp member **32** has two arms **82** pivoted to a respective side thereof. These arms **82** are part of the dollies **80** mentioned before. These arms **82** are made of structural angles for example. Each arm **82** extends forward inside the rear end of the bed extension deck **22**, into the ramp storage compartment '**B**'. Each arm **82** has a pair of closely-spaced in-line casters **84** mounted to its forward end, and a cap plate **86** extending above the casters **84**. The casters **84** have a larger diameter than a height of the structural angle of the arms **82**. The casters **84** on one arm **82** are aligned with the lower flange **88** of a respective structural channel **50** enclosing a respective side of the bed extension deck **22**. The dollies **80** guide the ramp member inside the bed extension deck **22**, and for support the front end of the ramp member **32** inside the bed extension deck **22**.

There are provided inside the side channels **50**, a pair of horizontal guide blocks **90** affixed to the web of the channels **50** at the rear end of the channels. These horizontal guide blocks **90** are mounted in a parallel relationship with the lower flange **88** of a respective channel **50**. The clearance between these horizontal guide blocks **90** and the lower flanges **88** of the channel **50** is basically the same as a distance between the lower

segment of the casters **84** and the cap plate **86** of each arm **82** plus a free sliding fit. Each dolly **80** is thereby movable in a precisely fitted manner inside a gap between a respective guide block **90** and a flange **88**, at the end of its rearward travel.

A stopper block **92** is mounted vertically to the web of each of the side channels **50** at the rear end of the ramp storage compartment **'B'**. These stopper blocks **92** are used to prevent the dollies **82** from sliding out of the ramp storage compartment **'B'**. In use, the cap plate **86** and/or the rear caster **84** of a dolly abuts against a stopper blocks **92** on the rear end of the channels **50** so as to retain both dollies **80** captive inside the bed extension deck **22**.

The guide block **90** and the stopper block **92** shown in **FIGS. 7** and **8** are those mounted to the far side channel **50**, while the casters **84** are those facing the near side channel **50**, on the near side dolly **80**. The drawing has been prepared in this manner for convenience to better explain the operation of the dollies **80**.

It will be understood that when the ramp **24** is fully deployed, each dolly **80** is held fix between the lower flange **88**, the stopper block **92** and the guide block **90**, with the arms **82** extending rigidly, parallel with the floor of the bed extension deck **22**. A cross-member (not shown) may be provided across the bed extension deck **22** between the dollies **80** to add stability to these dollies **30**.

Because of the arm **82** extending rigidly rearward on each dolly **80**, the ramp member **32** is pivoted at a distance from its front end. When the ramp member is lowered to the ground, as illustrated in **FIGS. 2** and **7**, the front

end of the ramp member **32** extends higher than the arms **82** to reach a same height **'H'** as the floor surface **52** of the bed extension deck **22**.

The pivot points **94** on the arms **82** and ramp member **32** can be relocated to other pivot holes **96** along the sides of the ramp member **32** to accommodate different heights of pickup truck bed, so that the ramp's front end, in use, is of a same height **'H'** as the floor surface of the bed extension deck **22**. This feature is advantageous for driving a vehicle over the ramp member **32** and the bed extension deck **22** without encountering a transition step at the intersection of both elements.

Because each dolly **80** has closely spaced casters **84**, the arms **82** of these dollies **80** are stable and rigidly held to resist downward forces when the ramp is used normally. The arms **82** of these dollies **80** are also stable and rigidly held to resist upward forces when a vehicle climbs the ramp with substantial momentum. For reference purposes, the spacing between the casters **84** is about 1.5 to twice the diameter of one caster.

For reference purposes, the bed extension deck **22** may have overall dimensions of 48 inch wide by 96 inch long when unfolded. The ramp member **32** with its dollies may have dimensions of 47-3/4 inch wide by 95-1/2 inch long. The deployed ramp member **32** has a slope of about 23 degrees, when used on horizontal grounds.

Referring now to **FIGS. 9** and **10**, the folding of the bed extension deck will be described. As mentioned before, the preferred bed extension deck **22** has a separation **58** therein and a foldable rear portion **22'**. The rear portion **22'** is foldable on the piano-type hinge **34** from a flat position over the tailgate **98,** to a vertical position inside the tailgate **98** of a short box

pickup truck.

When the foldable segment **22'** of the bed extension deck **22** is in a flat position as shown in **FIG. 9**, the space available over the deck **22** is substantially the same as inside a full-length box of a conventional pickup truck. The truck can be used with the tailgate **98** open to carry common building materials and other equipment that is best transported in a conventional pickup truck.

When the foldable segment **22'** of the bed extension deck is in a folded position as shown in **FIG. 10**, the bed extension deck **22** and ramp member **32** do not prevent the tailgate **98** of a short box pickup truck from being closed as if nothing was mounted in the truck box **24**.

Referring to **FIGS. 11** and **12**, cross-section views of the bed extension deck **22** during folding are illustrated. Firstly, the latches **38** on both sides of the ramp member **32** are unlocked and tucked under the shoulders **40** along the edges of the ramp member **32** before the ramp member **32** is inserted fully inside the storage compartment **'B'** of the extension deck **22**.

The ramp member **32** is stowed inside the storage compartment **'B'** so that the second hinge **36** is vertically inline or slightly rearward relative to the first hinge **34** as illustrated in **FIG. 11**.

The tilting upward of the foldable segment **22'** of the bed extension deck causes the ramp member **32** to move backward, and causes the foldable ramp portion **32'** to move forward and downward such that the second hinge **36** is automatically pulled forward or backward to lie in a position near to or on a median **100** of the angle of displacement **'C'** of the foldable

segment **22'** of the bed extension deck.

The ramp storage compartment **'B'** together with its channels **50** and the ramp's dollies **80** jointly constitute a guiding arrangement for maintaining the ramp member **32** in a parallel alignment with the bed extension deck. Because of this guiding arrangement, the ramp member is easily adjustable inside the storage compartment **'B'** for maintaining the second hinge **36** in alignment with the median line **100**. The bed extension deck **22** with the ramp member **32** stowed therein are easily foldable by hand.

When the bed extension deck **22** is in its folded position, as shown in **FIG. 12** the tailgate **98** of the pickup truck can be closed to retain the bed extension deck **22** in that folded position. Springs and shock absorbers can also be used to assist in the working of the bed extension deck between a deployed and a folded positions.

When the bed extension deck is folded back to a flat alignment, the ramp member **32** returns to its initial position inside the storage compartment **'B'**, and can be withdrawn for normal use.

Although the bed extension deck **22** and ramp member **32** are described herein as accessories for a pickup truck, it will be appreciated that this invention can also be used in other environments including loading docks, trailers, cargo vans, etc.

Referring now to **FIGS. 13-19**, the bed extension deck and ramp assembly according to the second preferred embodiment **120** of the present invention will be described. The distinguishing characteristics of the bed extension deck and ramp assembly according to the second preferred embodiment of

the present invention is that the foldable deck extension **22'** and the ramp end section **124** of the ramp assembly can be folded flat over the bed extension deck **22** in a stowed mode. The bed extension deck and ramp assembly according to the second preferred embodiment **120** can be completely concealed from view in a short box of a pickup truck with the tailgate closed, under a tonneau cover for example, when not in use.

The extension deck and ramp assembly according to the second preferred embodiment **120** has many similarities with the extension deck and ramp assembly according to the first preferred embodiment **22**, **32**. Therefore, the following description is limited to the distinguishing characteristics in the second preferred embodiment. For convenience, the labelling of the elements in both embodiments is the same as long as the function of the corresponding elements do not differ substantially from each other.

A first characteristic in the extension deck and ramp assembly according to the second preferred embodiment **120** is a pair of lock pin and button assemblies **122** mounted to the side of the foldable deck extension **22'**. When pushed in, the lock pins prevent the ramp dollies **80** from sliding inside the foldable deck extension **22'**. When pulled out, the lock pin and button assemblies **122** allows a free sliding of the dollies **80** and the ramp member **32** inside the bed extension deck **22**.

The extension deck and ramp assembly according to the second preferred embodiment **120** has a ramp end section **124** that is retained to the ramp member **32** by a link segment **126**. The stiffening of the link segment **126** relative to the end section **124** and the ramp member **32** is effected by a pair of lock bars **130** movably mounted inside a pair of channel link members **132**. The ramp end section **124** also has on each of its sides, a respective

bar locking mechanism **134** for locking the lock bars **130**. A transverse handle **136** is mounted to the nose of the ramp end section **124** and is used for operating the mechanisms **134**. It will be appreciated that the bar locking mechanism **134** on one side of the ramp end section is a mirror image of the other mechanism on the other side, and therefore, only one side is illustrated. The handle **136** operates both mechanisms **134** simultaneously.

Referring particularly to **FIGS. 13** and **14**, the ramp end section **124** is connected to the ramp member **32** by the link segment **126**. This link segment **126** has a pair of piano hinges **36** mounted thereto, and a pair of channel-link members **132**. A pair of lock bars **130** slide fitly, such as deadbolts, from inside the ramp end section **124**, into a respective one of the channel-link members **132**, and in a respective "precise fit" pocket (not shown) inside the ramp member **32**. The lock bars **130** are preferably made of high-strength steel. When the lock bars **130** are extended such as illustrated in **FIG. 14**, the ramp end section **124** forms a rigid platform with the ramp member **32**.

It will be understood that the distance between both piano hinges **36** on the link segment **126** is substantially a same measurement as the thickness of the bed extension deck **22**, or slightly more such that the foldable deck extension **22'** can be folded a straight angle flat over the bed extension deck **22** with the ramp member **22** inside.

Each lock bar **130** is slid in and out of the ramp end section **124** by way of a respective knob **140** guided along a slot **142** in a respective side wall of the ramp end section **124**. Each bar locking mechanism **134** has cams **144**, **144'** and a link bar **146** to secure the knob **140** in one extremity of the slot

142 or the other, as can be seen in **FIG. 14** and **FIG. 17**. As can be appreciated from these illustrations, both bar locking mechanisms **134** are operated by moving the handle **136** upward or downward. Both knobs **140** and lock bars **130** are free to move along the slots **142** when the handle **136** is in the raised position as illustrated in **FIG. 17**. When the handle is in the down position , as seen in **FIG. 14**, the knobs **140** and the lock bars **130** are locked in place by either cams **144**, **144'**, at either ends of the slots **142**.

The stowing of the ramp member and the foldable deck extension in the bed extension deck and ramp assembly according to the second preferred embodiment **120** is effected as follows: Starting with a deployed ramp member **32** and ramp end section **124**, as illustrated in **FIG. 13**, the lock pins **122** are pulled out to unlock the ramp dollies **80** from the foldable deck extension **22'**. The ramp member **32** and ramp end section **124** are lifted up in a horizontal alignment as shown in **FIG. 15**. Then, the ramp dollies **80** and the ramp member **32** are slid inside the bed extension deck **22**, as illustrated in **FIGS. 16** and **17**. As this point, or during the lifting of the ramp assembly to a horizontal position, the handle **136** is moved into an upper position, unlocking the movement of the lock bars **130** as previously explained.

The movement of the ramp member **32** along the bed extension deck **22** brings each of the knobs **140** to register into a respective seat **150** on the end of the foldable deck extension **22'**, as can be seen in **FIG. 17**. A further movement of the end section **124** inside the foldable deck extension **22'** causes the knobs **140** and the lock bars **130** to move inside the end section **124**, and to free up to movement of the hinges **36** on the link segment **126**, as can be appreciated by looking at **FIG. 18** and **FIG. 19**.

The deployment of the ramp member **32** and ramp end section **124** in the bed extension deck and ramp assembly according to the second preferred embodiment **120** is done by reversing the steps mentioned above. The moving of the knobs **140** and lock bars **130** is done manually, preferably before the ramp member **32** is moved out of the foldable deck extension **22'**. The handle **136** is then position downward in its "in-use" position, thereby locking the lock bars **130** in place.

It should be noted that the handle **136** constitutes a fence on the ramp end section **124** when it is in a raised position. Because of this fence, the ramp assembly **22**, **124** cannot be used when the handle **136** is not in a downward "bar locking position".

CLAIMS

What is claimed is:

1. A truck bed extension deck and ramp assembly wherein said ramp assembly being movably mounted inside said bed extension deck; said bed extension deck having a foldable deck extension hinged to a rear end of said bed extension deck; said foldable deck extension being foldable a straight angle between a first position extending horizontally inline with said bed extension deck and a second position folded flat over said bed extension deck;

said ramp assembly being movably mounted inside said foldable deck extension; said ramp assembly comprising a ramp member, a ramp end section extending from an end of said ramp member and a link segment pivotally mounted between said end of said ramp member and said ramp end section; said link segment having a pair of hinges, said pair of hinges being spaced apart a distance equivalent to a thickness of said bed extension deck such that said ramp end section being foldable a straight angle relative to said ramp member when said ramp member is stowed inside said bed extension deck and said ramp end section is stowed inside said foldable deck extension.

2. The truck bed extension deck and ramp assembly as claimed in **claim 1**, wherein said ramp member also having a pair of lock bars movably mounted thereto for selectively extending in said ramp end section and in said end of said ramp member, for preventing a folding movement of said ramp end section and said link segment relative to said ramp member.

3. The truck bed extension deck and ramp assembly as claimed in **claim 2**, further comprising a bar locking mechanism including a handle, for locking a position of said lock bars when said ramp assembly is in use.

4. The truck bed extension deck and ramp assembly as claimed in **claim 3**, wherein said handle has a first bar locking position and a second bar release position and said second position constitutes a fence across said ramp end section.

5. In combination, a short-bed pickup truck, a tonneau cover over a box of said pickup truck and a bed extension deck and ramp assembly mounted in said box of said pickup truck being folded and concealed from view under said tonneau cover.

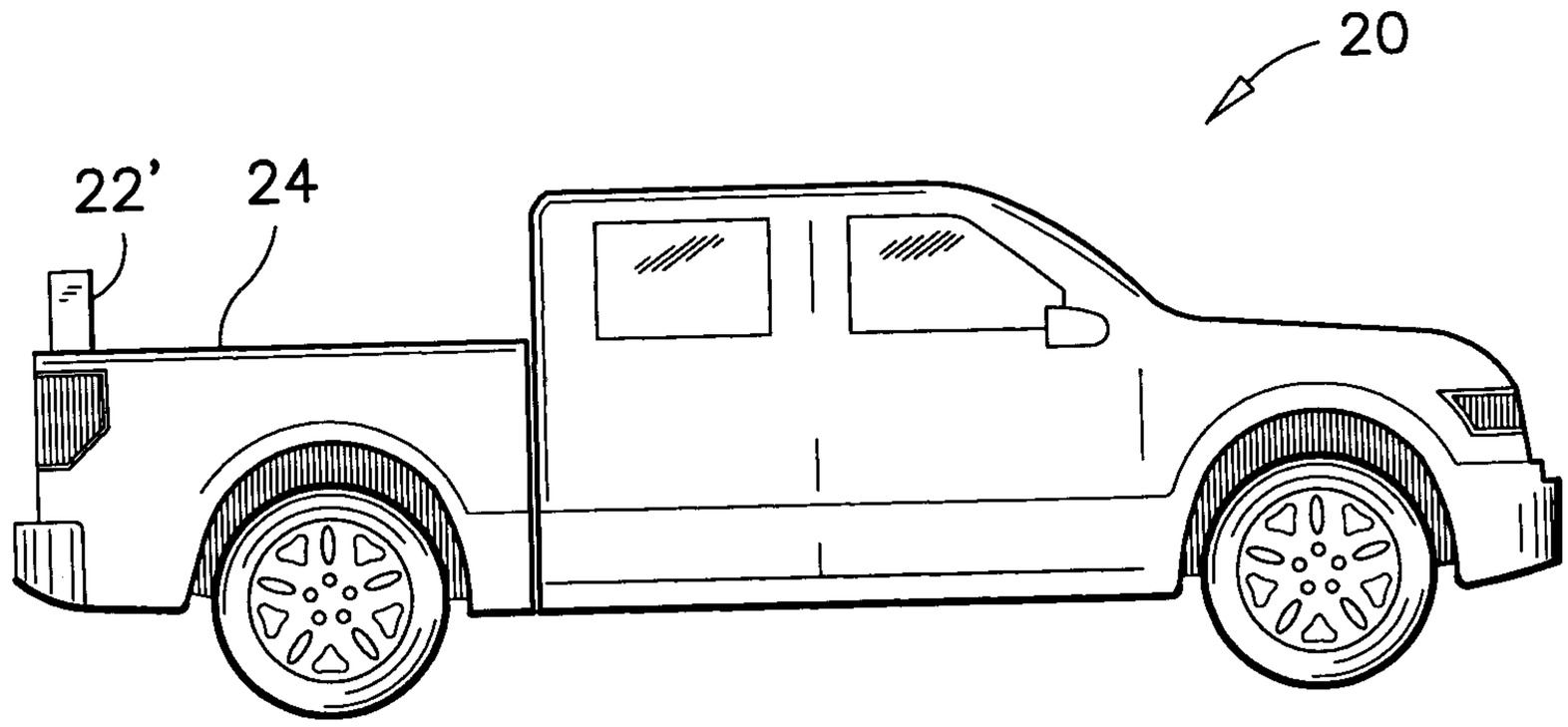


FIG. 1

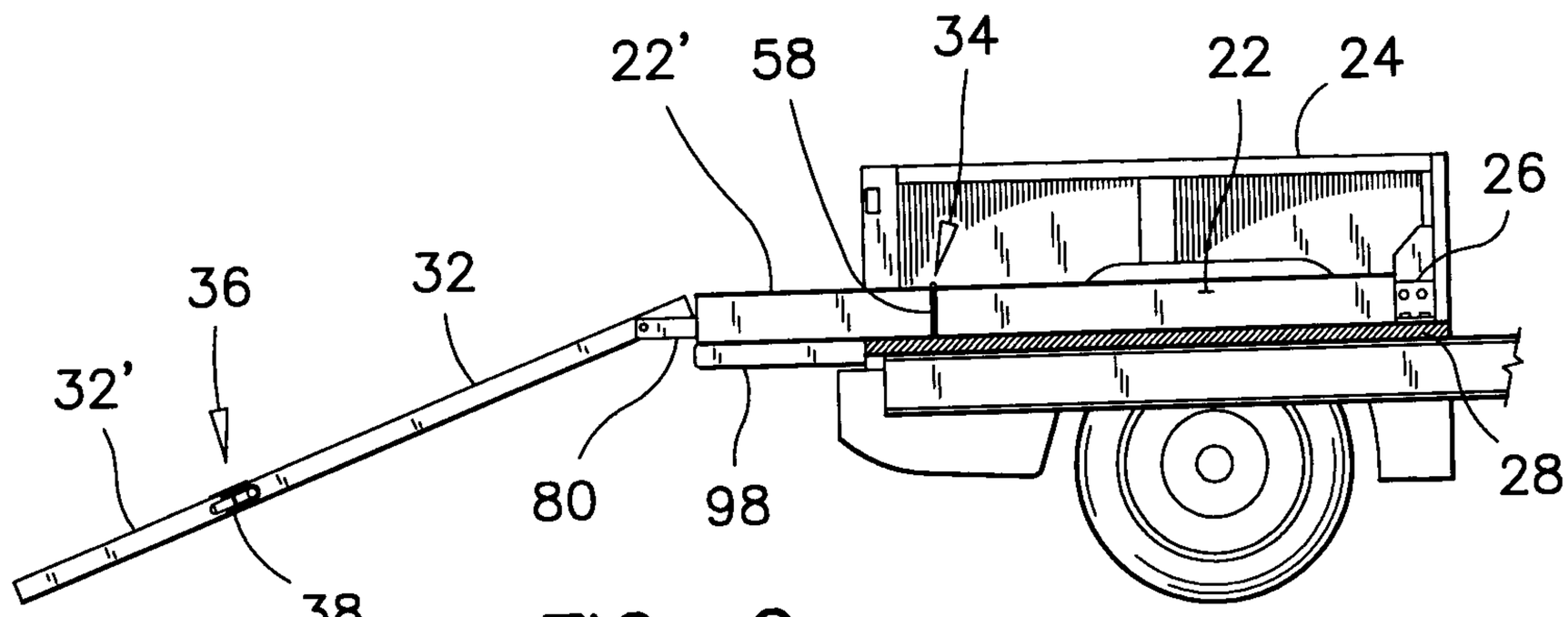


FIG. 2

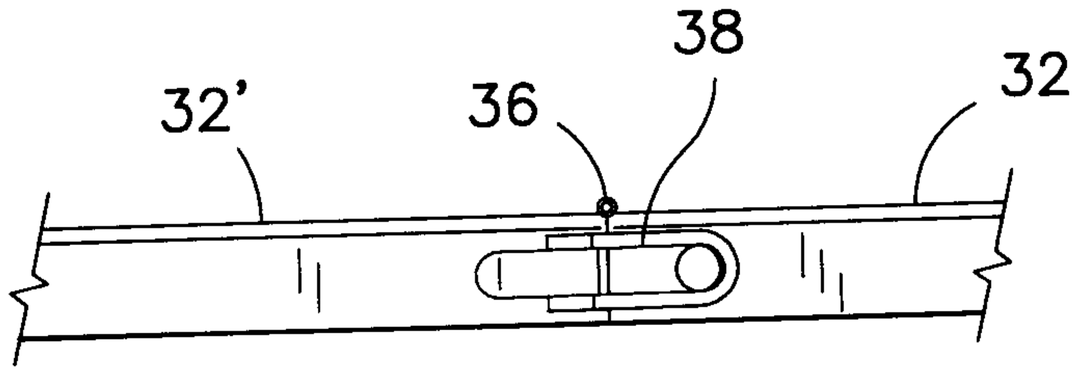


FIG. 3

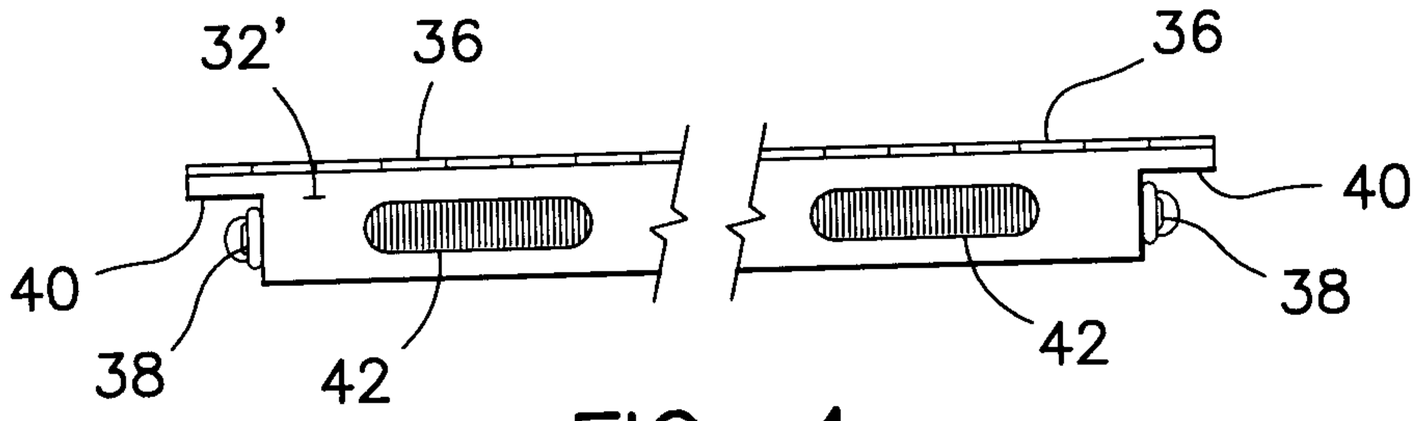


FIG. 4

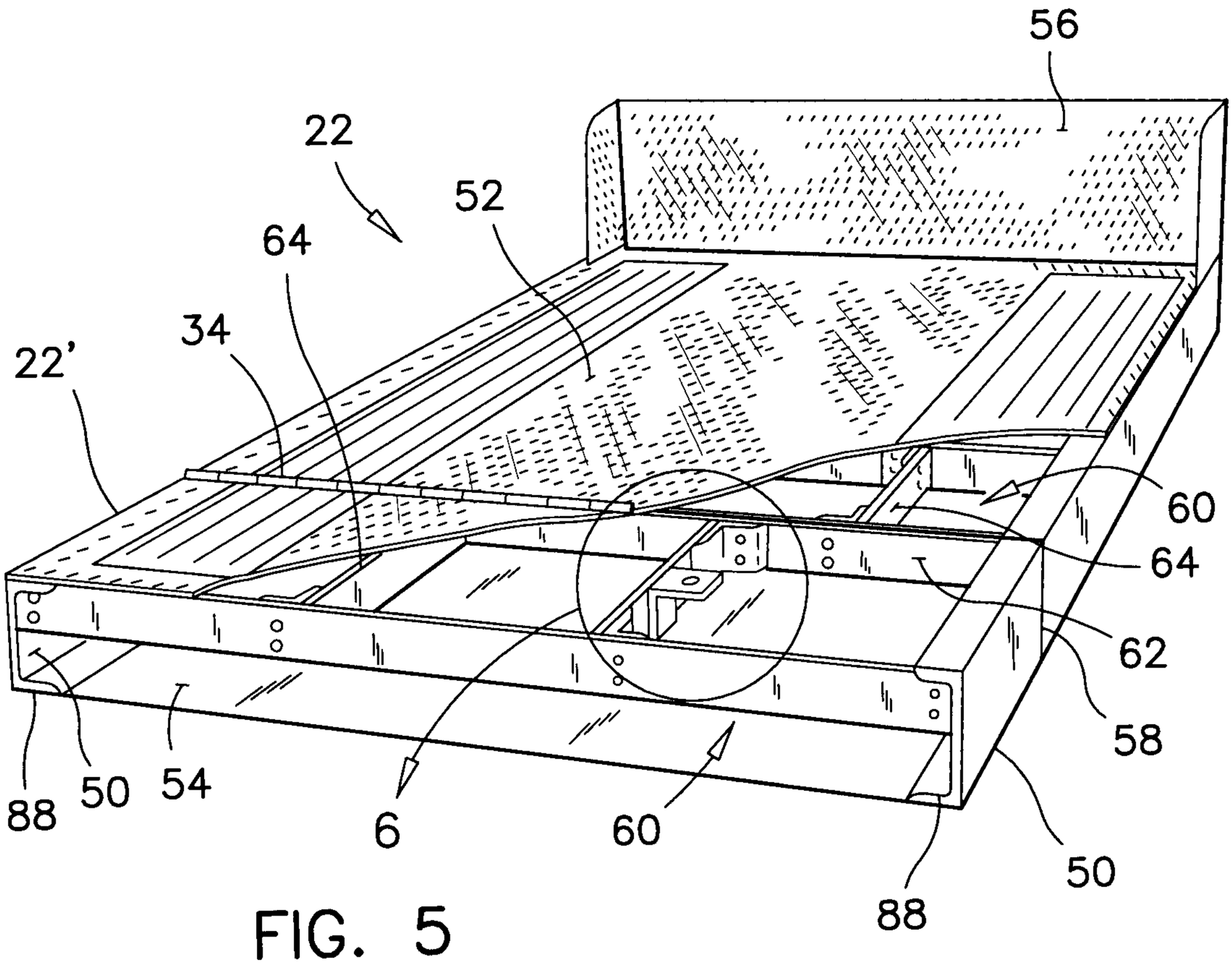

56
22
52
64
34
22'
60
64
62
58
88
50
54
6
60
50
88

FIG. 5

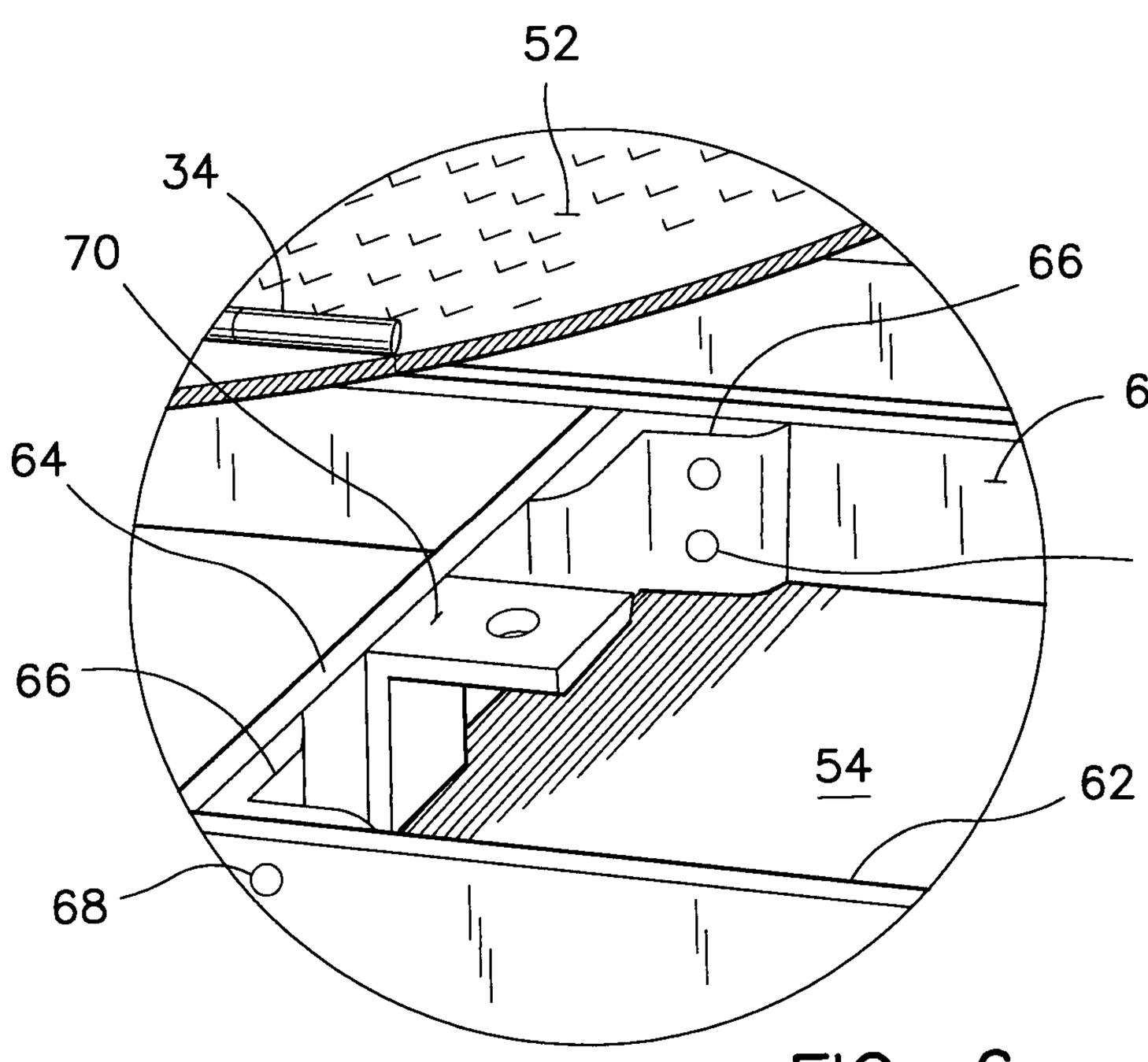

52
34
70
66
62
64
68
54
62
66
68

FIG. 6

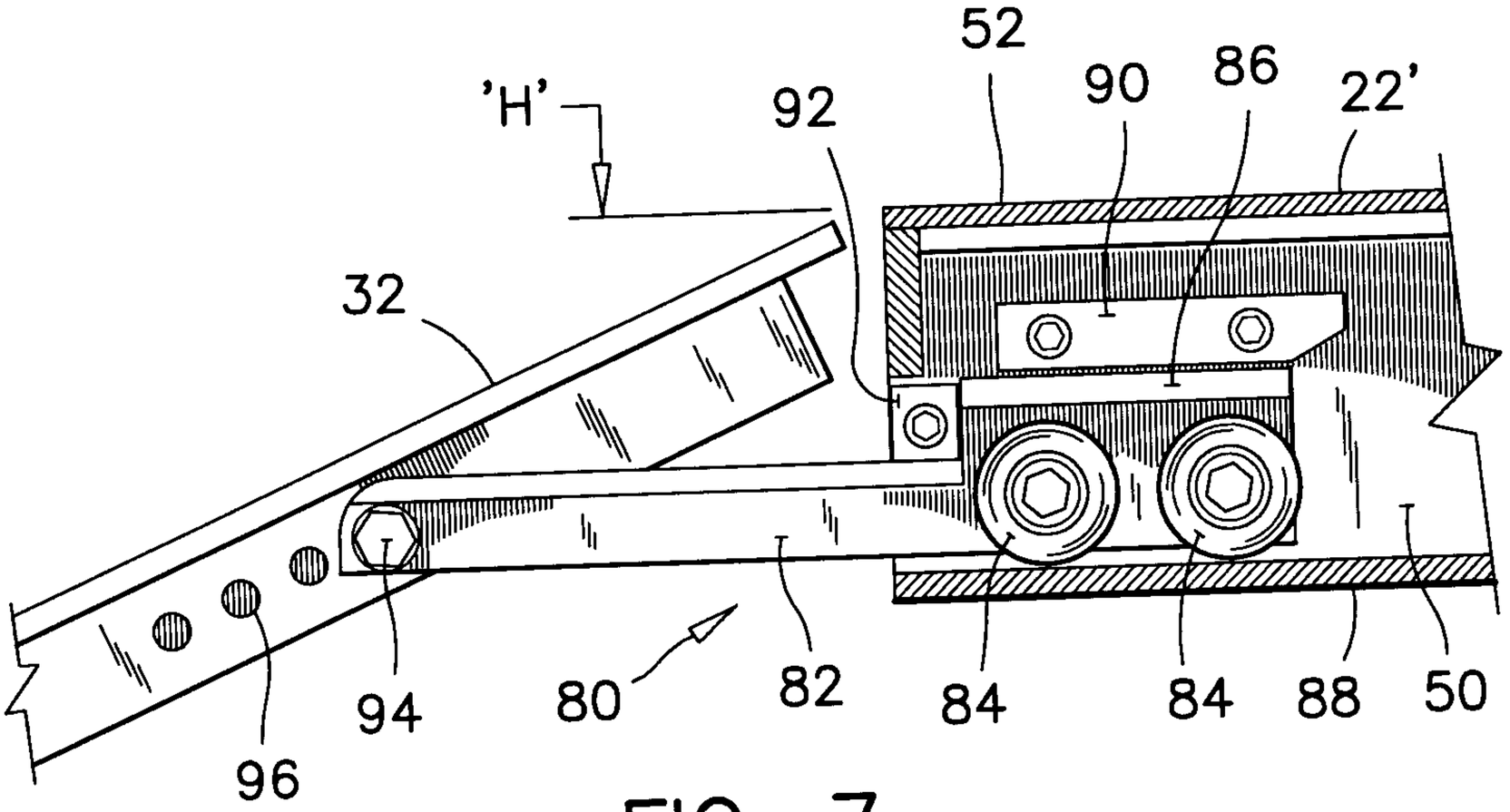

52
'H'
92
90
86
22'
32
94
80
82
84
84
88
50
96

FIG. 7

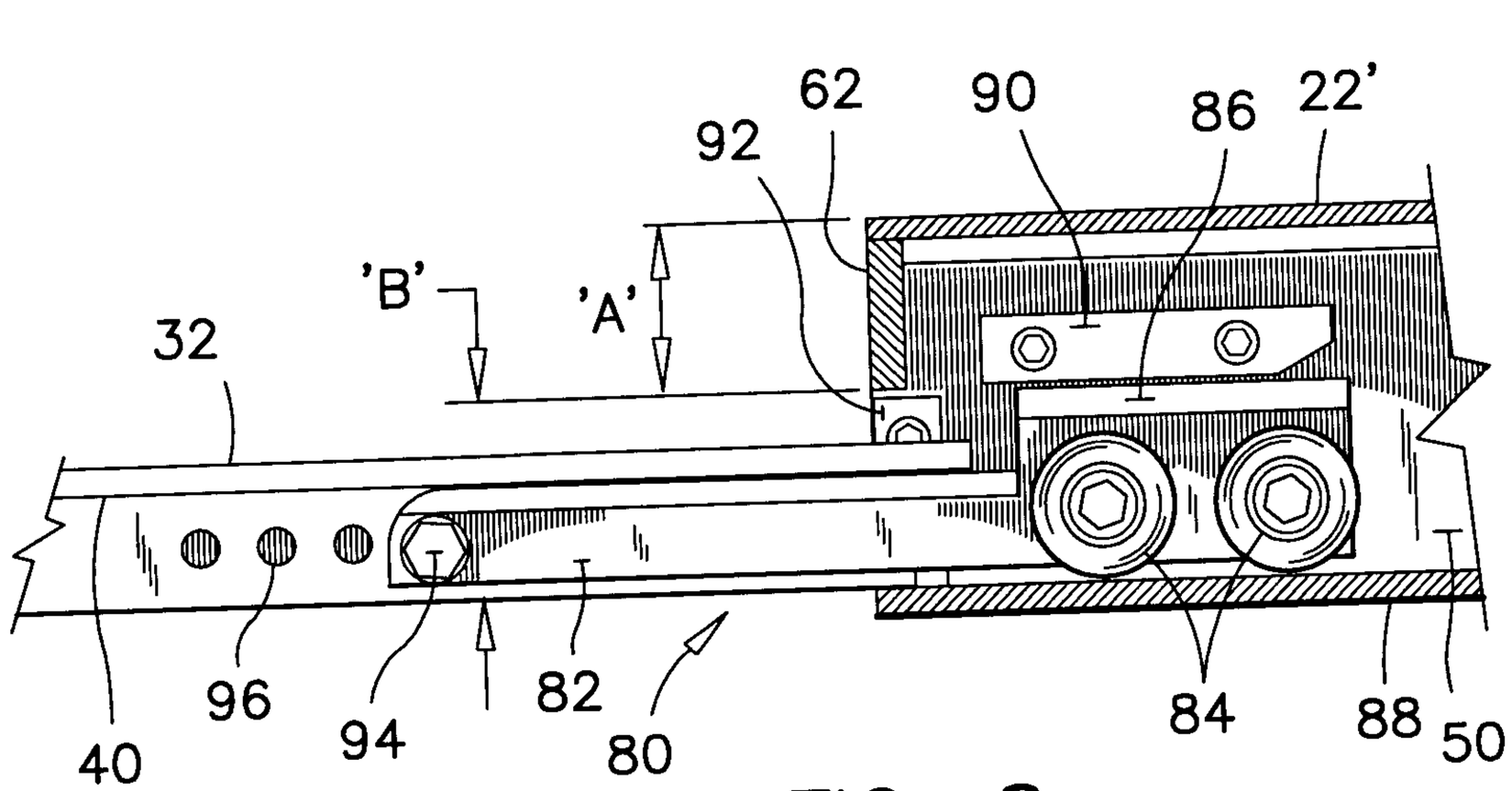

62
90
92
86
22'
'B'
'A'
32
40
96
94
82
80
84
88
50

FIG. 8

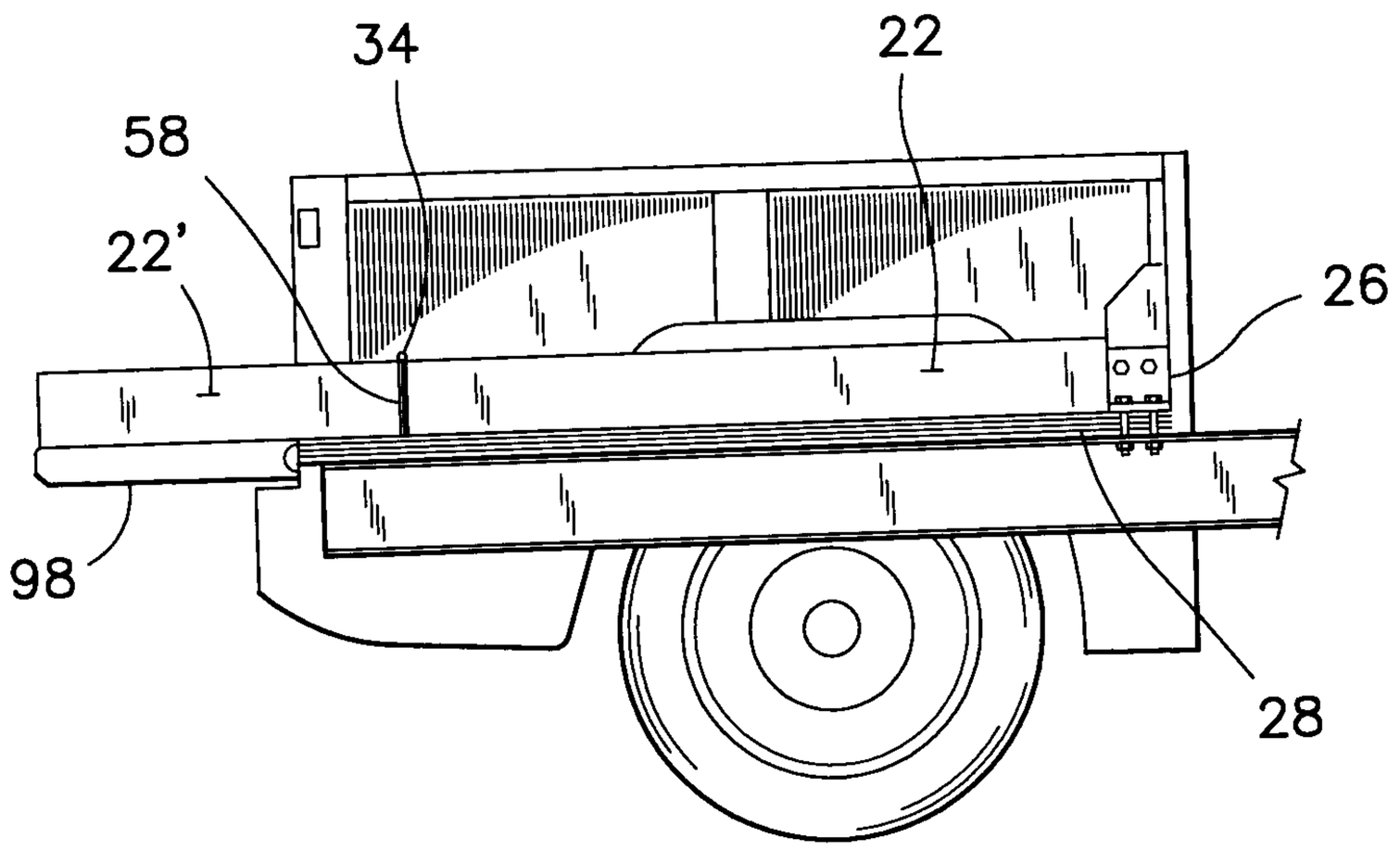


FIG. 9

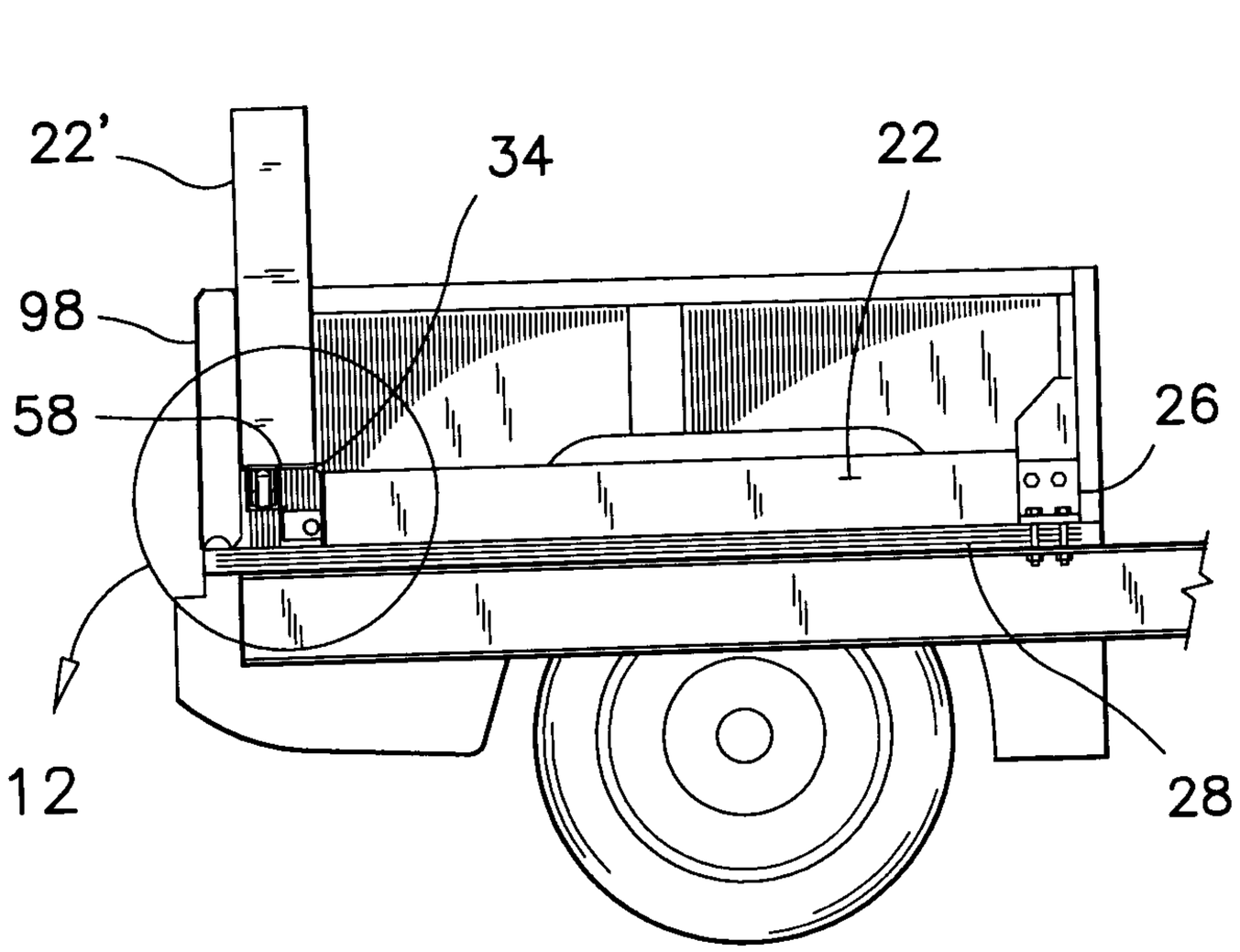


FIG. 10

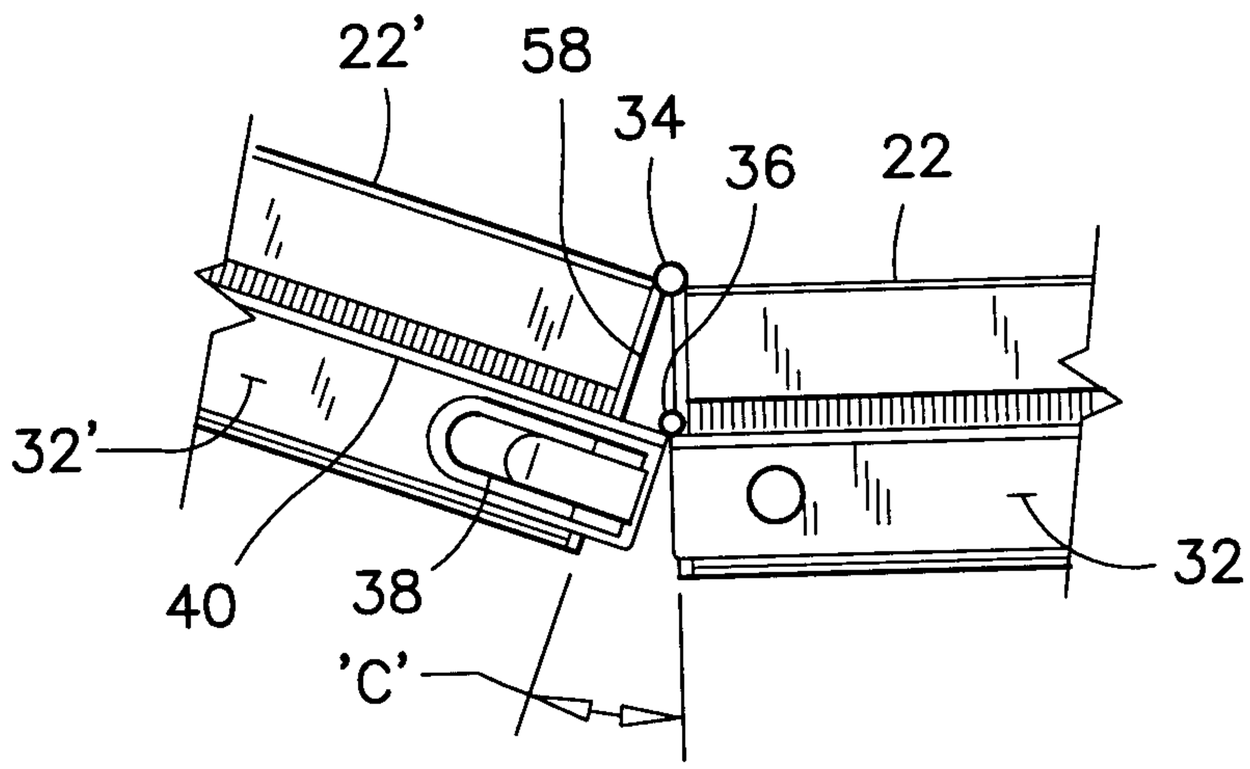


FIG. 11

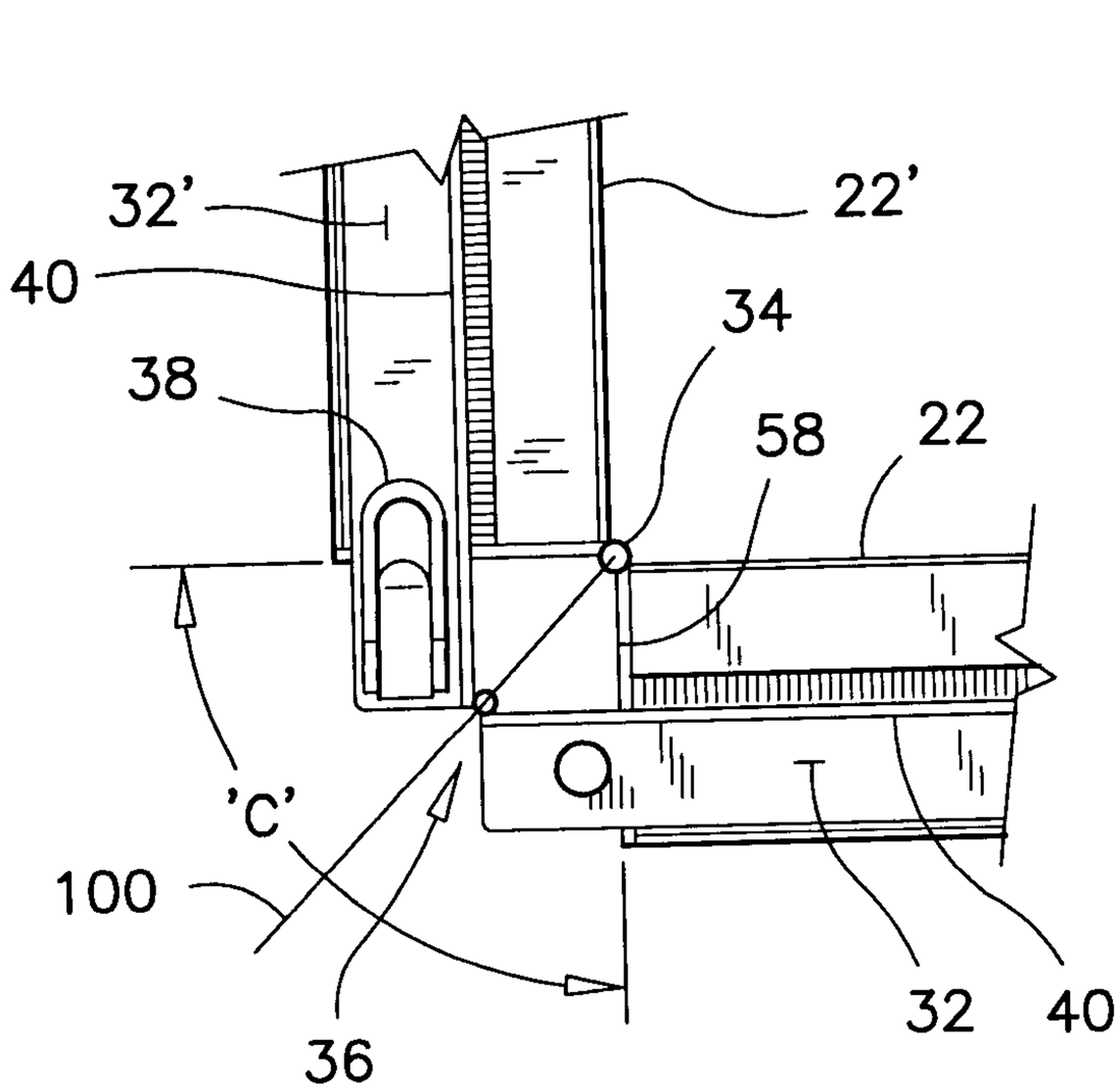


FIG. 12

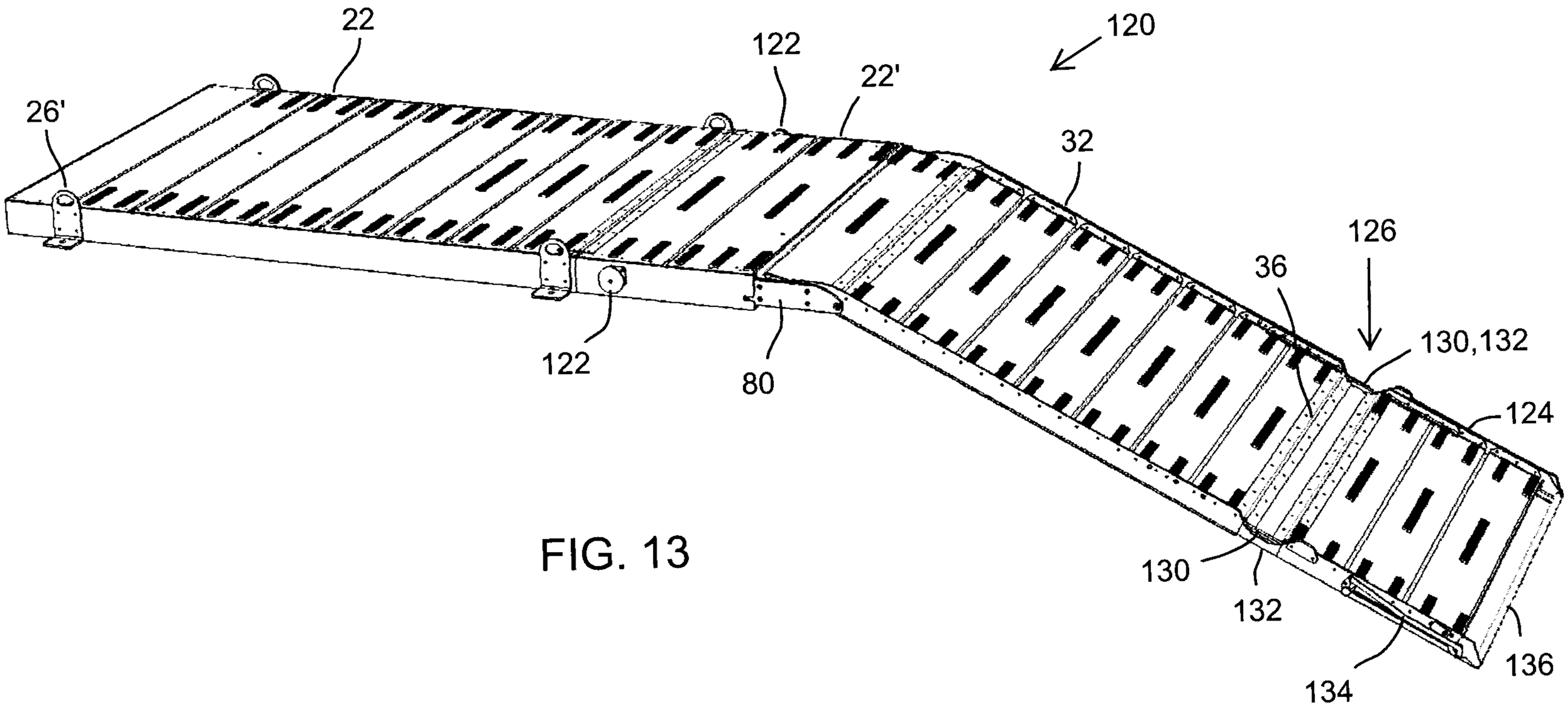


FIG. 13

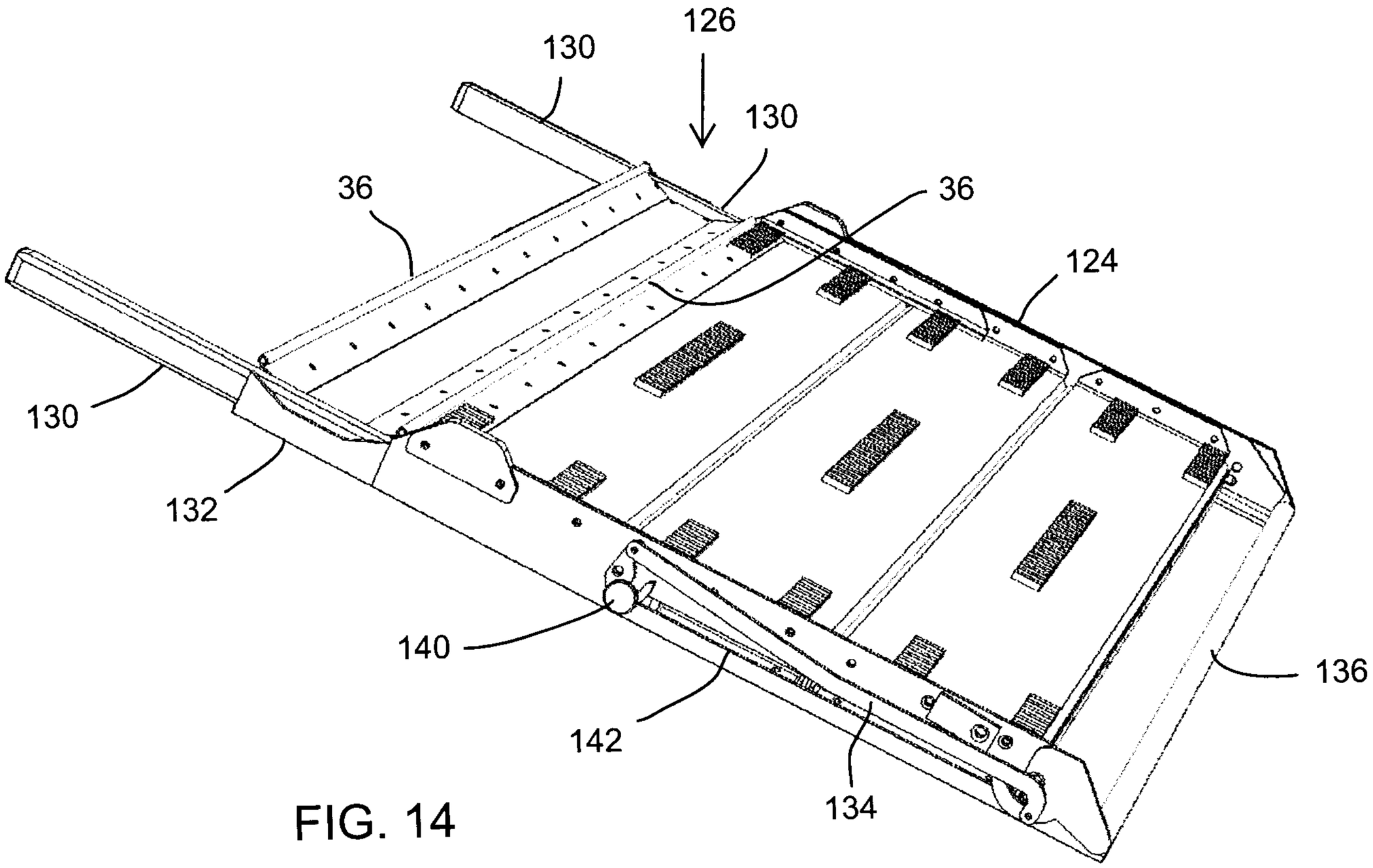


FIG. 14

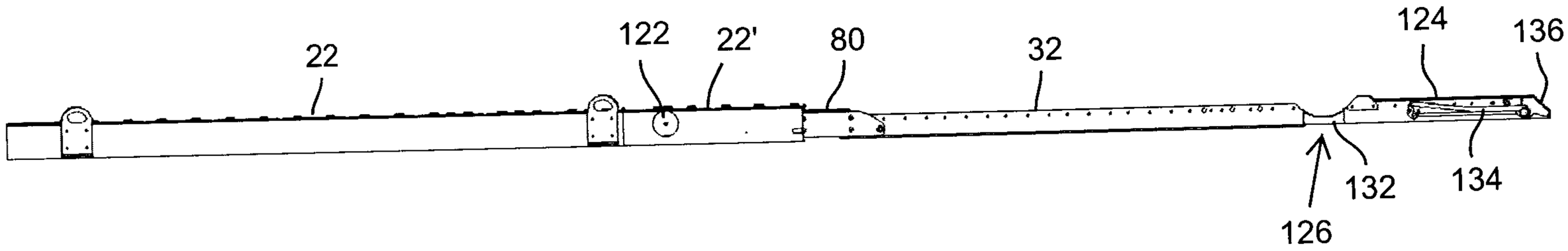


FIG. 15

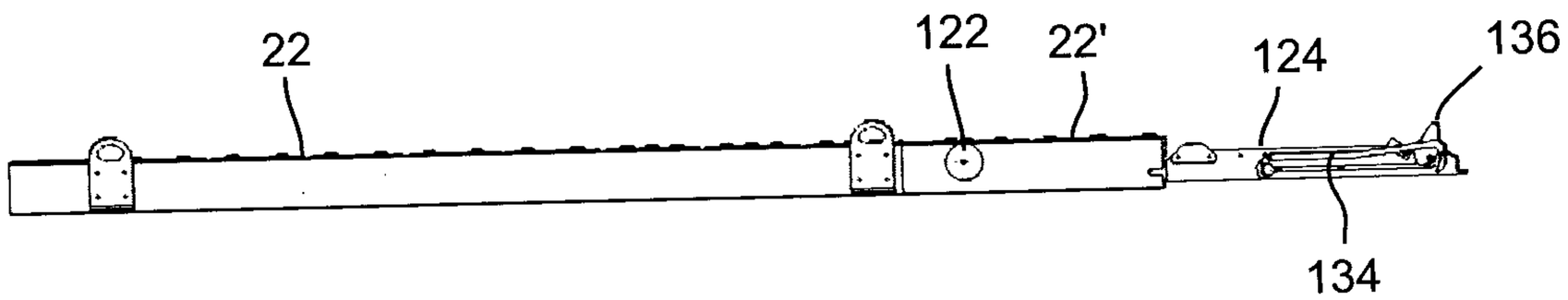


FIG. 16

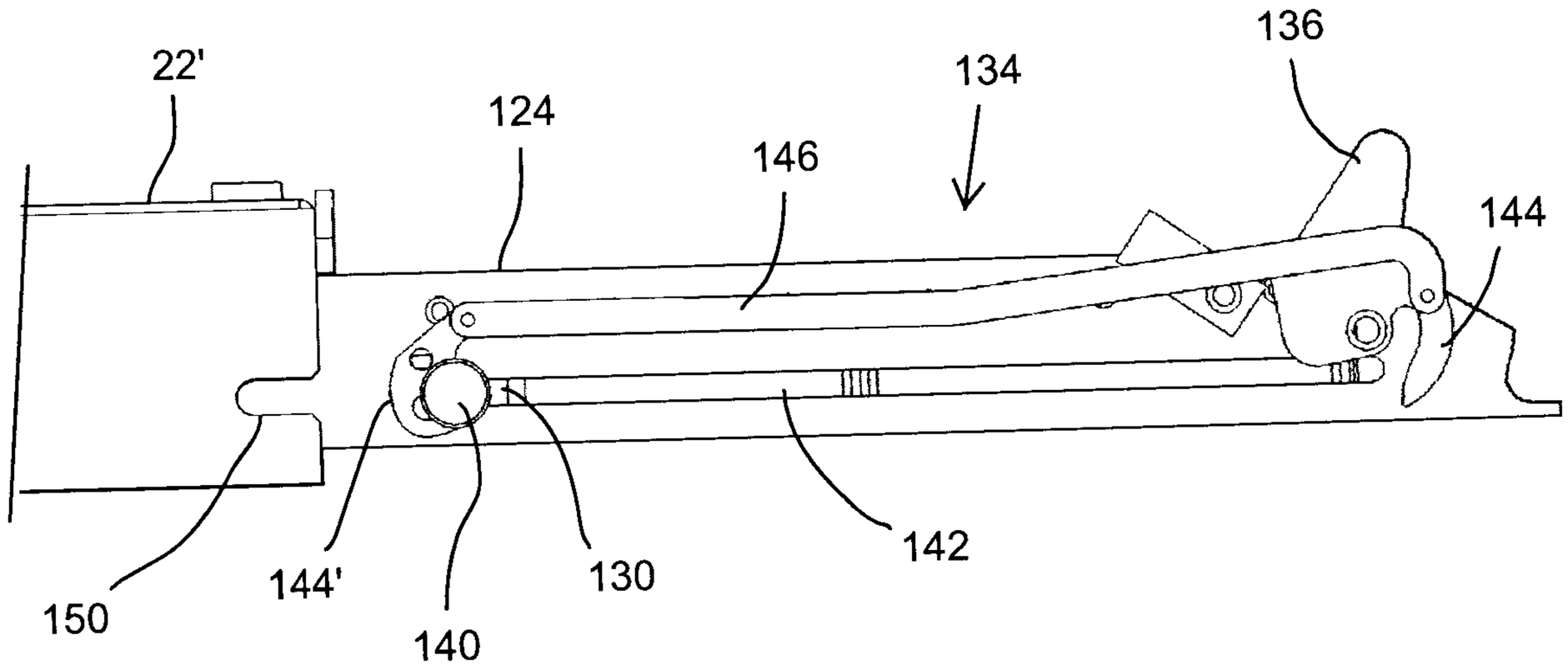


FIG. 17

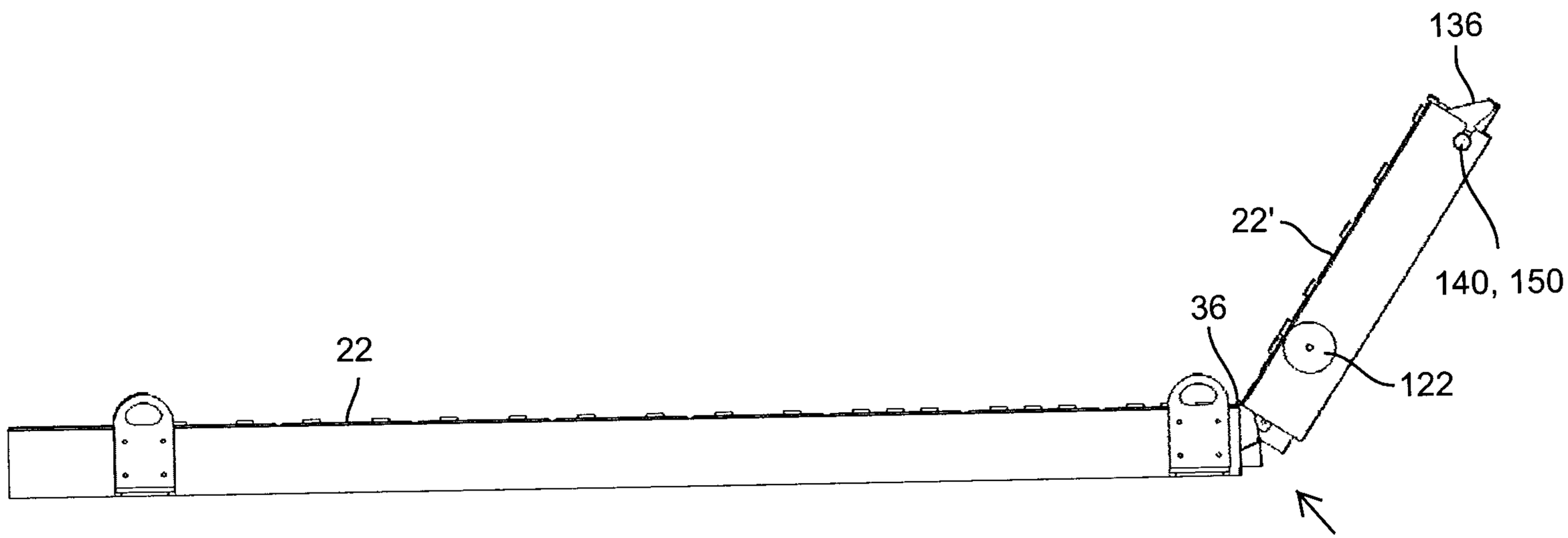


FIG. 18

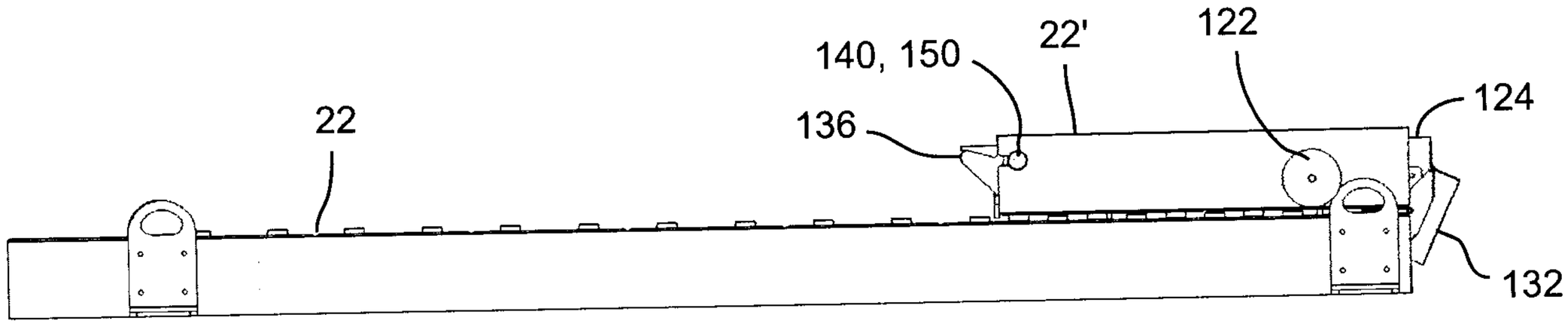
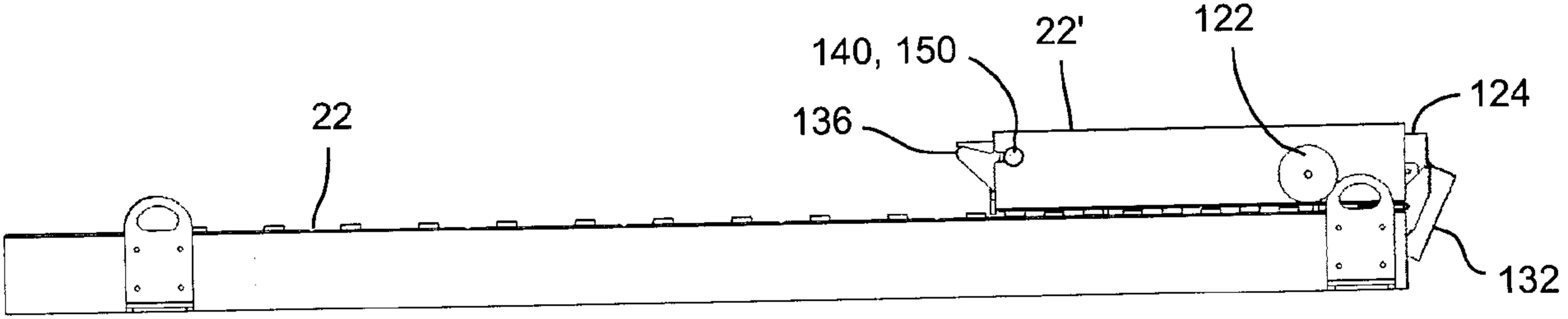


FIG. 19


140, 150
22'
122
124
136
22
132