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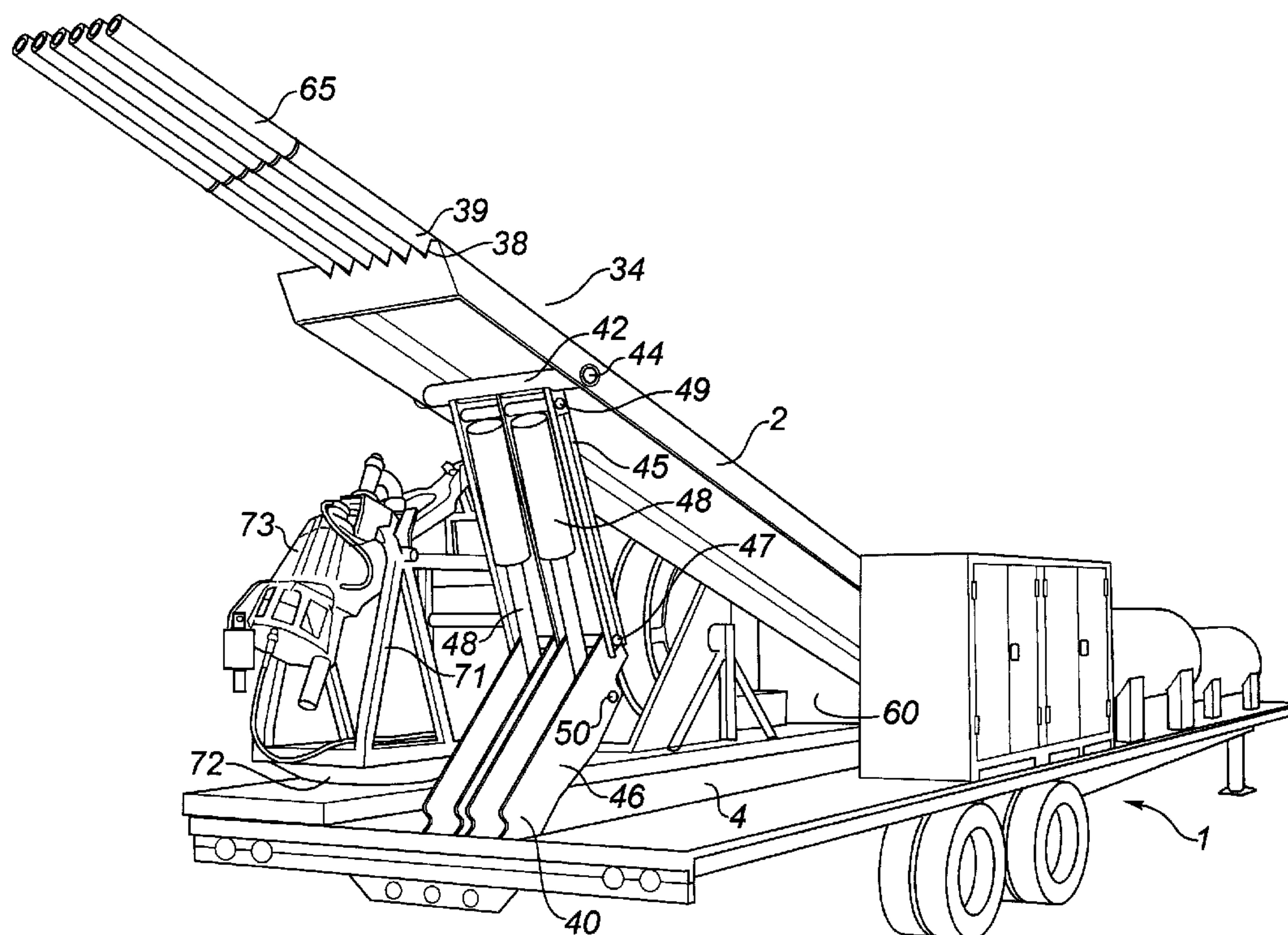
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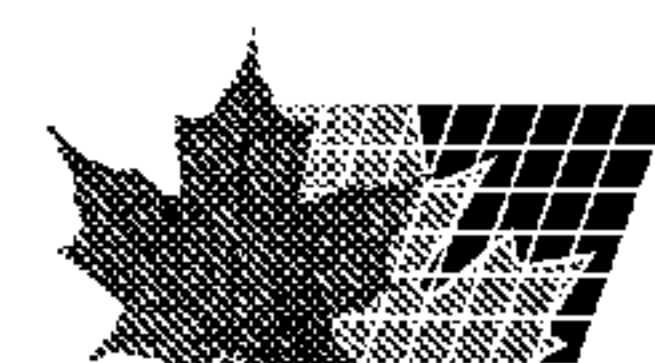
(54) Titre : REMORQUE A RAMPE POUR MATERIEL TUBULAIRE DE CHAMPS DE PETROLE

(54) Title: RAMP TRAILER FOR OIL FIELD TUBULARS



(57) Abrégé/Abstract:

The trailer is operative to carry tubulars (drill collars or drill pipe) to a service rig and raise them to the level of the rig floor so that the rig elevators can latch onto them and stand them up in the derrick. The trailer has a roller-equipped carriage operative to move along tracks supported by and extending lengthwise of the trailer frame. An elongate flat bed is pivotally mounted at its front end to the trailer frame. The bed's rear end can be raised by a scissor hoist connected between the carriage and the rear end of the bed. The bed has grooves extending lengthwise thereof in which the tubulars sit. Thus the trailer can be backed up to within a few feet from the well. The rear end of the bed can be raised and the carriage and bed can be advanced rearwardly to bring the rear ends of the tubulars within reach of the rig elevators.



1 **"RAMP TRAILER FOR OIL FIELD TUBULARS"**

2 **ABSTRACT OF THE DISCLOSURE**

3 The trailer is operative to carry tubulars (drill collars or drill pipe) to a
4 service rig and raise them to the level of the rig floor so that the rig elevators
5 can latch onto them and stand them up in the derrick. The trailer has a roller-
6 equipped carriage operative to move along tracks supported by and extending
7 lengthwise of the trailer frame. An elongate flat bed is pivotally mounted at its
8 front end to the trailer frame. The bed's rear end can be raised by a scissor
9 hoist connected between the carriage and the rear end of the bed. The bed
10 has grooves extending lengthwise thereof in which the tubulars sit. Thus the
11 trailer can be backed up to within a few feet from the well. The rear end of the
12 bed can be raised and the carriage and bed can be advanced rearwardly to
13 bring the rear ends of the tubulars within reach of the rig elevators.

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FIELD OF THE INVENTION

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BACKGROUND OF THE INVENTION

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The present invention relates to apparatus for positioning drilling tubulars (drill collars or drill pipe) at the edge of the floor of a service rig within reach of the rig elevators, so that the elevators can be used to raise the tubulars into a vertical position in the derrick.

Historically, service rigs have not been normally used in a drilling mode. They are not designed or equipped for that purpose. However in recent years, with the development of top drives, there has been increasing use of service rigs to deepen wells, drill out cement plugs and drill out bridge plugs. This has meant that the service rig has had to run drill collars and drill pipe to carry out these new drilling operations.

In this connection, difficulties have been encountered in picking up and laying down the drilling tubulars.

For example, in the specific case of drill collars (which are heavy, thick-walled joints of steel pipe), they are typically trucked from a storage yard to the well site and are deposited on timbers laid on the ground. The service rig usually does not have a catwalk and inclined ramp. Therefore, to stand the drill collar up in the service rig derrick, it is necessary for the crew to attach a winch line from the crown of the derrick to the front end of the collar and attempt to manually control the rear end of the collar as the line pulls the front end of the collar up and toward the rig floor, while seeking to avoid having the front end snag the edge of the hinged floor. This operation from time to time leads to damaging the floor or collar threads when the collar snags the floor or

1 alternatively hurting members of the crew as they try to muscle the heavy
2 collar into the proper position. Similar problems occur when the service rig
3 lays down drill collars.

4 With this background in mind, it is the objective of the present invention
5 to provide apparatus which can be used to bring drilling tubulars to the well
6 site, position the front ends of the tubulars at the edge of the service rig's
7 elevated floor, within reach of the elevators, and provide an inclined ramp
8 along which the rear end of the tubular being stood up can be dragged up to
9 floor level.

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SUMMARY OF THE INVENTION

12 In accordance with the present invention, a wheeled vehicle, preferably
13 a trailer, is provided having the following components:

- 14 • a trailer frame supporting a pair of parallel tracks extending
15 lengthwise of the trailer;
- 16 • a carriage operative to roll along the tracks;
- 17 • means, such as a double-acting hydraulic cylinder, connected
18 between the frame and the carriage, for advancing and retracting
19 the carriage along the tracks;
- 20 • an elongate bed, pivotally connected to the front end of the carriage
21 at the bed's front end, with the bed's rear end left free to be raised;
22 and
- 23 • means, such as a hydraulic cylinder-powered scissor hoist,
24 connected between the carriage and bed, for raising the rear end of
25 the bed;

- 1 • the bed preferably having means, such as a top wall forming a
2 series of parallel grooves extending lengthwise of the bed, for
3 supporting, restraining (from lateral movement) and guiding tubulars
4 positioned thereon;
- 5 • whereby the tubulars may be conveyed on the trailer-mounted bed
6 to the well site, the trailer may be positioned with its rear end
7 positioned close to but spaced laterally from the wellhead (so as not
8 to impede access to the blow-out preventer), the rear end of the
9 bed may be raised and the carriage and bed may be advanced
10 rearwardly to bring the rear ends of the tubulars to a position
11 adjacent the edge of the rig floor, where they may be latched onto
12 by the rig elevators.

13 The invention is characterized by the following advantages:

- 14 • the time required to stand a set of six collars up in the derrick can
15 be reduced by as much as 50% as compared to the prior art
16 manual/winch line system previously described;
- 17 • the rig crew do not need to as extensively manually adjust and
18 control the collars as they are being picked up or laid down, with
19 consequent reduction in likelihood of injury; and
- 20 • the bed can bring the drill collars (with attached pick-up subs) to the
21 edge of the service rig floor, where the rig elevators can be latched
22 onto them so that the rig hoisting equipment can be used to stand
23 the collars up.

DESCRIPTION OF THE DRAWINGS

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Figure 1 is a perspective view of the trailer with the bed in the upraised position;

Figure 2 is a side view of the trailer, with parts removed, showing the bed in the rearmost position and upraised over the rig floor, with a drill collar being lifted;

Figure 3 is a side elevation of the trailer;

Figure 4 is a plan view of the trailer;

Figure 5 is a perspective view of the trailer frame;

Figure 6 is a perspective view of the carriage;

Figure 7 is a perspective view of the bed;

Figure 8 is a perspective view of the scissor hoist;

Figure 9 is a side view of the scissor hoist;

Figure 10 is a side view of the trailer frame, carriage, carriage cylinder, bed and scissor hoist shown in the flat position;

Figure 11 is a side view similar to Figure 10, showing the bed raised;

Figure 12 is a side view similar to Figure 11, with the bed advanced to the rearmost position;

Figure 13 is an end view of the bed, carriage and trailer frame;

Figure 14 is an end view of the trailer frame;

Figure 15 is an end view of the bed; and

Figure 16 is an end view of the carriage.

DESCRIPTION OF THE PREFERRED EMBODIMENT

1 **DESCRIPTION OF THE PREFERRED EMBODIMENT**
2 As shown in Figure 1, a trailer 1 is provided to support and convey a
3 bed 2. The trailer 1 has a U-shaped frame 3 forming a central rectangular
4 opening 4 extending lengthwise of the frame 3 from its rear end. The frame 3
5 comprises a pair of parallel I-beams 5 extending along the side edges of the
6 opening 4. Each I-beam 5 has an inwardly projecting square tubing member
7 6 welded to its web to provide a track 7. In summary, there is provided a
8 trailer 1 having a frame 3 supporting a pair of parallel tracks 7 extending
9 lengthwise of the frame.

10 A rectangular carriage 10 is provided to fit in the opening 4 and run on
11 the tracks 7. The carriage 10 has side rails 11 connected by cross rails 12.
12 Roller holders 13 are secured to the cross rails 12. Rollers 14 extend from
13 the holders 13 for running on the tracks 7. The carriage 10 may therefore roll
14 back and forth on the tracks 7.

15 A double acting hydraulic cylinder 20 is pivotally connected to the
16 frame 3 and the carriage 10 by pins 21 and support members 22 at
17 connection points 23, 24. The cylinder 20 provides means operative to
18 advance and retract the carriage 10 along the tracks 7.

19 A rectangular bed 2 is pivotally connected adjacent its front end 31 to
20 the front end of the carriage 10 by pivot pins 32 and support members 33.
21 The rear end 34 of the bed 30 is free to be raised. The bed 30 comprises a
22 sub-frame carrying a top wall 36. The top wall 36 is grooved lengthwise to
23 form grooves 37 and corrugations 38 operative to support, restrain and guide
24 drill collars 39 positioned therein.

1 A conventional scissor hoist 40 is pivotally connected by sleeves 41, 42
2 and cross-rods 43, 44 with the carriage 10 and rear end of the bed sub-frame
3 35. The hoist 40 comprises frames 45, 46 hinged together by pin 47.
4 Hydraulic cylinders 48 are pivotally connected to the frames 45, 46 by pins 49,
5 50 and function to unfold the hoist the raise the rear end of the bed 30.
6 Broadly stated, the scissor hoist 40 provides means, connected between the
7 carriage 10 and bed 2, for raising the rear end 34 of the bed.

8 A hydraulic motor assembly 60 is provided on the trailer 1 for actuating
9 cylinders 20, 48 as required through suitable hoses (not shown)

10 From the foregoing it will be understood that the bed 2 of a trailer 1 can
11 be loaded at a storage site with drill collars 39 and trucked to a well site. The
12 rear end of the trailer 1 can be backed to within several feet of the well 70 and
13 close to the edge 61 of the floor 62 of a service rig 63. The scissor hoist 40
14 can then be actuated to raise the rear end 34 of the bed 2 above the level of
15 the rig floor. The cylinder 20 can then be actuated to advance the carriage 10
16 and inclined bed 2 rearwardly until the drill collars 39 are positioned within
17 reach of the rig elevators 64. Pick-up subs 65 are threaded into the raised
18 ends of the drill collars. The elevators 64 are then latched onto one of the
19 pick-up subs 65 and the rig hoisting assembly 66 is used to drag the attached
20 collar 39 to an upright position above the floor 62. The groove corrugations
21 38 function to guide the lower end of the drill collar 39 as it is pulled along the
22 bed 2.

1 In a preferred feature, a cradle 71 is mounted on a rotatable turntable
2 72 supported by the trailer frame 3, for supporting a top drive 73. The cradle
3 71 can be turned to align the top drive 73 with a lifting winch cable from the
4 rig, thereby making it easier to lift the top drive out of the cradle.

1 THE EMBODIMENTS OF THE INVENTION IN WHICH AN
2 EXCLUSIVE PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS
3 FOLLOWS:

4

5 1. Apparatus for positioning oilfield tubulars at the floor of a service rig
6 having elevators and located over a wellhead at a well site, comprising:

7 a wheeled vehicle having a frame supporting a pair of parallel tracks
8 extending lengthwise of the frame, the vehicle having front and rear ends;

9 a wheeled carriage supported by the tracks and operative to roll along
10 the tracks;

11 means, connected between the frame and the carriage, for advancing
12 and retracting the carriage along the tracks;

13 a flat bed having front and rear ends and carried by the carriage, the
14 bed being pivotally connected to the carriage at its front end, with its rear end
15 free to be raised;

16 means, connected between the carriage and the bed, for raising the
17 rear end of the bed;

18 the bed having means on its upper surface for supporting tubulars
19 positioned thereon.

1 2. Apparatus for positioning oilfield tubulars at the floor of a service rig
2 having elevators and located over a wellhead at a well site, comprising:

3 a trailer having a frame having forward and rear ends;

4 the frame forming an opening extending longitudinally thereof and
5 having parallel sides, said frame forming a pair of tracks extending along the
6 sides of the opening;

7 a wheeled carriage supported by the tracks and operative to roll along
8 the tracks;

9 means, connected between the frame and the carriage, for advancing
10 and retracting the carriage along the tracks;

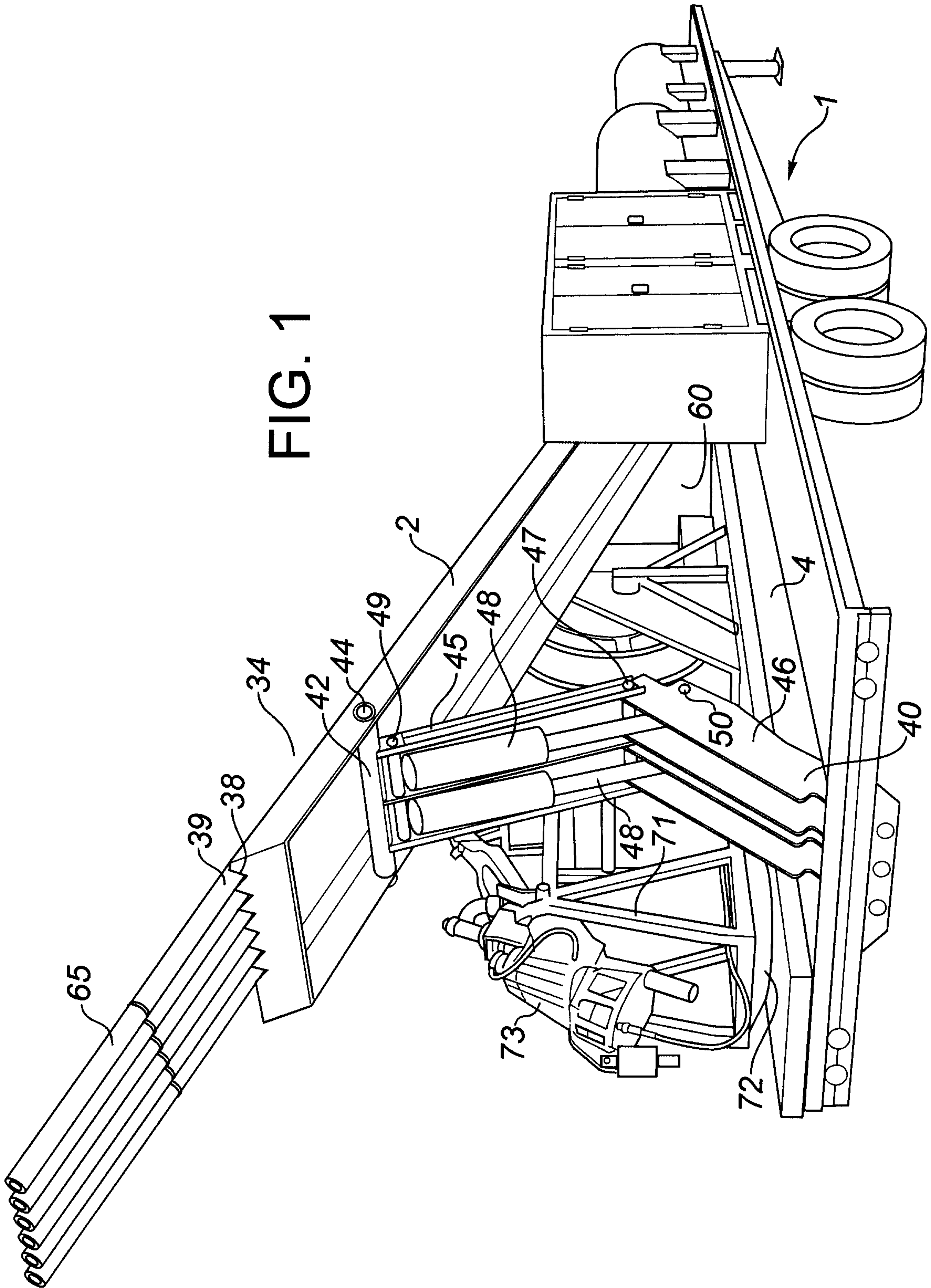
11 a flat bed having front and rear ends and carried by the carriage, the
12 bed being pivotally connected to the carriage at its front end with its rear end
13 free to be raised;

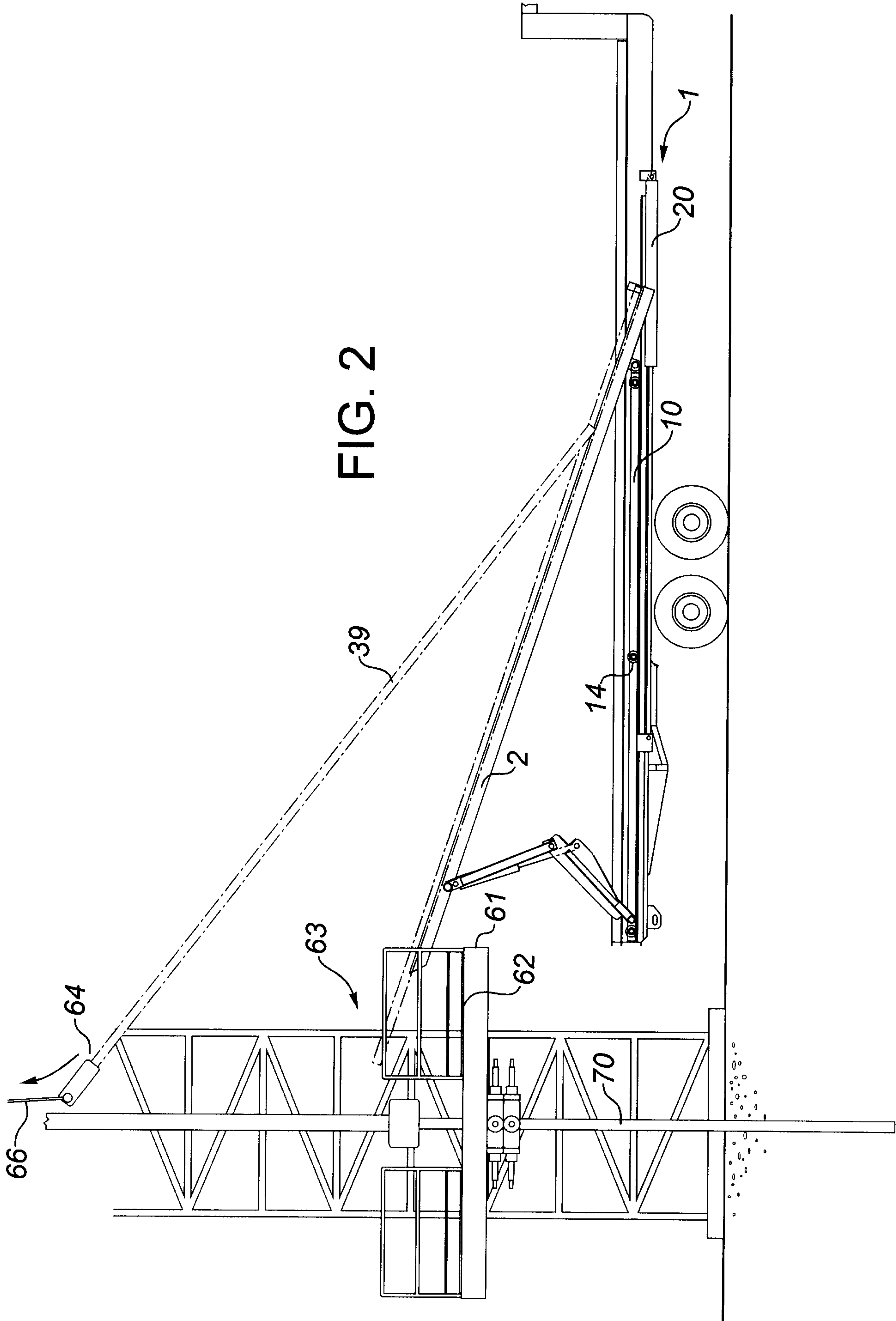
14 means, connected between the carriage and the bed, for supporting
15 and raising the rear end of the bed;

16 the bed having means on its upper surface for supporting tubulars
17 positioned thereon;

18 so that tubulars may be conveyed on the bed to the well site, the trailer
19 may be positioned with its rear end located close to but spaced laterally from
20 the well, the rear end of the bed may be raised and the carriage and raised
21 bed may be advanced rearwardly to bring the rear ends of the tubulars to a
22 position over the rig floor where they may be latched onto by the rig elevators.

- 1 3. The apparatus as set forth in claim 1 or 2 wherein:
2 the upper surface of the bed forms parallel grooves extending
3 longitudinally of the bed for retaining and guiding tubulars seated therein.
4
5 4. The apparatus as set forth in claim 1 or 2 comprising:
6 a cradle for a top drive, rotatably mounted on the frame to one side of
7 the opening, for rotation about a vertical axis.





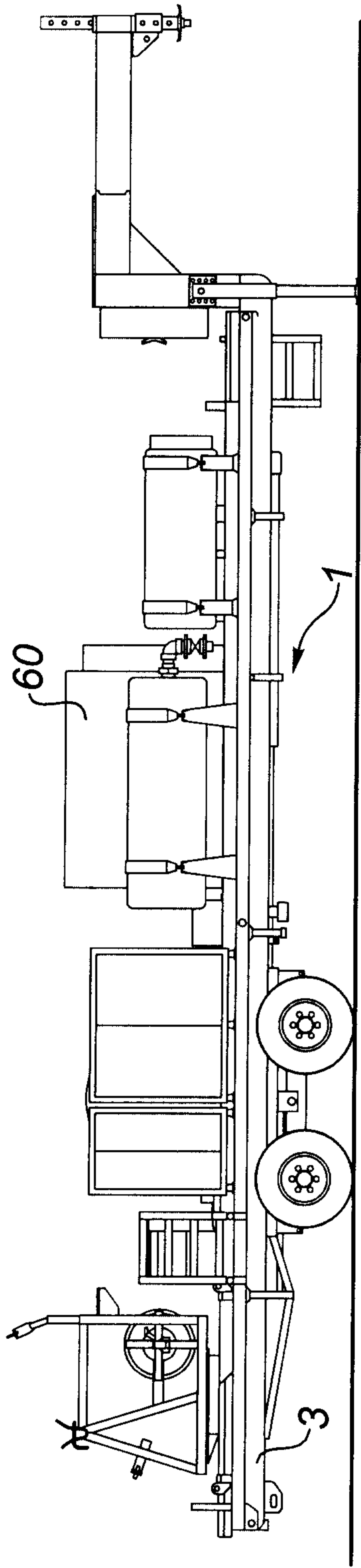


FIG. 3

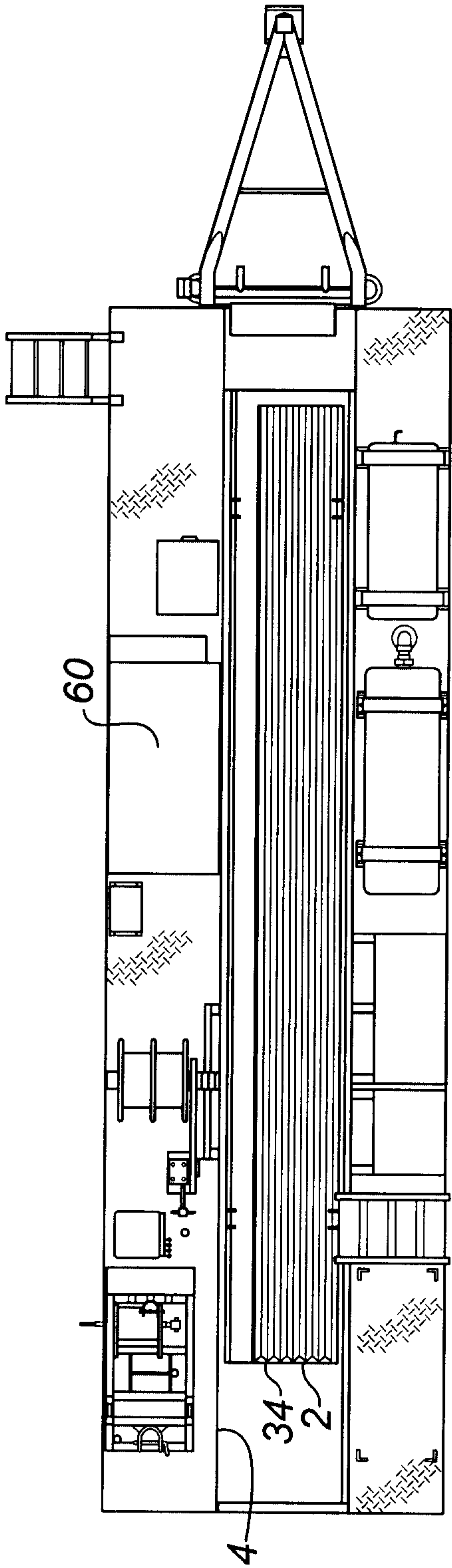


FIG. 4

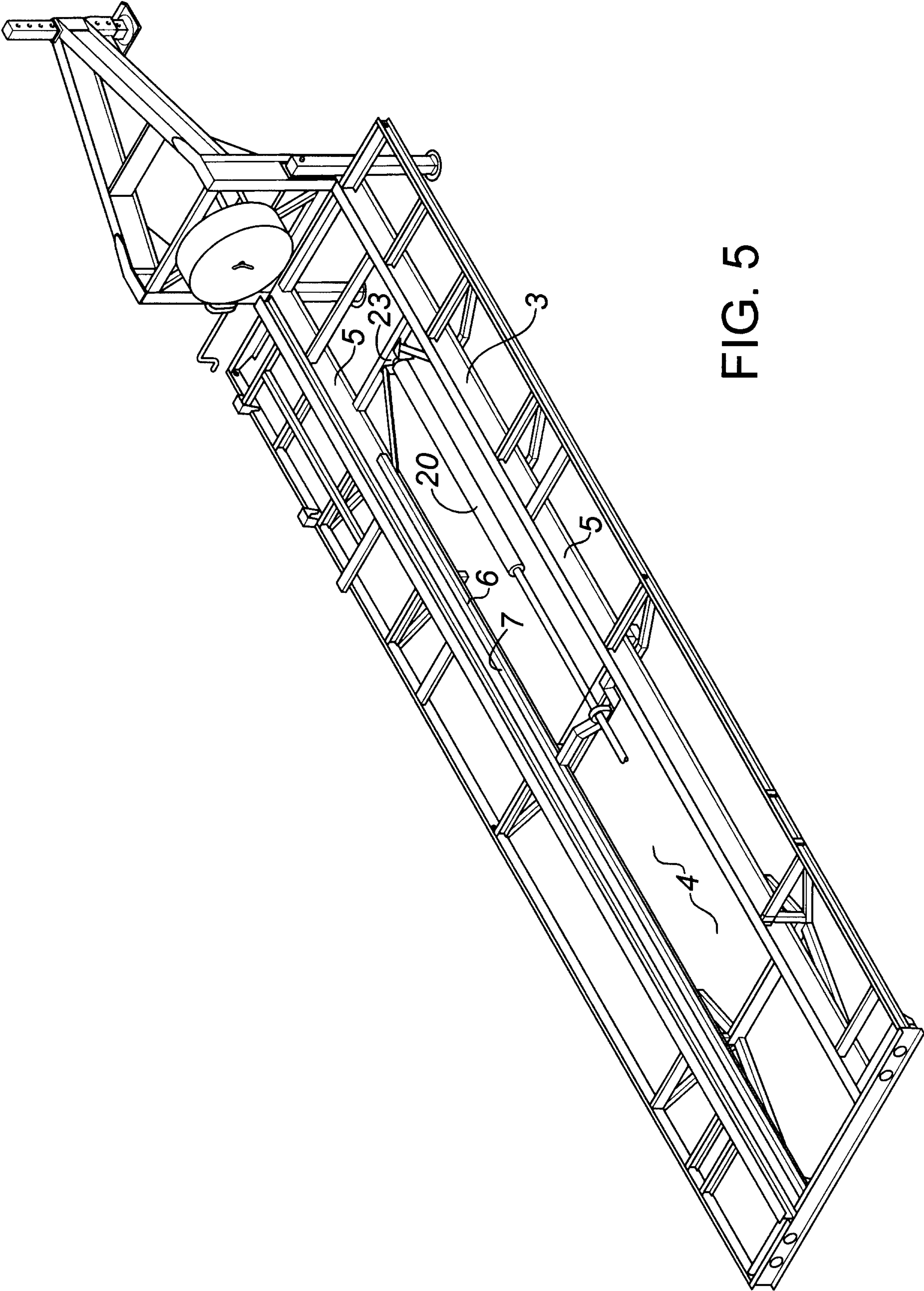


FIG. 5

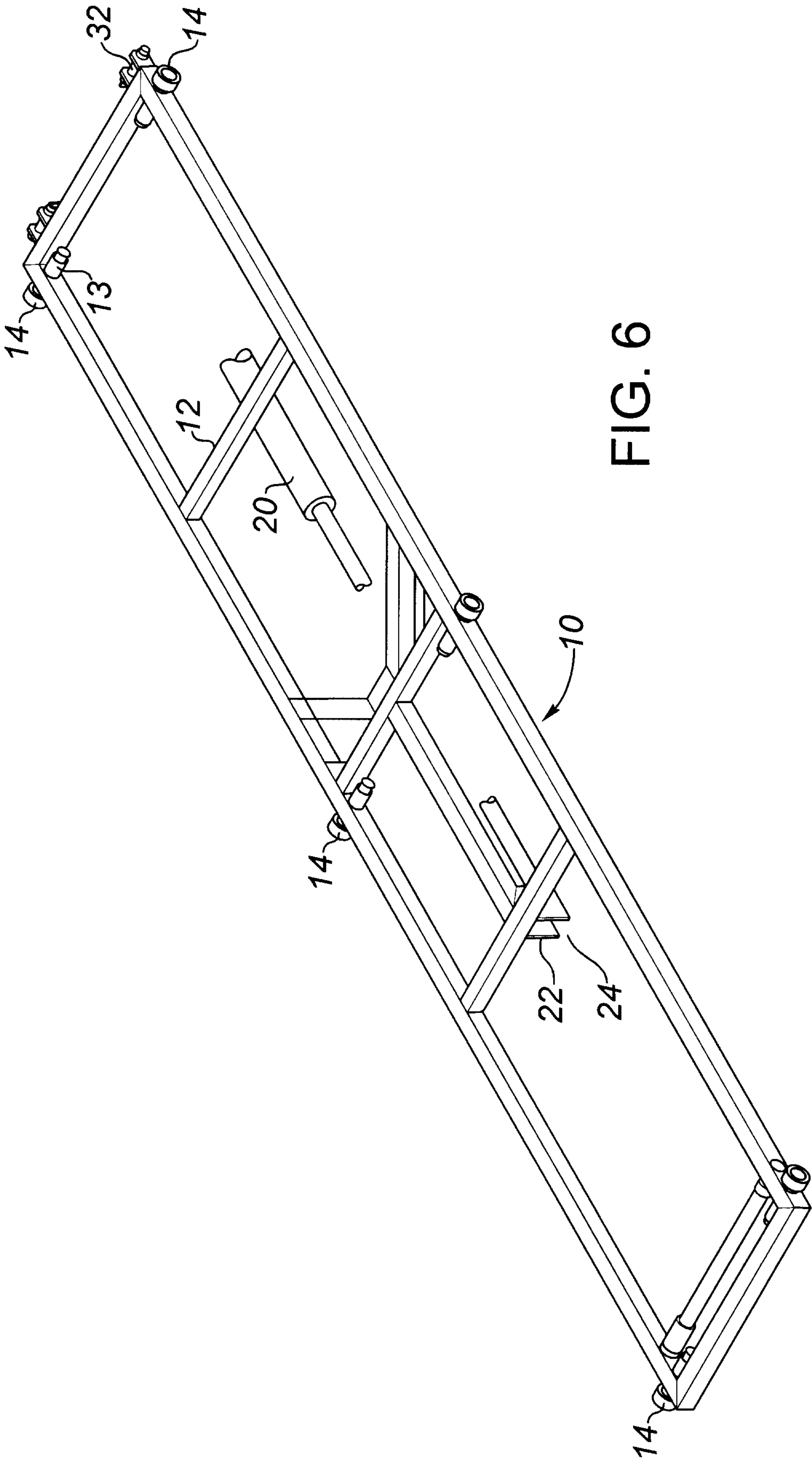


FIG. 6

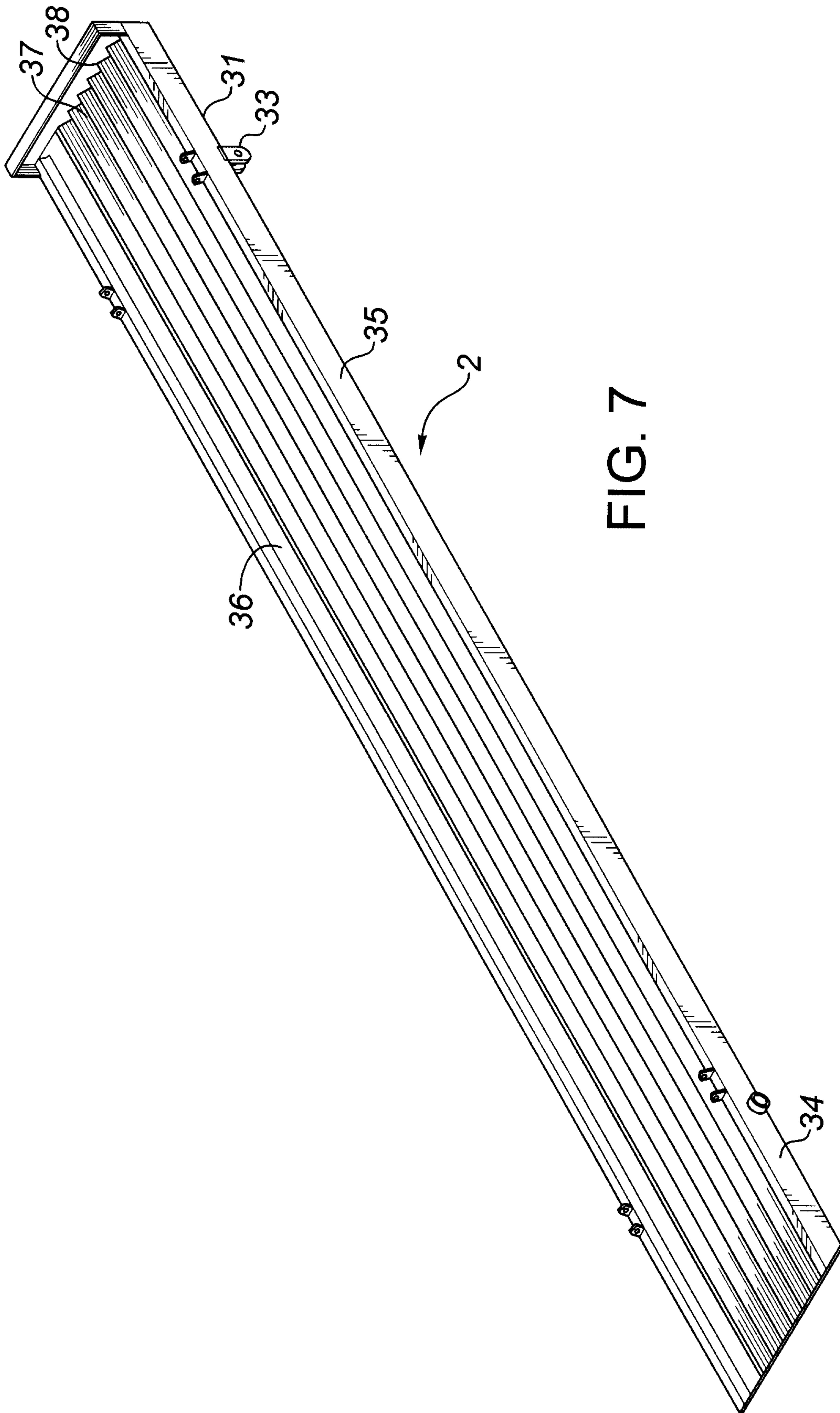
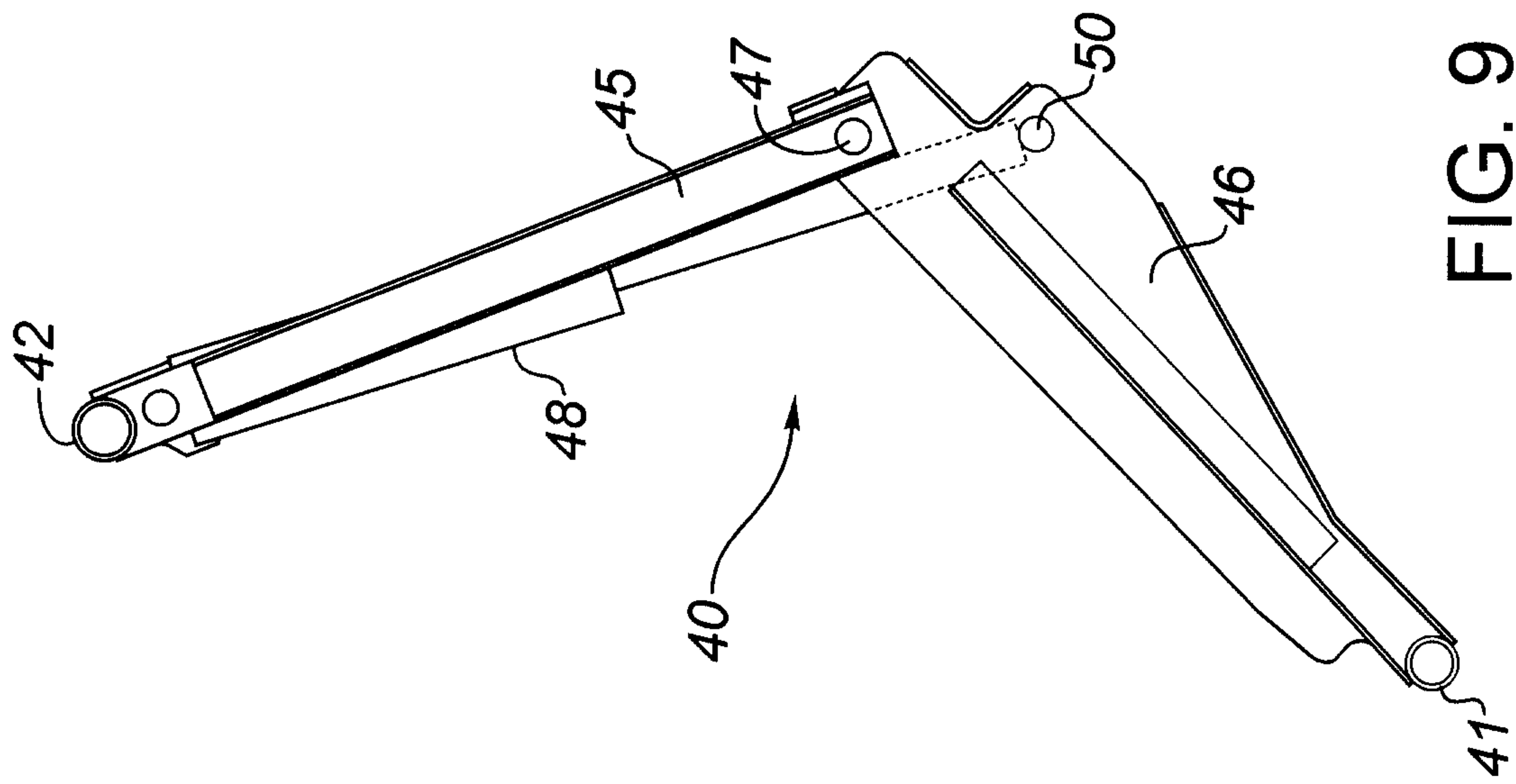
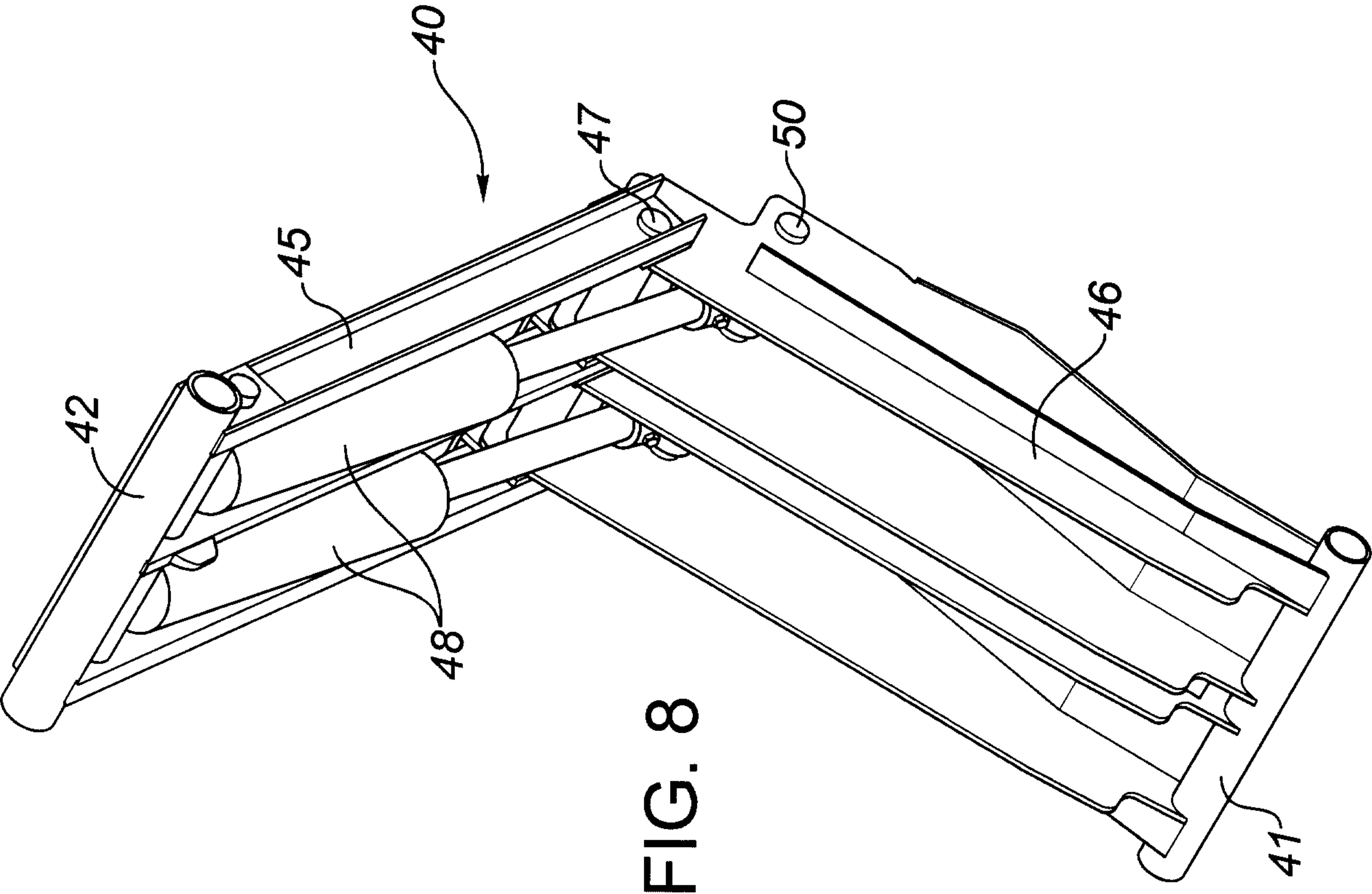
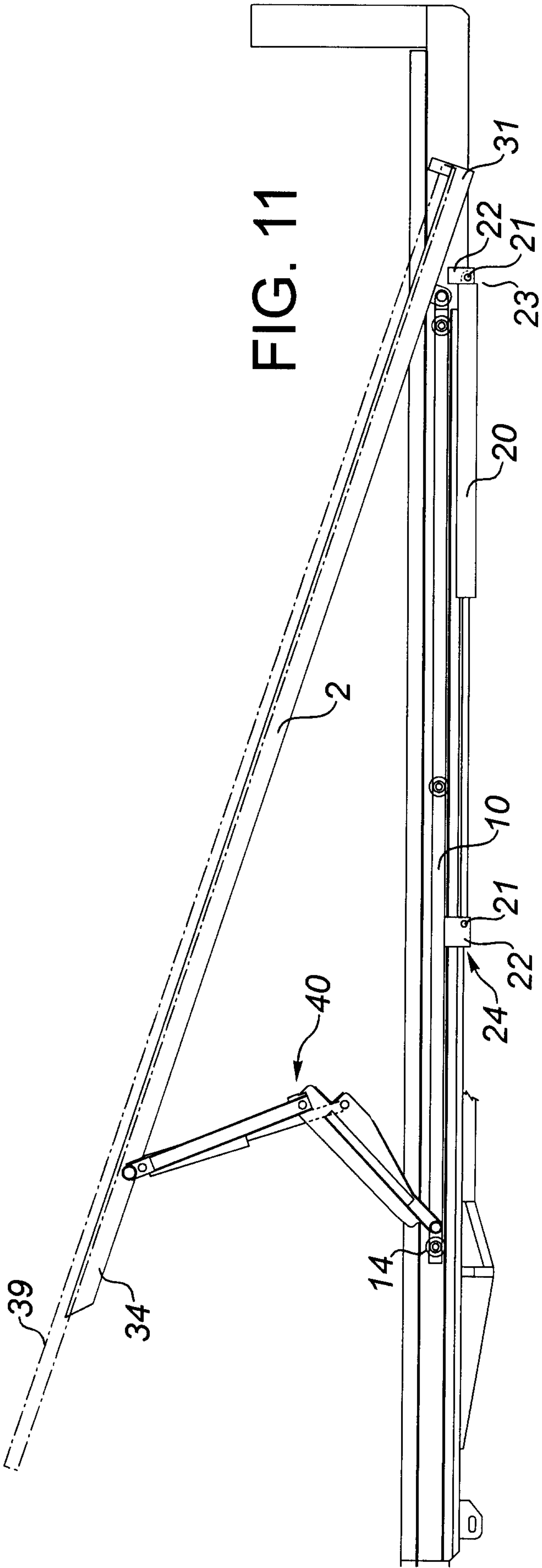
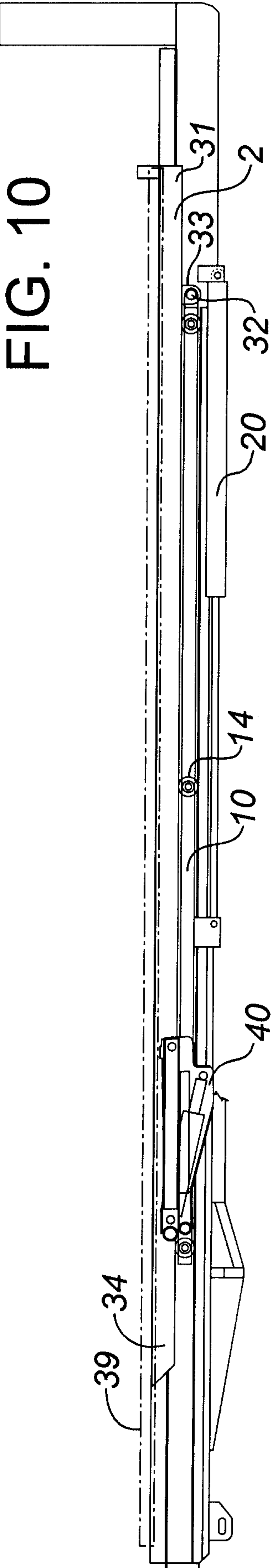


FIG. 7





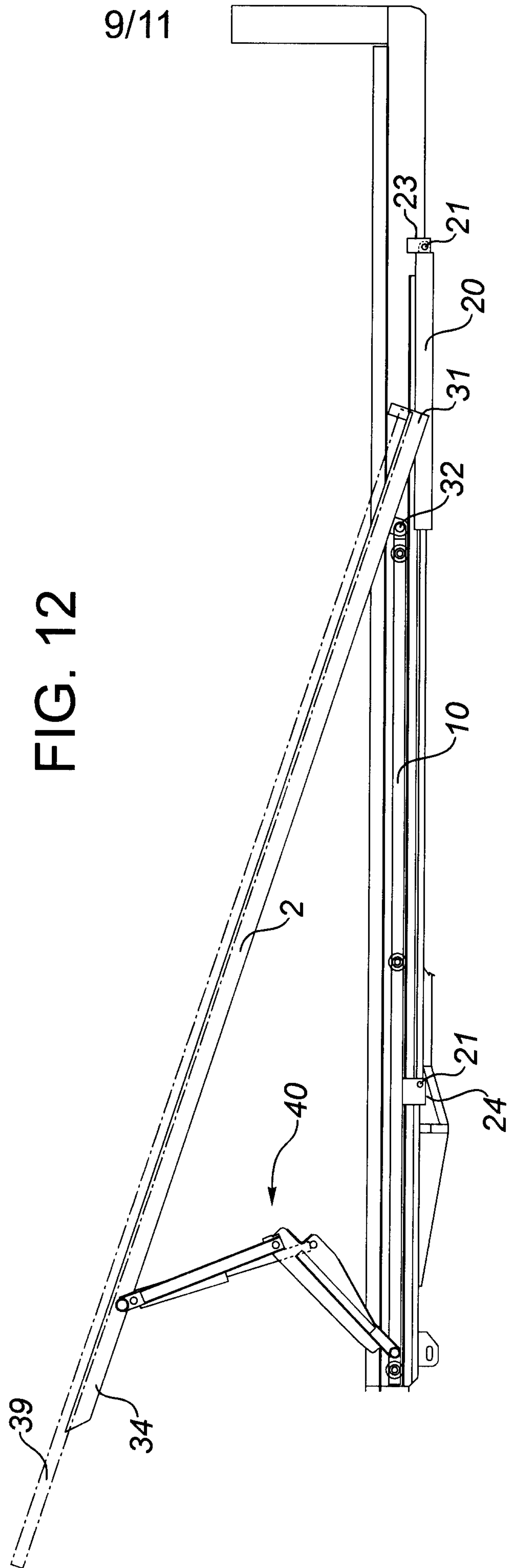


FIG. 12

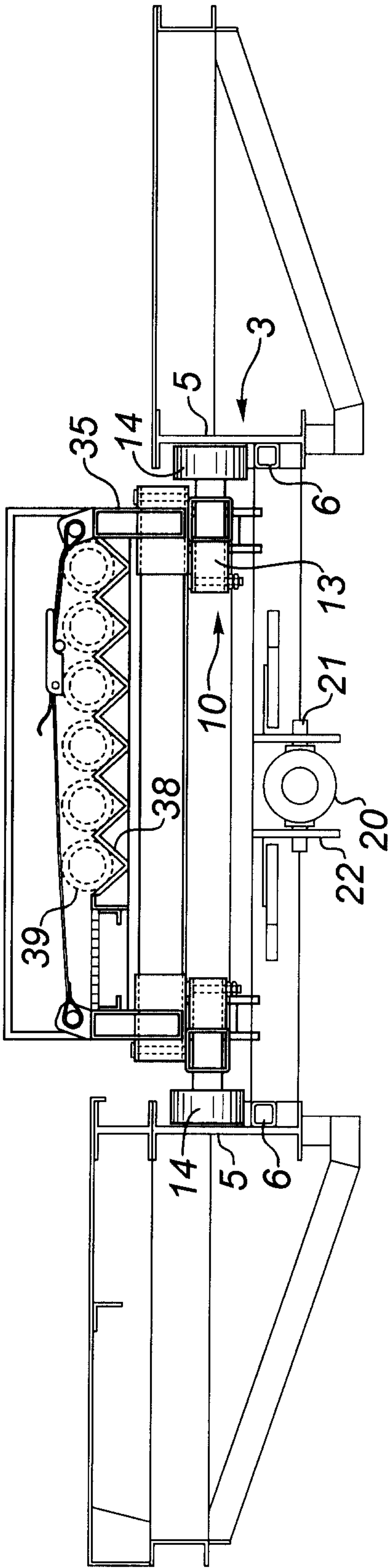


FIG. 13

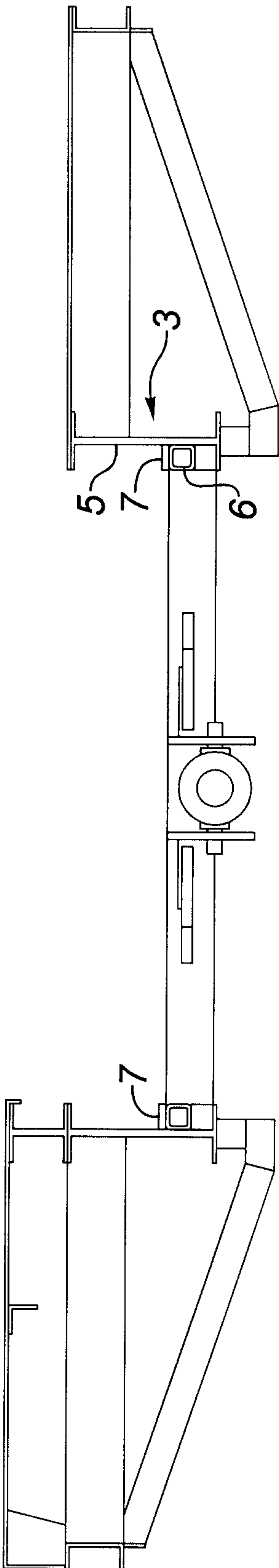


FIG. 14

