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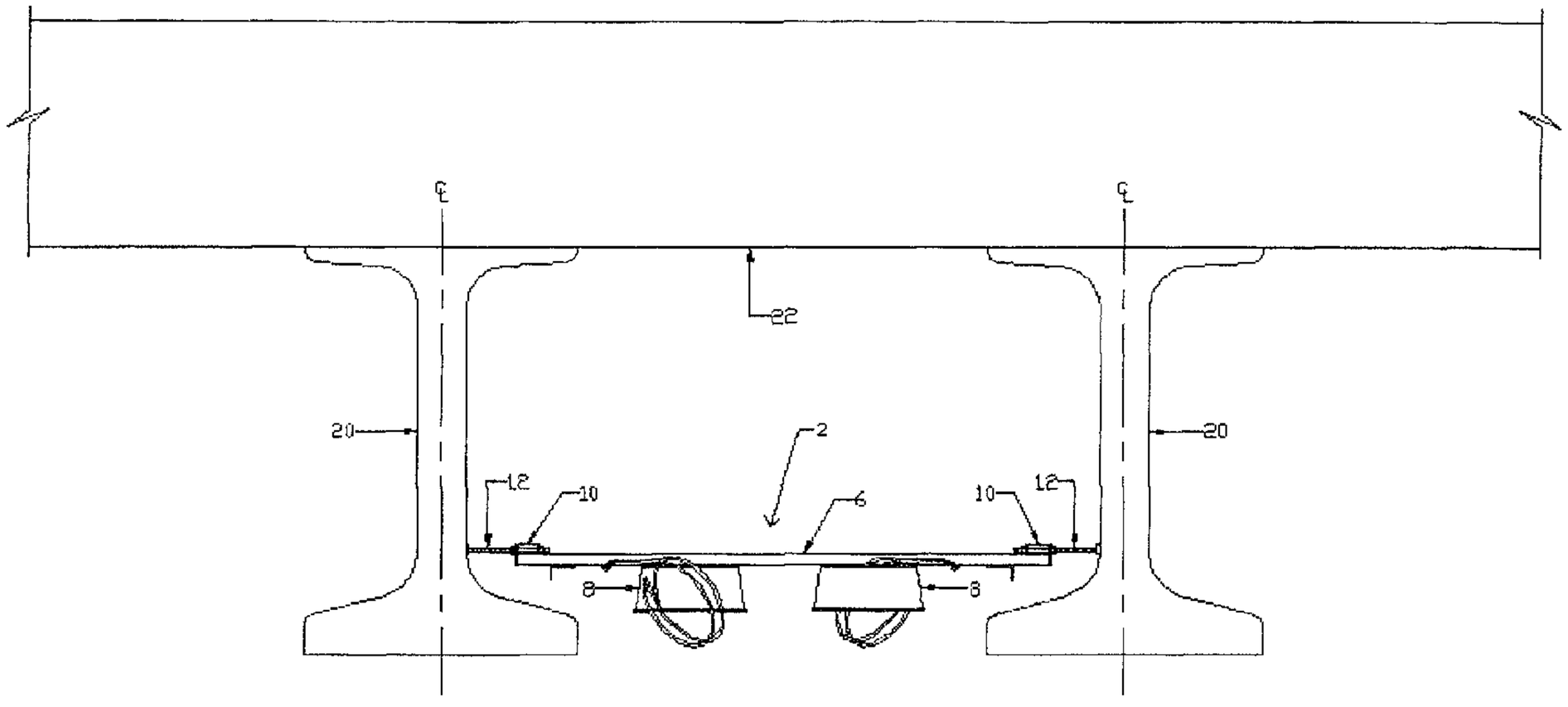
(72) **Inventeur/Inventor:**
TOPPAZZINI, DAN, CA

(73) **Propriétaire/Owner:**
WEINMANN LIMITED, CA

(74) **Agent:** FOGLER, RUBINOFF LLP

(54) **Titre : ENSEMBLE DE LUMINAIRES ET APPAREIL ET METHODES D'INSTALLATION ASSOCIES**
(54) **Title: LUMINAIRE ASSEMBLIES AND ASSOCIATED INSTALLATION APPARATUS AND METHODS**



(57) **Abrégé/Abstract:**
A lifting jig for installing a luminaire assembly including a frame for supporting a luminaire assembly; wherein the frame is a space truss; and a support for supporting the luminaire assembly.

Abstract

A lifting jig for installing a luminaire assembly including a frame for supporting a luminaire assembly; wherein the frame is a space truss; and a support for supporting the luminaire assembly.

LUMINAIRE ASSEMBLIES AND ASSOCIATED INSTALLATION APPARATUS AND METHODS

TECHNICAL FIELD

[0001] The present invention relates generally to luminaire assemblies and, more particularly, the field of luminaire assemblies, and associated installation apparatus and methods.

BACKGROUND

[0002] Luminaires for providing general illumination to an area are well known and are often used in outdoor lighting applications including roadway lighting, lighting of tunnels, bridges and platforms.

[0003] To install multiple luminaires, a luminaire assembly for supporting the luminaires is often assembled *in situ* (under the ceiling of a traffic tunnel for example). Once assembled, the luminaires are installed on the luminaire assembly. This is time consuming and labour intensive.

[0004] It would be desirable to have an improved luminaire assembly, installation apparatus and method.

SUMMARY

[0005] According to certain embodiments (but not all), the present invention relates to a luminaire assembly including a generally planar skeletal frame comprising longitudinal members and cross members, and an adjustable lock secured to the frame, the lock movable along an axis generally parallel to the axis of the cross members, between an unlocked retracted position to an extended locked position for frictionally securing the assembly between parallel surfaces such as girders. The luminaire assembly may further include one or more luminaires may be secured to the frame or

to one or more of the cross members. The luminaire assembly may further include one or more rods extending from the from in a direction generally perpendicular to the plane of the frame, wherein the free end of each rod is securable to a surface of an infrastructure structure.

[0006] According to certain embodiments (but not all), the present invention relates to a luminaire assembly for installation between girders including a frame assembly on which one or more luminaires may be installed, the frame assembly being of a width wider than the gap between the inner facing feet of the girders. The luminaire assembly may further include a generally planar skeletal frame including longitudinal members and cross members, and an adjustable lock secured to the frame, a lock movable along an axis generally parallel to the axis of the cross members, between an unlocked retracted position to an extended locked position for frictionally securing the assembly between girders. One or more luminaires may be secured to the frame or to one or more of the cross members. The luminaire assembly may further include one or more rods extending from the from in a direction generally perpendicular to the plane of the frame, wherein the free end of each rod is securable to a surface of an infrastructure structure.

[0007] According to certain embodiments (but not all), the present invention relates to a method of installing a luminaire assembly between parallel spaced apart girders or other surfaces beneath the ceiling of an infrastructure structure, including providing a frame assembly on which one or more luminaires may be installed, wherein the frame, when oriented in a plane generally parallel to the plane defined by the bottom surface of the girders, is wider than the gap between the inner facing feet of the girders, orienting the frame at an angle with respect to the plane defined by the bottom surface of the girders, whereby the frame may be placed between the girders, and orienting the frame to generally to the plane defined by the bottom surface of the girders whereby the frame is wider than the gap between the inner facing feet of the girders. The method may further include securing the luminaire assembly between the inner sides of the girders.

[0008] According to certain embodiments (but not all), the present invention relates to a lifting jig for installing a luminaire assembly including a frame for supporting a luminaire assembly; and a rotatable assembly on the frame for rotating the luminaire assembly between a generally horizontal position and an inclined position. The lifting jig may further include a locking for locking the luminaire assembly to the frame.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] Various embodiments of the present invention will now be described with reference to the drawings, in which:

[0010] FIG. 1 is an end view of a luminaire assembly according to an embodiment of the present disclosure, installed between girders;

[0011] FIG. 2 is a top view of the luminaire assembly of FIG. 1;

[0012] FIG. 3 is a front view of a lifting jig according to an embodiment of the present disclosure;

[0013] FIG. 4 is an end view in the direction B-B of the lifting jig of FIG. 3;

[0014] FIG. 5 is an end view in the direction B-B of the lifting jig of FIG. 3 with the frame support pivoted;

[0015] FIG. 6 is an end view in the direction B-B of the lifting jig of FIG. 3 with the luminaire assembly of FIG. 1 attached, shown supported by a fork lift in a raised position; and

[0016] FIG. 7 is an end view in the direction B-B of the lifting jig of FIG. 3 with the luminaire assembly of FIG. 1 attached, with the frame pivoted, and supported by a fork lift in a raised position.

DESCRIPTION OF THE INVENTION

[0017] The present invention will now be described more fully hereinafter with reference to the accompanying drawings, which are intended to be read in conjunction with both this summary, the detailed description and any preferred and/or particular embodiments specifically discussed or otherwise disclosed. This invention may,

however, be embodied in many different forms and should not be construed as limited to the embodiments set forth herein. Instead, these embodiments are provided by way of illustration only and so that this disclosure will be thorough, complete and will fully convey the full scope of the invention to those skilled in the art.

[0018] Referring initially to FIGs 1 and 2, in one embodiment of the present invention there is provided a luminaire assembly generally indicated by reference numeral 2. The luminaire assembly includes a generally planar skeletal frame formed of spaced generally parallel longitudinal members 4 and spaced generally parallel cross members 6 connecting the longitudinal members 4, wherein the cross members 6 run in a direction generally perpendicular to the direction of the longitudinal members 4 and in the same general plane as the longitudinal members 4. The members 4 and 6 are made from metal beams, metal tubes or the like. Metal alloys, composite materials or other suitable material having sufficient tensile strength may be used.

[0019] Luminaires 8 are affixed to the cross members 6. The luminaires 8 may be selected from any number of suitable conventional luminaires or alternatively suitable custom designed luminaires may be used or combinations thereof.

[0020] Threaded housings 10 are provided on the outer longitudinal members 4 for receiving threaded bolts 12.

[0021] The luminaire assembly 2 is adapted to be installed between girders such as girders 20 which extend from the bottom of a bridge deck 22. The bridge deck 22 may form part of the ceiling of a traffic tunnel, the underside of a bridge or other surface of an infrastructure structure for example.

[0022] To facilitate the installation of the luminaire assembly 2, there is provided, according to another embodiment of the present invention, a lifting jig generally indicated by the reference numeral 30. The lifting jig 30 is adapted to support the luminaire assembly 2 and position it for installation.

[0023] The lifting jig 30 includes a frame generally indicated by 32 from which masts 34 extend to supports 66 for supporting the luminaire assembly 2.

[0024] The frame 32 is constructed as a space truss with a top cord 38 and two bottom cords 40 and 42 formed of elongated hollow metal tubes. Webs 44, also formed of elongated metal tubes, connect the cords 38, 40 and 42 and define triangular panels 46. Rungs 48 running generally parallel to the cords 38 and 40 connect the two webs of three panels, a panel in the middle and a panel at either end on one side of the frame 32. Beams 50, are supported by the top cord 38, and run generally perpendicular to the longitudinal axis of the top cord 38. The beams 50 are supported by posts 52 which rest on bottom cords 40 and 42.

[0025] Bars 54 are affixed to the ends of the beams 50 forming a "T". A platform (not shown) may be placed on the beams 50 to serve as a work platform. Tips 56 on the bars 54 serve to restrain lateral movement of a board to the outside of the frame 32 while the masts 34 restrain lateral movement in the opposite direction.

[0026] The masts 34 extend from the top cord 38 and support a pair of beams 58 and 60 which run generally parallel to the top cord 38. The beams 58 and 60 are hinged together by hinges 62 which permit the beam 58 to be hinged open to a position approximately at right angles to its closed position abutting beam 60. Extending from each beam 60 is a mast 64 which is collinear with the corresponding mast 34. Secured to the end of each mast 64 is a frame support 66 formed of a U-shaped channel and running approximately perpendicular to the mast 64. A bracket 68 with a hole 70 is provided at the ends of the frame supports 66.

[0027] The holes 70 are adapted to receive bolts 72 which are attached to the frame support 66 by chains 74. A hydraulic cylinder 76 is attached to the central mast 34 with the piston 78 attached to the central frame support 66.

[0028] Fork pockets 90 formed of hollow tubes of square profile are provided mid-span below the cords 40. The fork pockets 90 are sized and spaced to receive conventional forks of a conventional fork lifting equipment such as a lifting rig. The fork pockets 90 are positioned approximately mid-span of the lifting jig 30. Other suitable means for securing the lifting jig on the lifting equipment may be used.

[0029] In operation, the luminaire assembly 2 is secured to the frame support 66 by slipping the longitudinal members 6 into the U-shaped channels of the frame

supports 66. The bolts 72 are then inserted into the holes 70 to lock the luminaire assembly 2 to the frame supports 66.

[0030] The luminaire assembly 2 can then be lifted into position. The lifting operation involves lifting the lifting jig 30 with the luminaire assembly 2 secured to it by a suitable lifting rig indicated. The forks of the lifting rig are inserted into the fork pockets 90. The lifting jig is then lifted by the lifting rig 90. In order to slip the luminaire assembly 2 between girders 20, the cylinder 76 is activated to retract the piston 78 to open up the hinged beams 58 and 60 and in turn orient the luminaire assembly 2 in an axis generally parallel to the longitudinal axis of the masts 34.

[0031] The lifting jig 30 is then elevated to lift the luminaire assembly 2 to a sufficient height between the girders 20 such that the luminaire assembly 2 can be rotated to a generally horizontal position without snagging the girders 20. The cylinder 76 is activated to extend the piston 78 to close the hinged beams 58 and 60 and rotate the luminaire assembly 2 to a position generally parallel to the beams 50 between the girders 20. The bolts 12 are then adjusted to press the bolts 12 against the sides of the girders 20 to secure the luminaire assembly 2 between the girders 20. The luminaires 6 can then be electrically connected to a power source (not shown). Workers can use the rungs 44 to climb onto the work platform to carry out the electrical connections. The bolts 72 are then pulled from the holes 68 to unlock the luminaire assembly 2 from the lifting jig 30 and the lifting jig 30 can then be lowered leaving the luminaire assembly 2 in place.

[0032] It will be understood by a person of ordinary skill in the art that the luminaire assembly 2 may be sized appropriately according to the spacing of the girders between which it is to be installed. The luminaire assembly 2 may also be of various lengths such as to accommodate a larger number of luminaires. The number and spacing of longitudinal members and cross members may vary.

[0033] Luminaires may be installed on the luminaire assembly after the luminaire assembly is installed. The luminaire assembly may be installed according the method described herein with respect to the installation of luminaire assembly 2. The luminaire assembly may also be secured to a bridge, tunnel ceiling or other structure by rods.

[0034] While the present invention has been described above in terms of specific embodiments, it is to be understood that the invention is not limited to these disclosed embodiments. Many modifications and other embodiments of the invention will come to mind of those skilled in the art to which this invention pertains, and which are intended to be and are covered by both this disclosure and the appended claims. It is indeed intended that the scope of the invention should be determined by proper interpretation and construction of the appended claims and their legal equivalents, as understood by those of skill in the art relying upon the disclosure in this specification and the attached drawings.

CLAIMS

1. A lifting jig for installing a luminaire assembly comprising:

a frame;

wherein the frame is a space truss; and

a support on the frame comprising spaced horizontal parallel beams for supporting the luminaire assembly; and

fork pockets on the frame for receiving forks of a lifting rig.

2. The lifting jig according to claim 1, further comprising means for pivoting the support between a first position and a second position.

3. The lifting jig according to claim 2, the means for pivoting the support comprising a pair of spaced parallel masts extending from the frame, the masts comprising upper and lower sections hingedly connected, the upper section of each mast supporting one of the beams of the support, such that the upper sections can be moved between the first and second positions.

4. The lifting jig of claim 2 or 3, wherein the first position is a generally horizontal position and the second position is an inclined position.

5. The lifting jig of claim 2 or 3, wherein the inclined position is generally vertical to the horizontal position.

6. The lifting jig of any one of claims 1 to 5, further comprising locking means for releasably locking the luminaire assembly to the support.

7. An installation system for installing a luminaire assembly between girders comprising:

a lifting rig; and

a lifting jig of any one of claims 1 to 6.

8. The installation system of claim 7, wherein the lifting rig is a fork lift and wherein the means for pivoting comprises pivoting means on the fork lift.

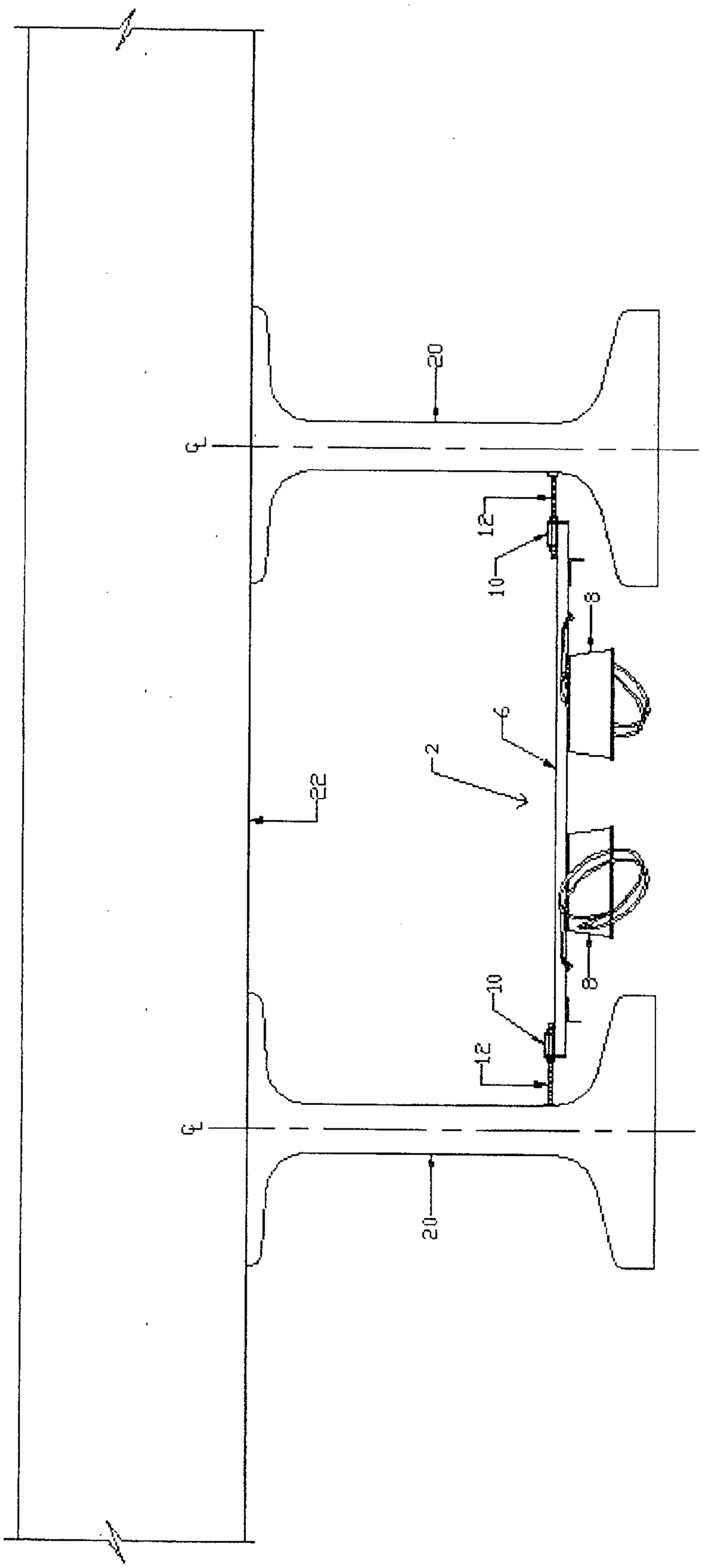


FIG. 1

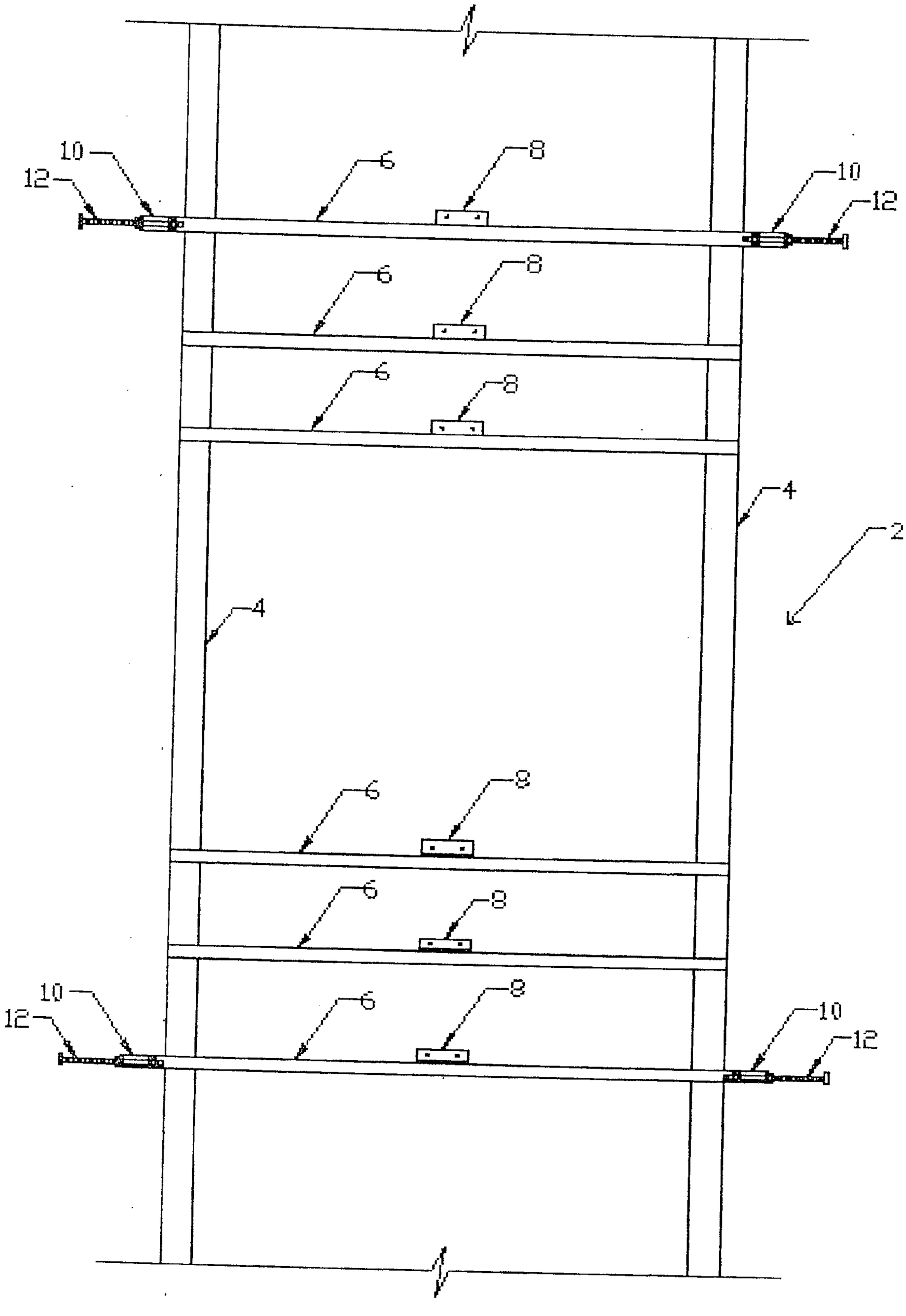


FIG. 2

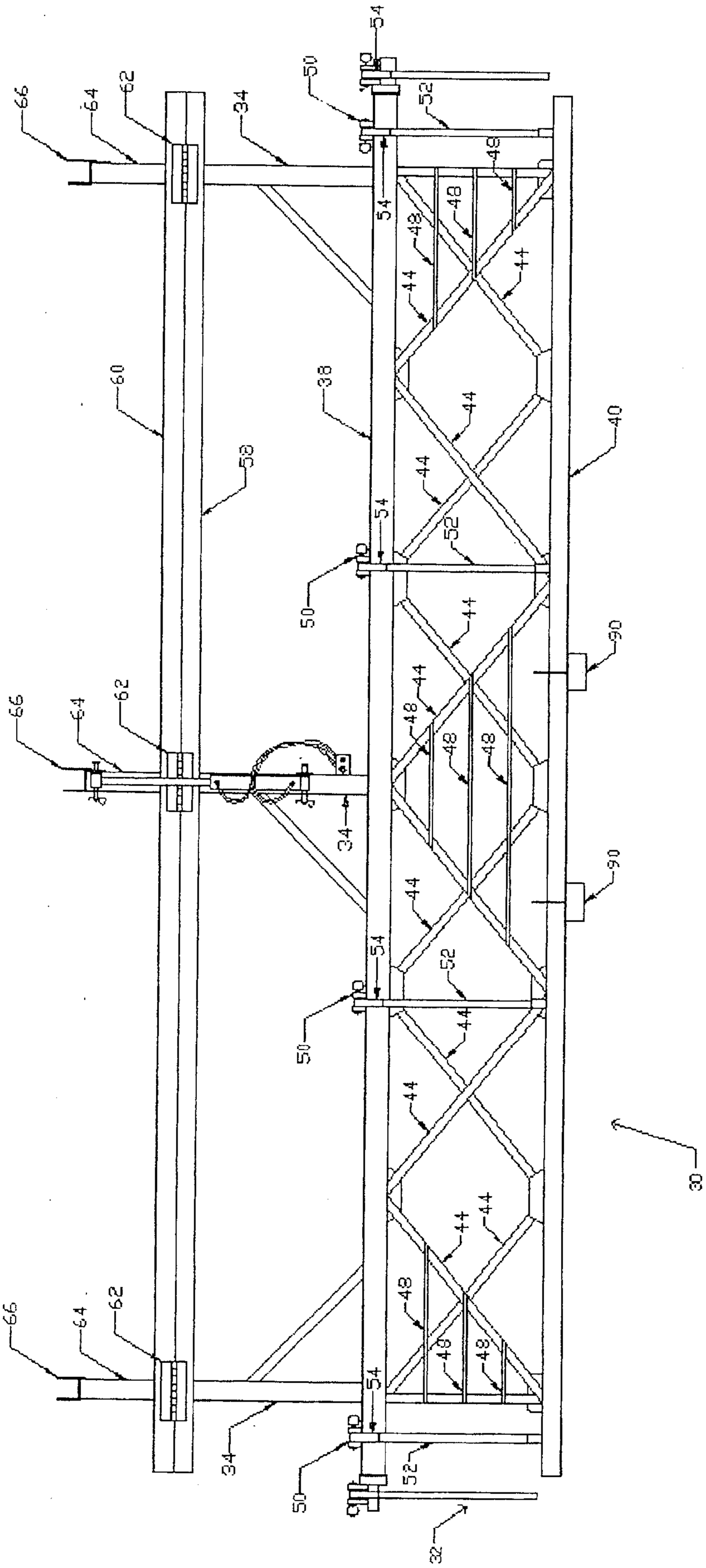


FIG. 3

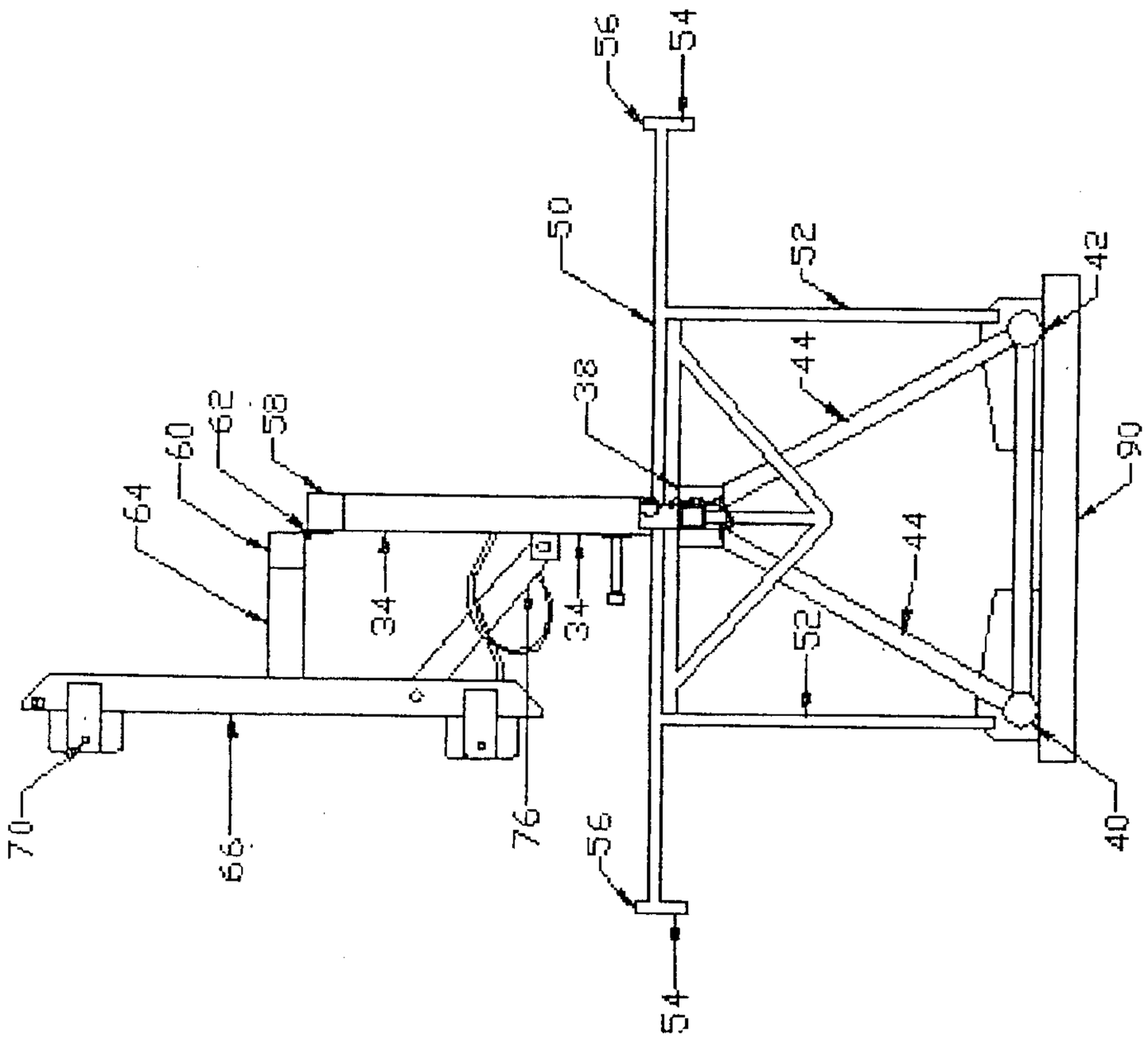

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FIG. 5

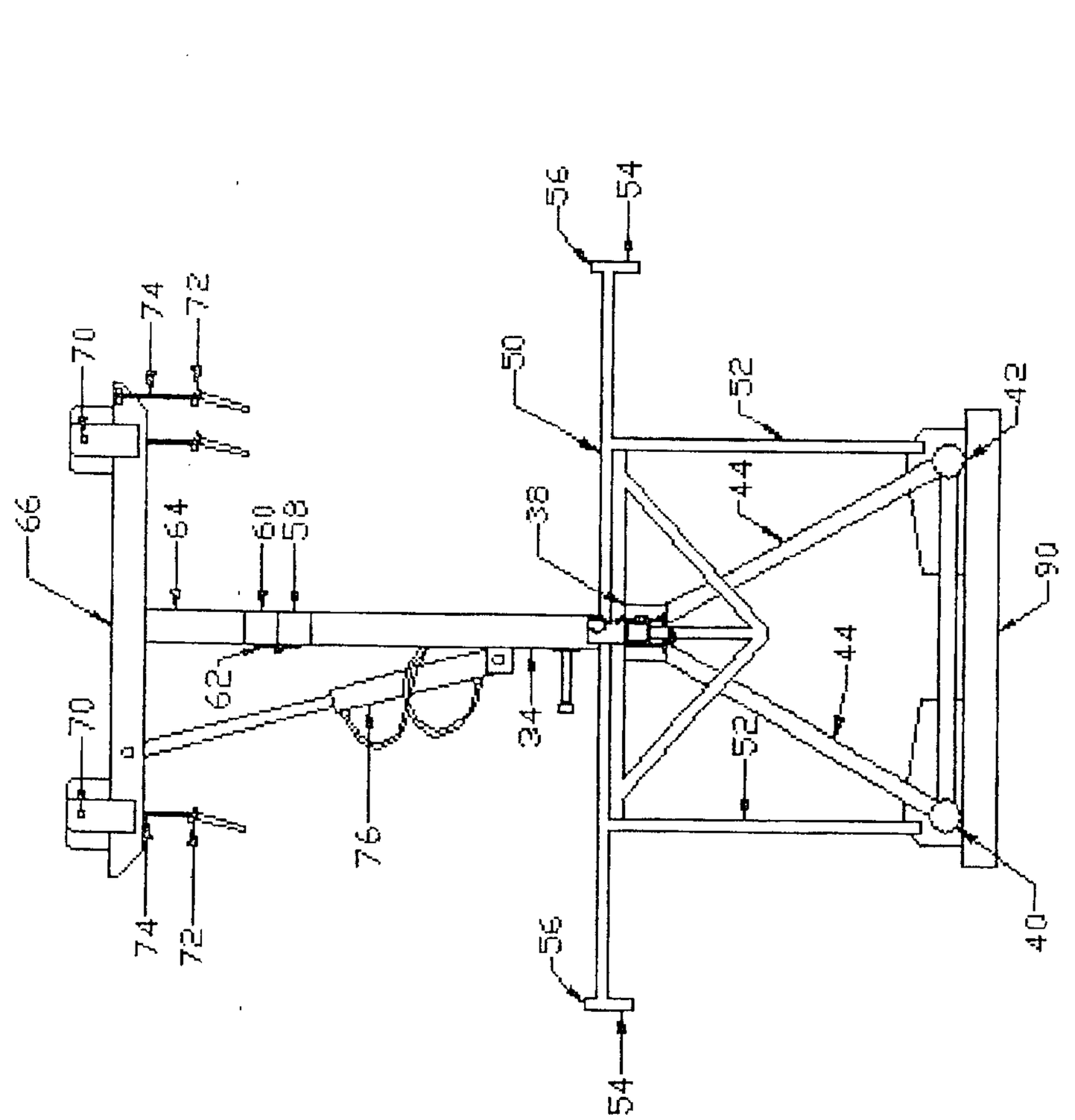
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FIG. 4

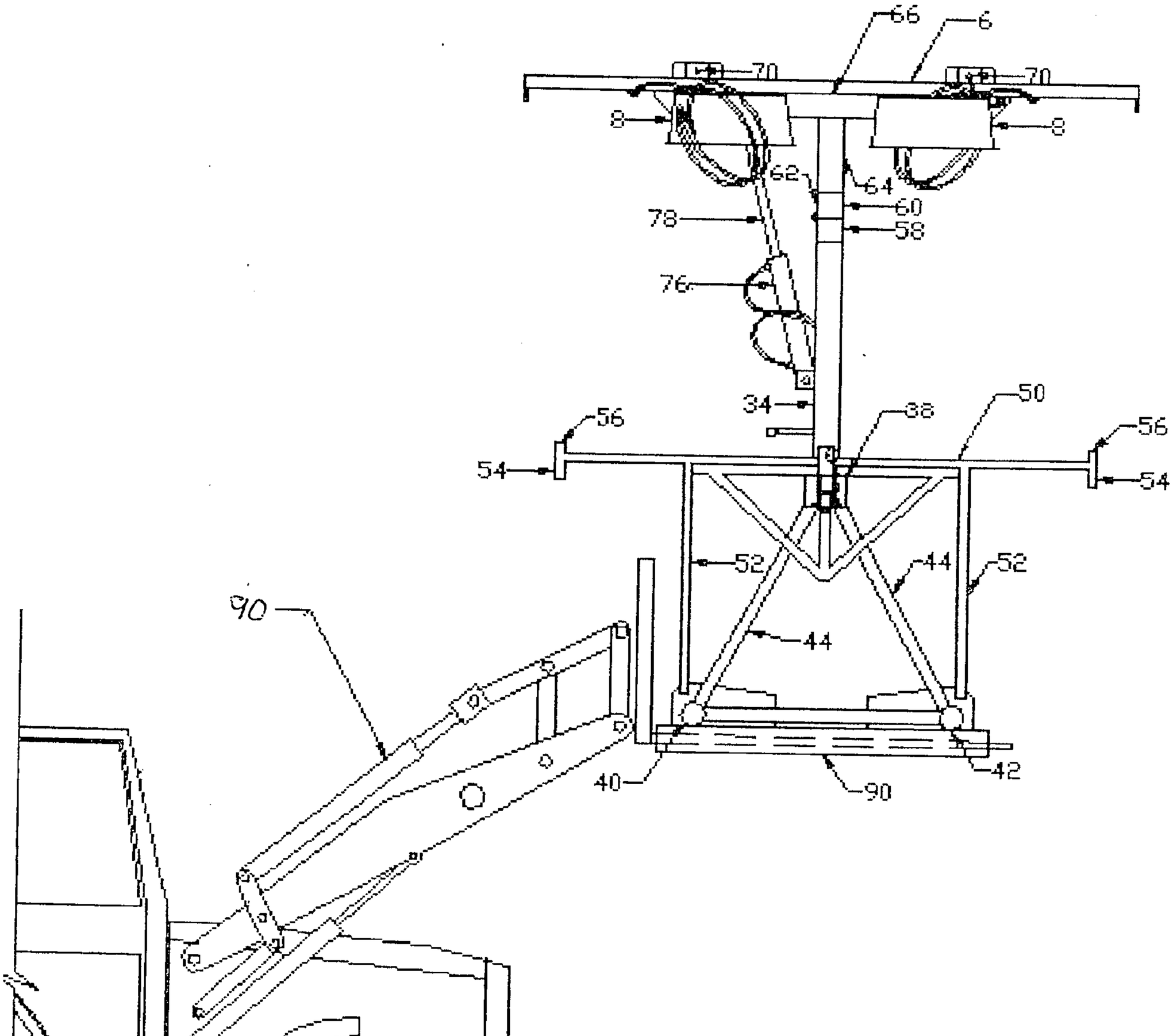
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FIG. 6

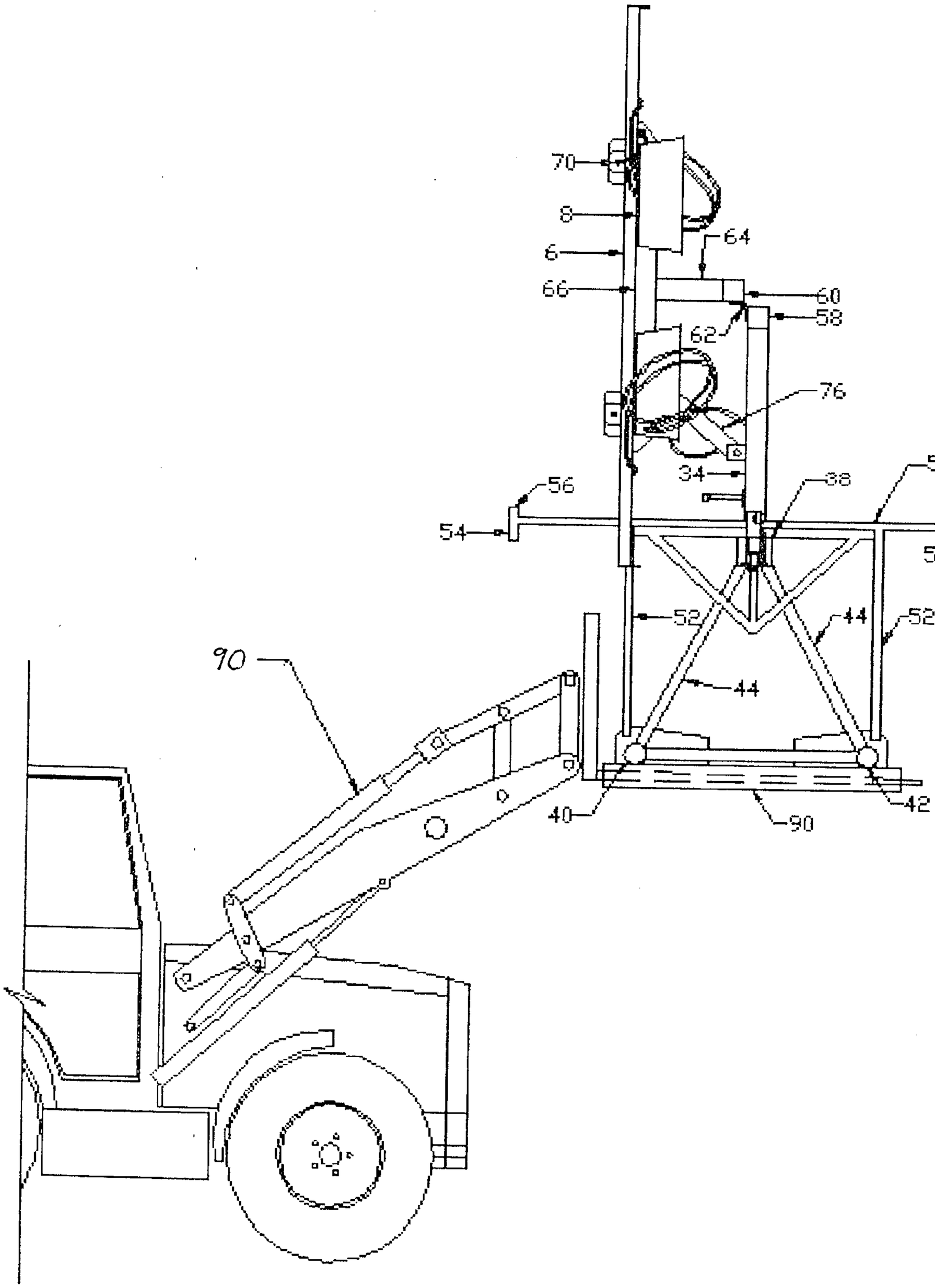
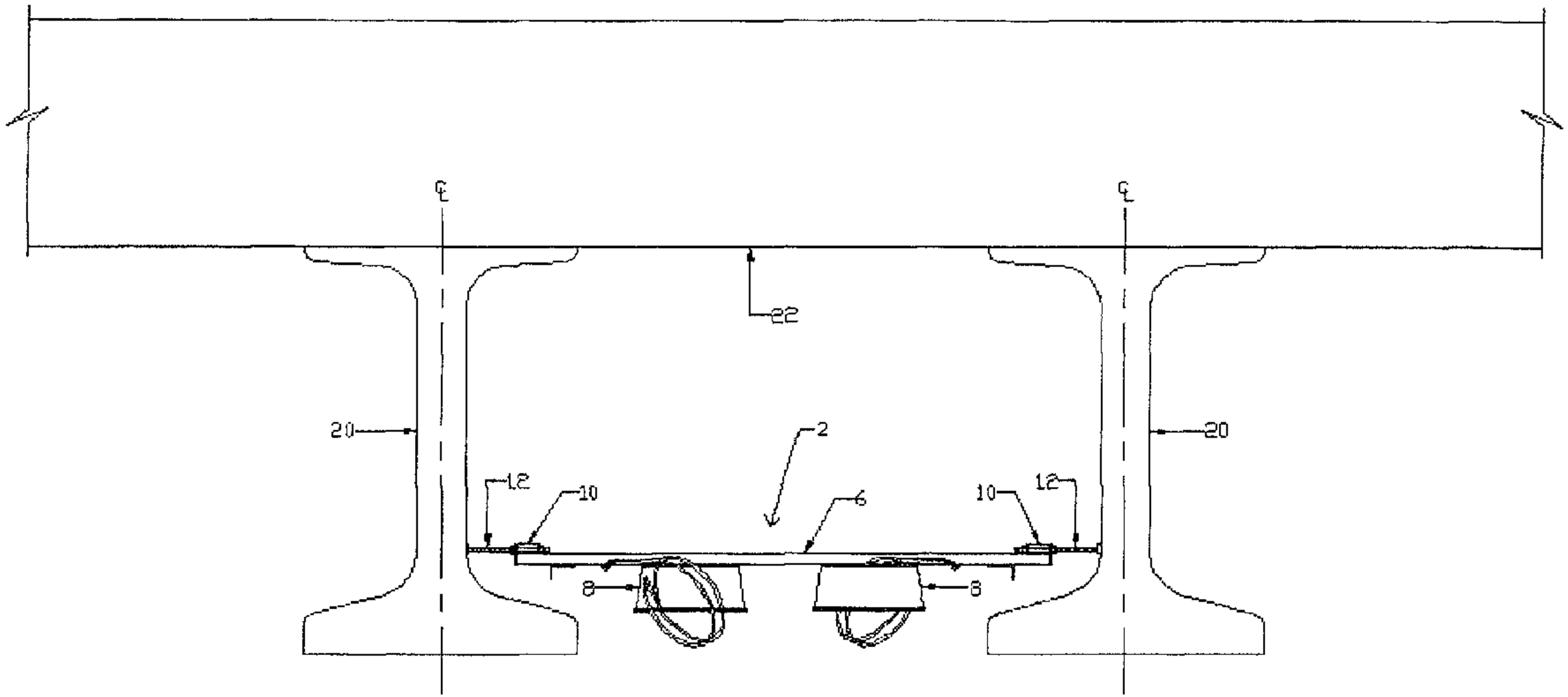


FIG. 7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