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(71) Applicant: **Satco, Inc.**
1601 East El Segundo Boulevard
El Segundo,
California 90245 (US)

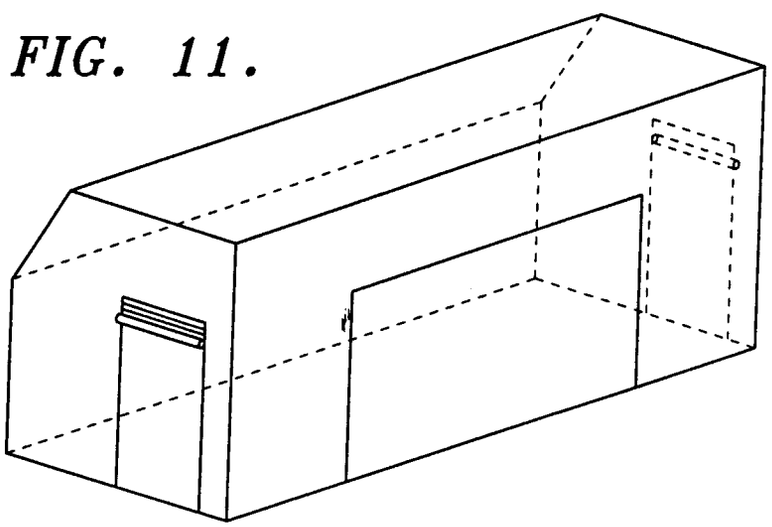
(72) Inventor: **Looker, Robert**
405 Toro Canyon Road
Carpenteria,
California 93013 (US)

(74) Representative: **Patentanwälte Viering & Jentschura**
Postfach 22 14 43
D-80504 München (DE)

(54) Air cargo container.

(57) A cargo container for air or surface freight has roll-up doors to allow access, through the interior of the cargo container, to cargo contained in adjacent cargo containers. The roll-up doors generally include a curtain and a doorbar. The container also includes ramps and plates to guide at least one of the roll-up doors into a pre-locked position. An internal latching mechanism is then used to further close and subsequently re-open the roll-up door from within the cargo container interior. The latching mechanism preferably includes a handle, a tensioning cam, and a handle lock.

FIG. 11.



EP 0 679 589 A1

BACKGROUND OF THE INVENTION

The field of the invention is cargo containers. From the beginning of manned flight, cargo of one type or another has been transported in planes. Since that time, the air freight industry has engaged in a constant effort to increase the efficiency of transporting cargo by air. For instance, it is customary to load commercial cargo into cargo containers on the ground, and then load the containers themselves onto the aircraft. Fig. 1 shows a conventional cargo container used for this purpose. This process saves time and is also more secure in-flight. The cargo is thus shipped by air, after which, the containers are then unloaded directly onto trucks for shipping to final destinations. Fig. 2A shows a typical configuration for loading containers onto trucks. This configuration creates difficult problems when the trucks reach their final destination. The presence of Container A inhibits access to cargo in Container B and relatively few truck stations possess the capability to move cargo containers, such as Container A, off of the truck to allow direct access to Container B.

Attempts have been made to address this problem by using swinging doors for Containers A and B. As shown in Figs. 2A and 2B, door 2 of Container A swings inward while door 1 of Container B swings outward, thereby providing an accessway from the back of the truck through Container A to cargo in Container B. This method is very limiting, as the doors are expensive, heavy and fail after a relatively short period of service. Moreover, a significant amount of space must be cleared within Container A to allow the doors to swing inwardly into Container B.

Thus, there exists a need for an improved cargo container which allows access to other containers stored farther back on the truck. Since these cargo containers are often used in aircraft, a preferred container would also be lightweight and durable.

SUMMARY OF THE INVENTION

To these ends, an improved cargo container has roll-up doors. At least two of these roll-up doors are positioned so that when cargo containers are placed adjacent to each other, a passageway between cargo containers is created by opening one door from each cargo container. Thus, access is provided, through the interior of one cargo container, to cargo held in adjacent containers. Moreover, the roll-up doors may be more durable and lighter than conventional swinging doors and require less space to operate.

Accordingly it is an object of the present invention to provide an improved air cargo container. Other and further objects and advantages will appear hereinafter.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings, wherein similar reference characters denote similar elements throughout the several views;

Fig. 1 is a perspective view of a conventional cargo container;

Fig. 2A is a plan view of a conventional configuration of cargo containers loaded onto a truck;

Fig. 2B is a side elevation view thereof.

Fig. 3 is a side elevation view of the cargo container of the present invention;

Fig. 4 is a front elevation view thereof;

Fig. 5 is a rear elevation view thereof;

Fig. 6 is a section view of the front door taken along line 6--6 of Fig. 4;

Fig. 7 is an enlarged front elevation view of the latching mechanism for the front door with the guideplate partially cut away;

Fig. 8 is a section view thereof, taken along line 8--8 of Figs. 4 and 7 with the door post cut away and the doorbar omitted for clarity;

Fig. 9 is a section view thereof taken along line 9--9 of Fig. 8;

Fig. 10 is a section view of the rear door taken along line 10--10 of Fig. 5;

Fig. 11 is a perspective view of the preferred embodiment of the present invention;

Fig. 12A is a plan view of a preferred method of loading containers onto a truck; and

Fig. 12B is a side elevation view thereof.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Turning now in detail to the drawings, Fig. 1 represents a typical conventional cargo container. These cargo containers generally have seven panels: front, rear, top, bottom, a large lateral panel, a small lateral side panel, and a slanted panel connecting the small lateral panel to the top. This shape allows the container to fit within an aircraft fuselage with a minimum of wasted space.

Figs. 2A and 2B illustrate how these cargo containers are generally loaded onto a truck for transportation.

Fig. 3 shows a lateral roll-up door **20** located within the large lateral side panel. The lateral roll-up door **20** includes a doorbar **26**, curtain **28**, tensioning cables **32**, and endplates **40**. The tensioning cables **32** are attached to a roller tube with coil spring and the doorbar **26**. The endplates **40** are attached to the doorbar **26**.

Fig. 4 shows a front roll-up door **22** located within the front panel. The front roll-up door **22**

includes a doorbar **26** attached to a curtain **28**, tensioning cables **32**, rainguard **36**, and endplates **40**. Guideplates **44** are attached to the cargo container itself. The tensioning cables **32** are also attached to a roller tube with coil spring.

As shown in Fig. 5, a rear roll-up door **24** is located within the rear panel and includes a doorbar **26** attached to a curtain **28**, tensioning cables **32**, rainguard **36** and endplates **40**. The tensioning cables **32** are also attached to a roller tube with coil spring.

Fig. 6 provides another view of the front roll-up door **22**. The curtain **28** and rainguard **36** are attached to a doorbar **26**. A fixed pin **30** is attached to the center of the doorbar **26** and a threshold angle **38** is attached to the frame of the cargo container.

Turning to Fig. 7, the latching mechanism for the front roll-up door **22** is shown. A guideplate **44** is attached to the frame of the cargo container. A tensioning cam **48** is attached to a cam support block **50** which is attached to the frame of the cargo container. An endplate **40** is attached to the doorbar **26**, which is attached to the curtain **28**.

Fig. 8 provides another view of the latching mechanism. A ramp **42**, guideplate **44**, cam support block **50**, handle stop block **54**, spring-loaded handle lock **56**, and threshold angle **38** are attached to the frame of the cargo container. A tensioning cam **48** is attached to the cam support block **50**. An endplate guide block **46** is attached to the guideplate **44**. A handle **52** is rotatably attached to the tensioning cam **48**.

In Fig. 9, a handle **52** is rotatably attached to the tensioning cam **48** (not shown). A handle stop block **54** and spring-loaded handle-lock **56** are fixed to the frame of the cargo container.

In Fig. 10, a curtain **28** and rainguard **36** are attached to a doorbar **26**. A pin handle **60** is inserted into a moveable lock pin **58** which is attached at the center of the doorbar **26**. A threshold angle **38** is attached to the frame of the cargo container.

Operation of the front roll-up door **22** is now described in detail. In the preferred embodiment, the latching mechanism for the front roll-up door **22** resides within the interior of the cargo container. To close the door opening, the doorbar **26** with endplates **40** at each end thereof is lowered inside the guideplates **44**. The endplates **38** follow the ramps **42** which guide the endplates **40** over the tensioning cams **48**. The endplate guide blocks **46** then cause the endplates **40** to be cammed inwardly, placing them under the door tensioning cams **48** in a pre-locked position. This entire sequence occurs simply by lowering the doorbar **26**.

Once the doorbar **26** is thus lowered and placed in the pre-locked position, the handles **52** are rotated by hand or foot, 180 degrees, thereby lowering the doorbar **26** further and causing the tensioning cables **32** to be drawn up tight, sealing the door opening against water entry. As the handles **52** are rotated, they pass the spring-loaded handle locks **56** which, when passed, prevent accidental opening.

To open, the spring-loaded handle locks **56** are depressed, permitting the handles **52** to rotate 180 degrees in the reverse direction. The doorbar **26** is then moved slightly outwardly to clear the tensioning cams **48** and the front roll-up door **22** then rises by virtue of the coil spring located at the top of the front roll-up door **22**. Fig. 11 shows a perspective of the cargo container with the roll-up doors in their opened position.

Cargo is typically loaded in the cargo container through the lateral roll-up door **20**, but may also be loaded through the front or rear roll-up doors **22** and **24** respectively. Once loaded, the cargo container is then shipped, typically via aircraft, where it is eventually loaded onto a truck for transportation to final destinations.

Reference is now made to Fig. 12A, which shows a preferred method of loading cargo containers into a truck cargo bay. Upon reaching its final destination, cargo is unloaded while Containers A and B remain on-board the truck. This scenario may arise through a variety of reasons. For instance, the particular truck station at which cargo is being unloaded may not possess the capability to unload cargo containers from trucks.

For containers situated at the end of the truck, as shown by Container A in Fig. 12A, the rear roll-up door **24** allows access to cargo within Container A. It may also be possible, depending on the cargo, to unload cargo through the lateral roll-up door **20**. For containers situated further inside the truck cargo bay, as shown by Container B, unloading can likewise be accomplished by first unloading cargo from Container A and then opening door 2 of Container A and door 3 of Container B. As shown in Fig. 12B, a passageway from the rear of the truck, through the interior of Container A, is then created so that cargo from Container B can be unloaded without having to move Container A out of the truck cargo bay.

A further aspect of this invention is that less free space is needed within Container A to access Container B. Swinging doors require additional space within Container A in order for the doors to open into the interior of Container A. The present invention uses roll-up doors which eliminate the need for this extra space. Therefore, in Fig. 12A, it is clear that Container A need not be emptied in order to access Container B.

A preferred embodiment of the present invention has dimensions approximately as follows: front

door: 137cm opening; lateral door: 203cm opening; rear door: 127cm opening.

While a preferred embodiment and application of this invention have been shown and described, it would be apparent to those skilled in the art that many modifications are possible without departing from the inventive concepts herein. For instance, it is contemplated that the width of the containers may be easily expanded to utilize the entire width of a truck cargo bay or other cargo holding areas. Additionally, several containers may, of course, be aligned and used. The invention, therefore, is not to be restricted except in the spirit of the appended claims.

Claims

1. A cargo transportation system comprising:

a first cargo container and a second cargo container, each having a first roll-up door and a second roll-up door spaced apart and opposite from the first roll-up door; and

a vehicle for supporting the said first and said second cargo containers, with the first roll-up door of the first cargo container substantially aligned with the second roll-up door of the second cargo container, to provide access through the containers.

2. The cargo transportation system of claim 1 wherein at least the first roll-up doors further comprise a curtain having tensioning cables; and

the first container includes a latch for tightening the tensioning cables.

3. The cargo transportation system of claim 1 or 2 further comprising, on said first cargo container:

a doorbar on the first roll-up door;

a lock mechanism for locking the doorbar in place; and

guides for guiding the doorbar to the locking means.

4. The cargo transportation system of claim 3 wherein the lock includes a cam pivotally attached to the first cargo container and the guides include ramps on said first cargo container above the cam, a guideplate facing the ramps, and guide blocks joined to the guideplate, below the cam.

5. The cargo transportation system of claim 3 or 4 further comprising endplates on the ends of the doorbar for engaging the guides.

6. The cargo container of claim 1 wherein the first and second cargo containers are substantially the same width as the vehicle.

7. The cargo system of claim 3 wherein the guides are on the frame for guiding the bottom of the first and second roll-up doors out of the plane of the door, over the latch, and back into the plane of the door.

8. The cargo system of claim 3 or 4 wherein the first and second roll-up doors each include a curtain having tensioning cables attached to the doorbar on the bottom of the curtain.

9. The cargo system of claim 4 wherein the latch includes the cam pivotally mounted on the frame and a handle attached to the cam.

10. The cargo system of claim 1 wherein the frame is rigid and non-folding.

11. The cargo system of claim 9 further comprising a handle attached to the cam, and a handle lock on the container for locking the handle in place.

12. An air cargo container comprising:

a rigid frame;

a first doorway on the frame;

a first roll-up door supported on a first roller near the top of the first doorway;

a first doorbar attached near the bottom of the first roll-up door;

a first guideway in the first doorway including a pair of first ramps, a pair of first guideplates facing the pair of first ramps, and a pair of first endplate guides adjoining the first guideplates, below the first ramps;

a first pair of latches on the first doorway, positioned to engage the first doorbar;

a second doorway on the frame facing and spaced apart from the first doorway;

a second roll-up door supported on a second roller near the top of the second doorway;

a second doorbar attached near the bottom of the second roll-up door;

a second guideway in the second doorway including a pair of second ramps, a pair of second endplates facing the pair of second ramps, and a pair of second endplate guides adjoining the second guideplates, below the second ramps; and

a pair of second latches on the second doorway positioned to engage the second doorbar.

FIG. 1.
(PRIOR ART)

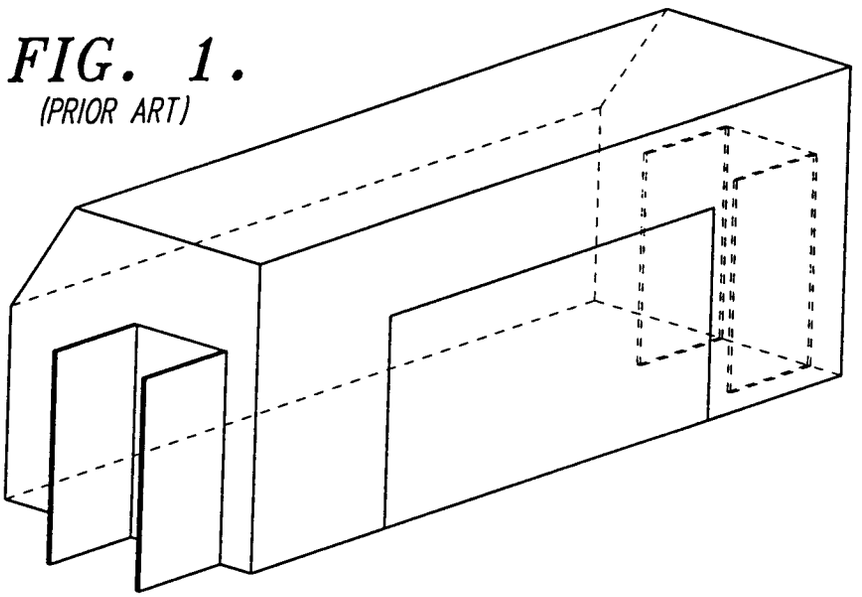


FIG. 11.

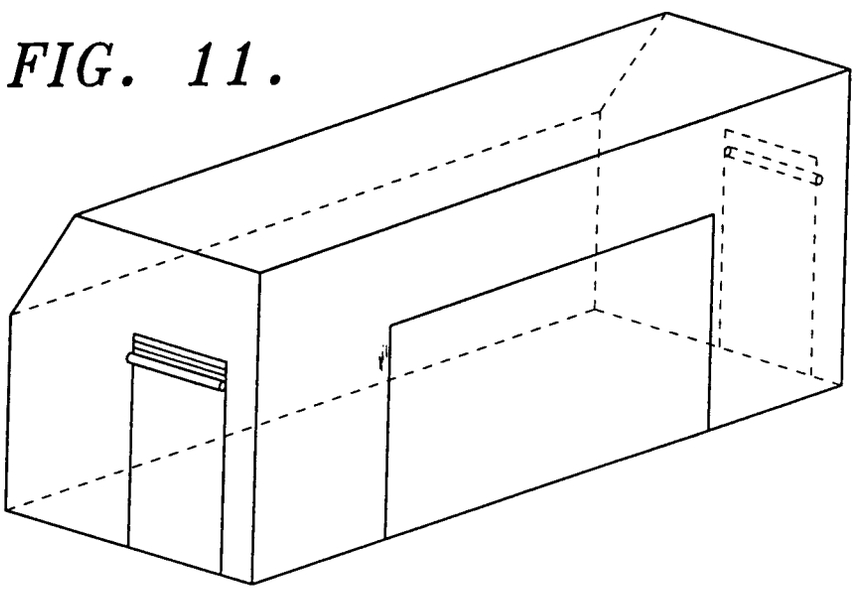


FIG. 2A.
(PRIOR ART)

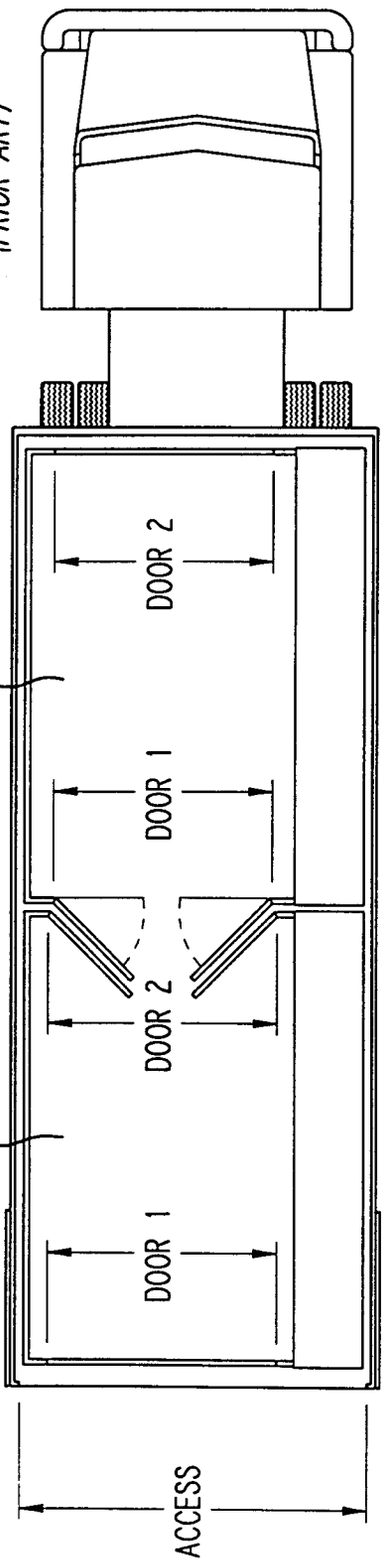


FIG. 2B.
(PRIOR ART)

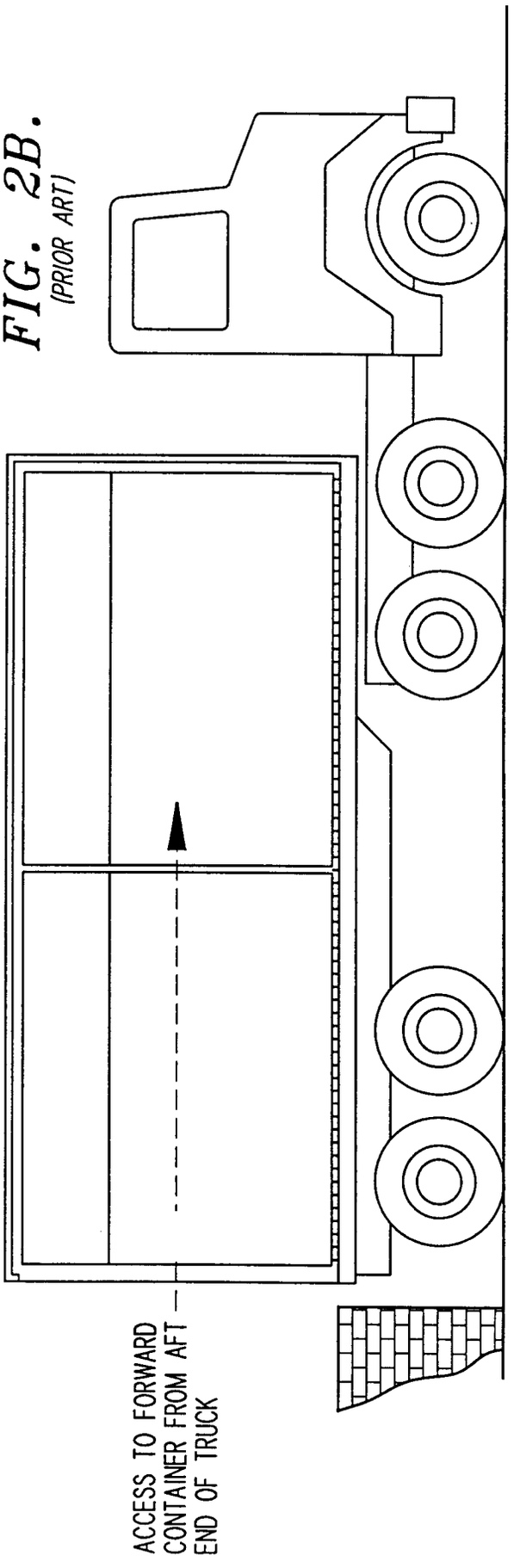
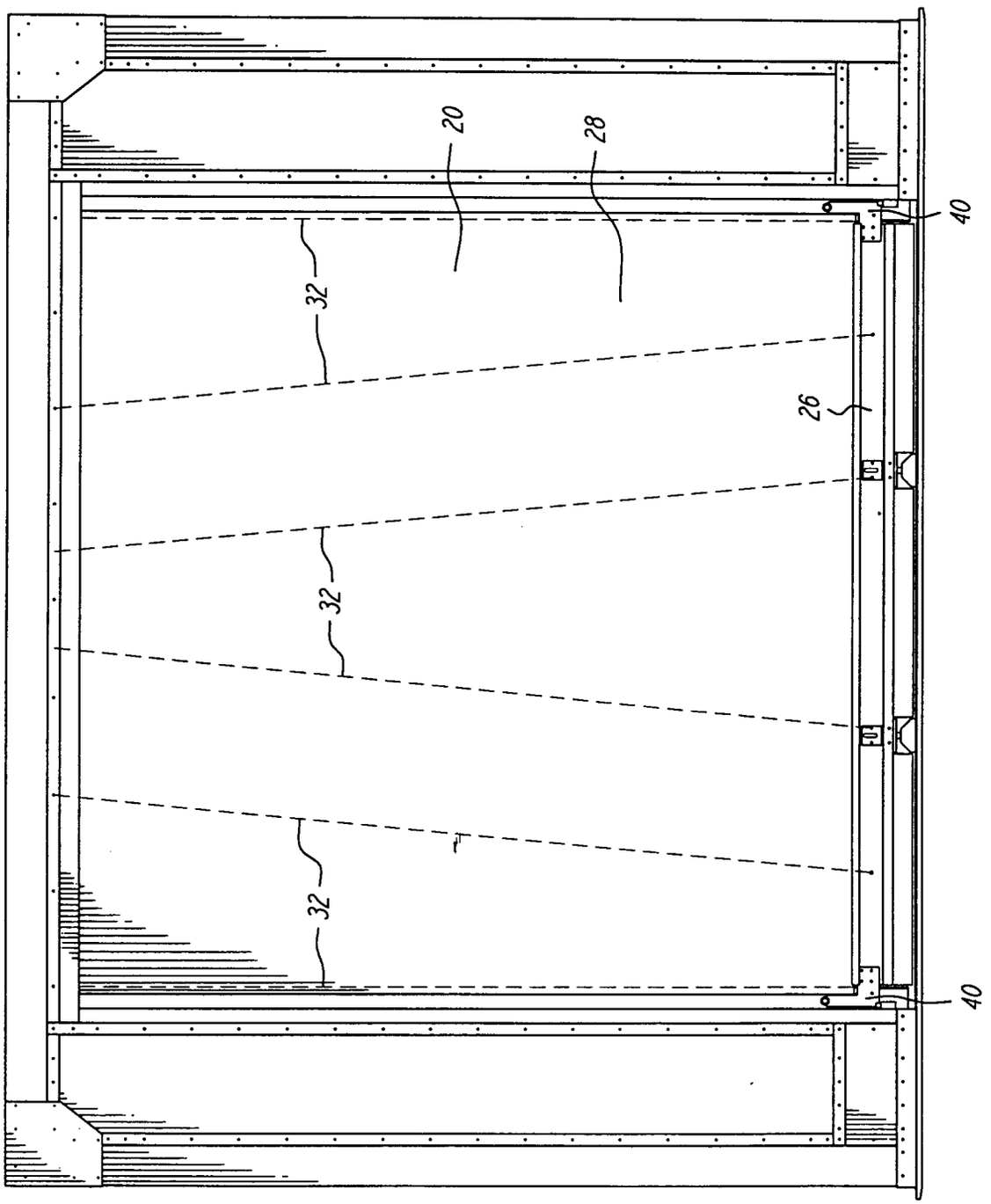


FIG. 3.



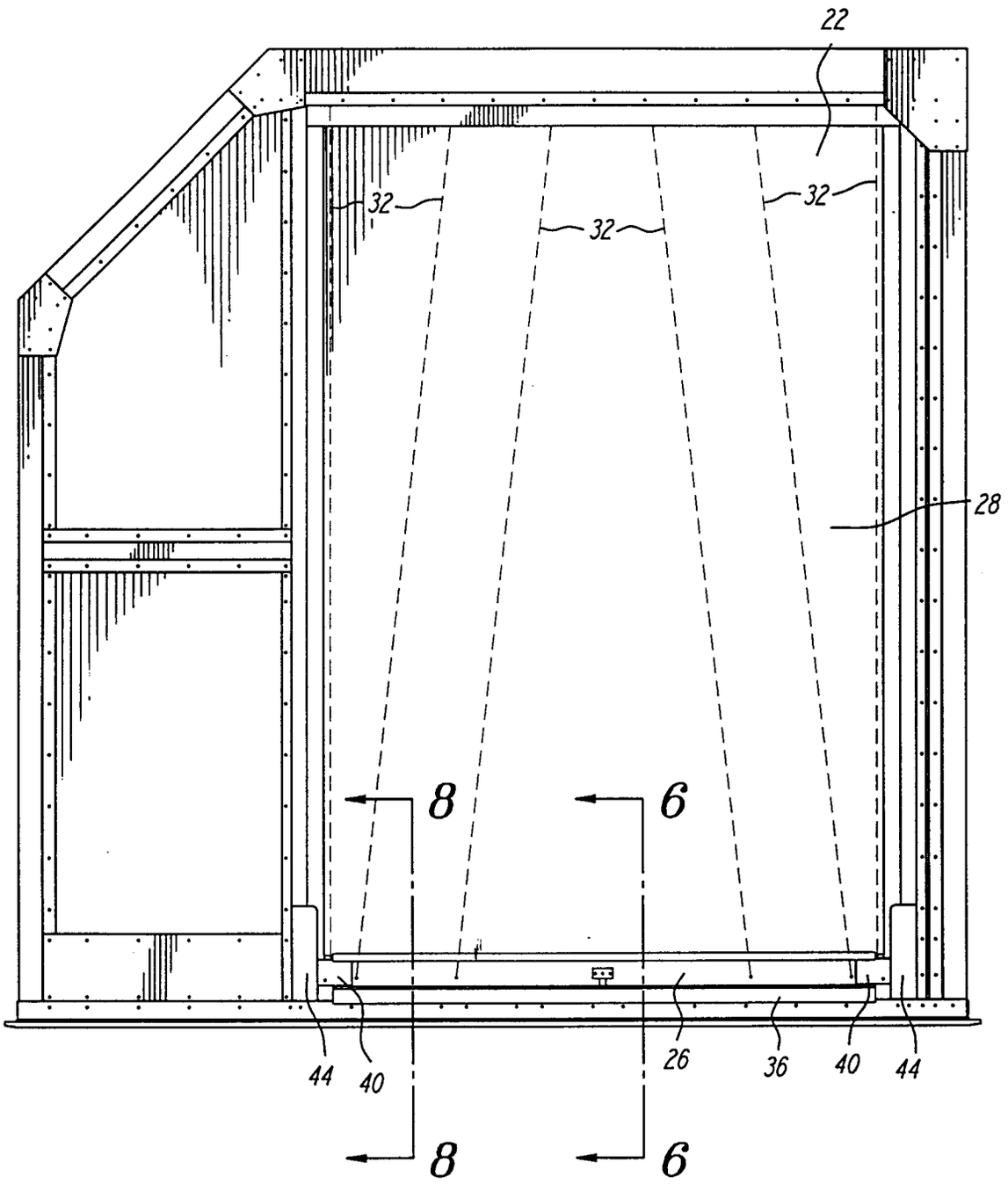


FIG. 4.

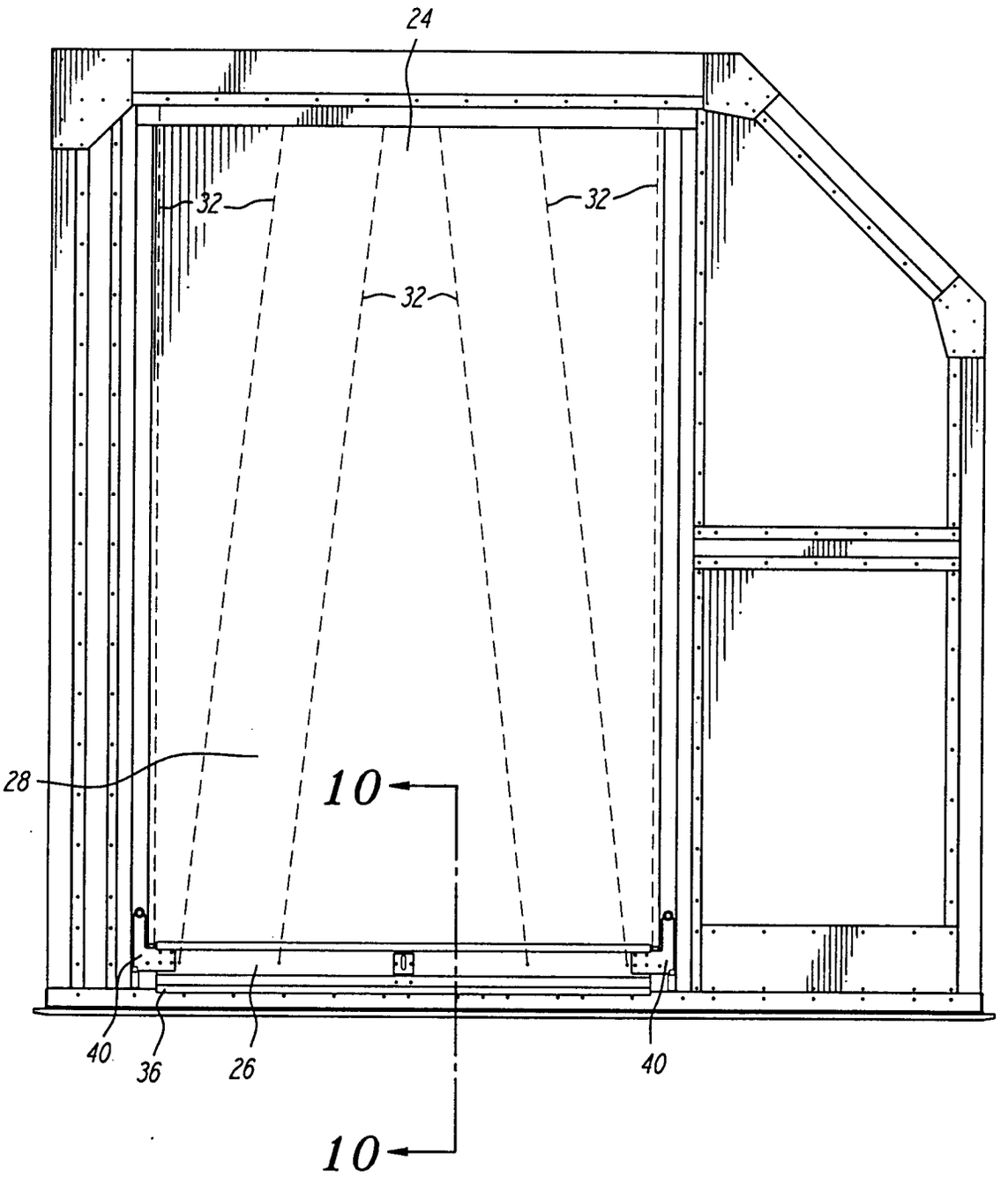


FIG. 5.

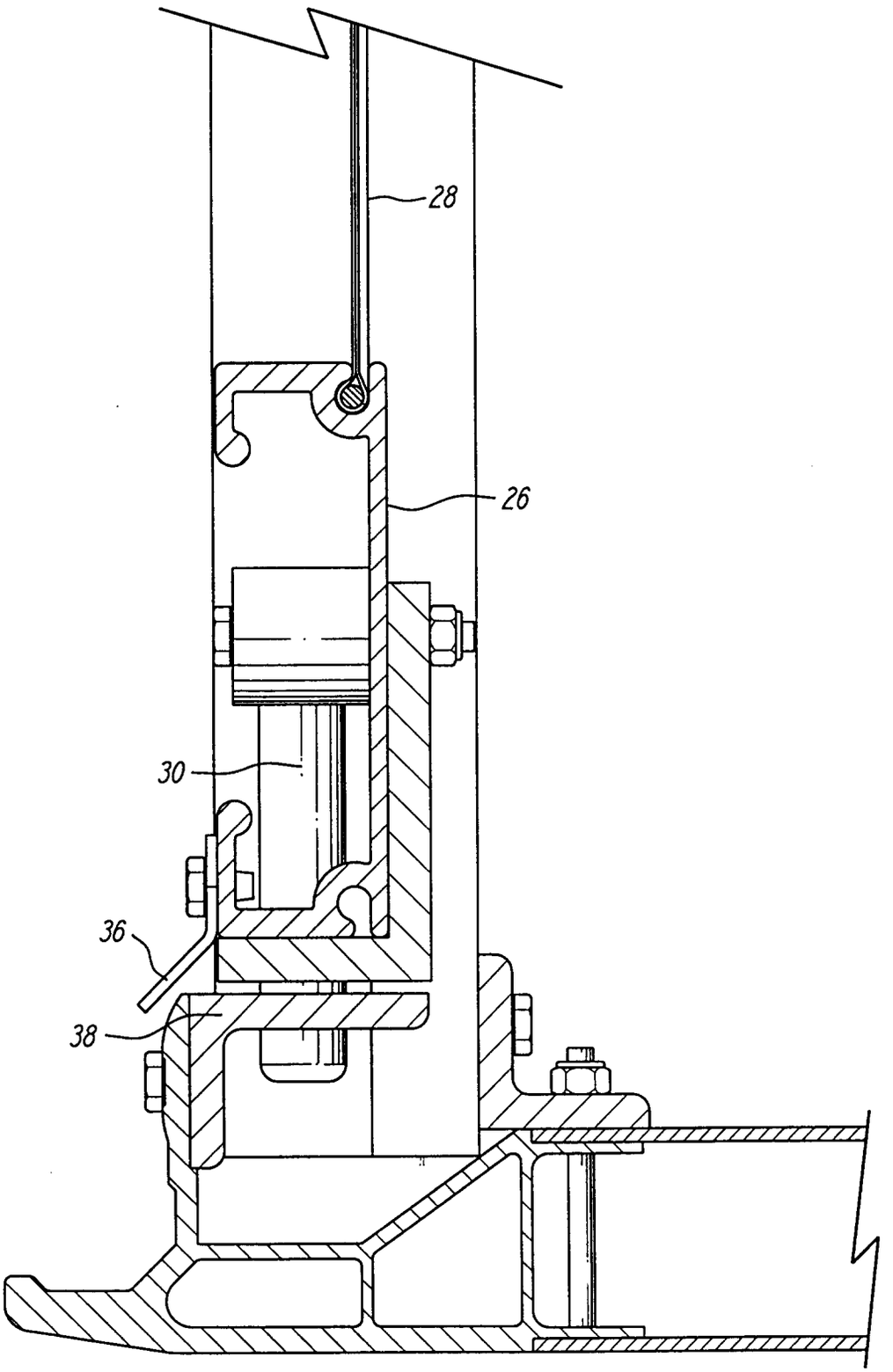


FIG. 6.

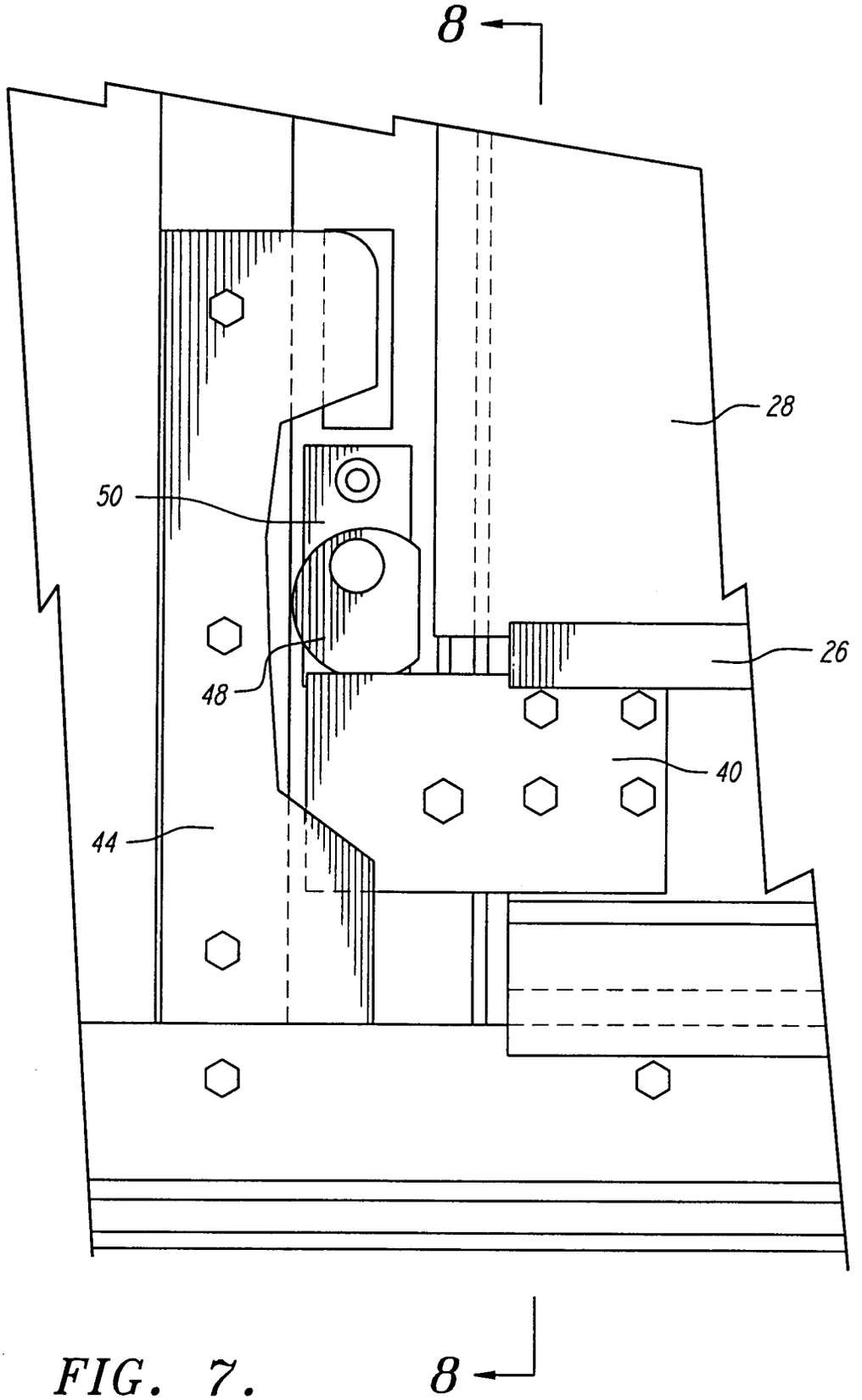


FIG. 7.

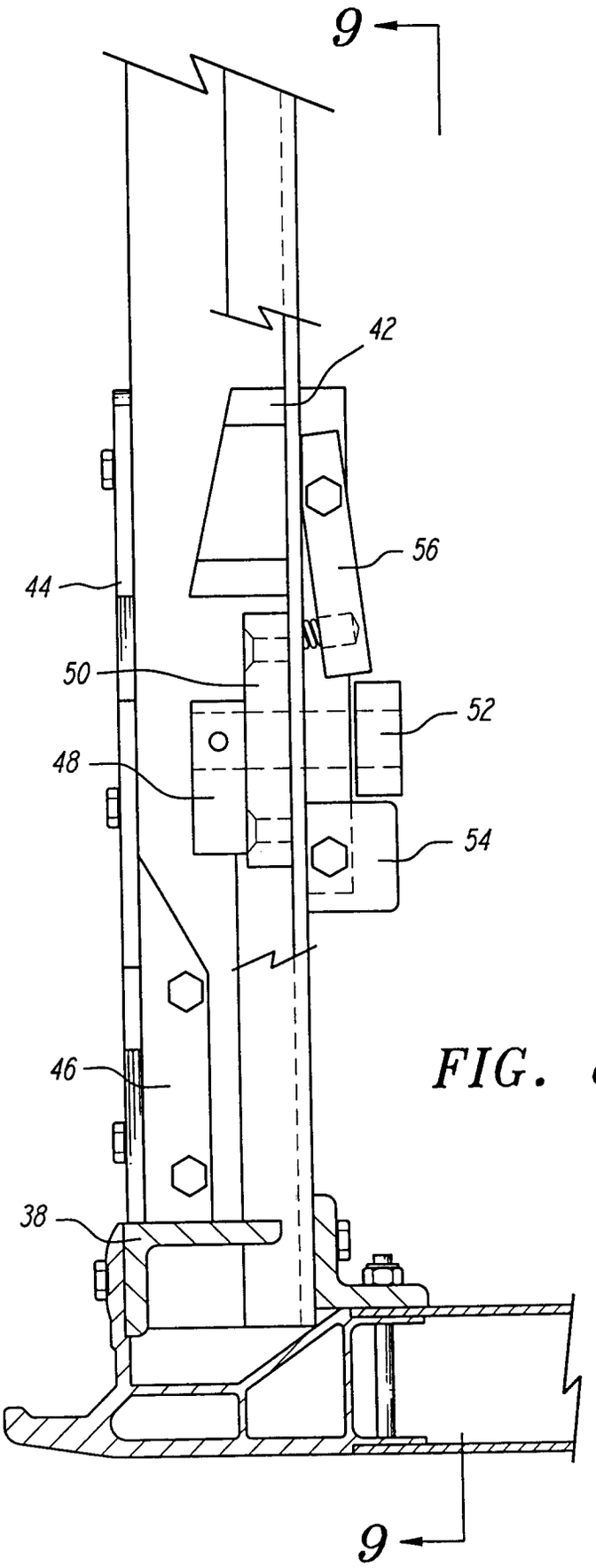


FIG. 8.

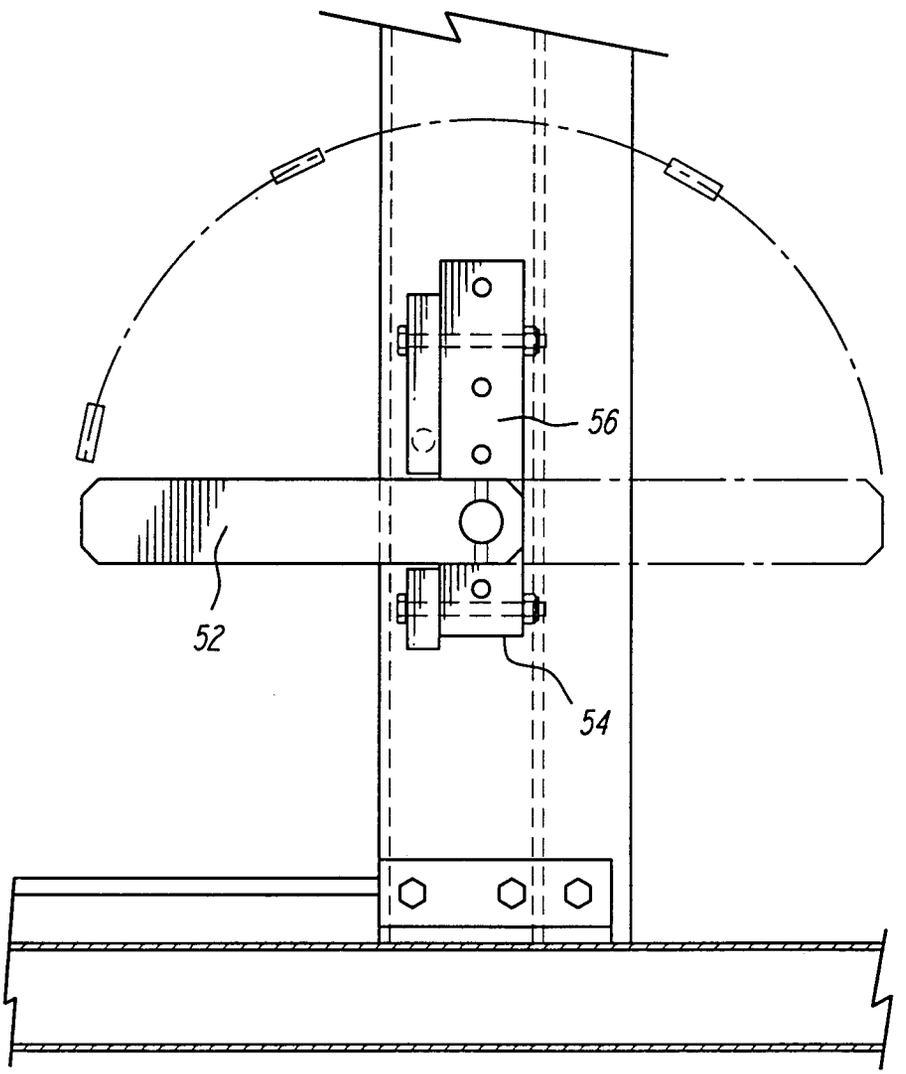


FIG. 9.

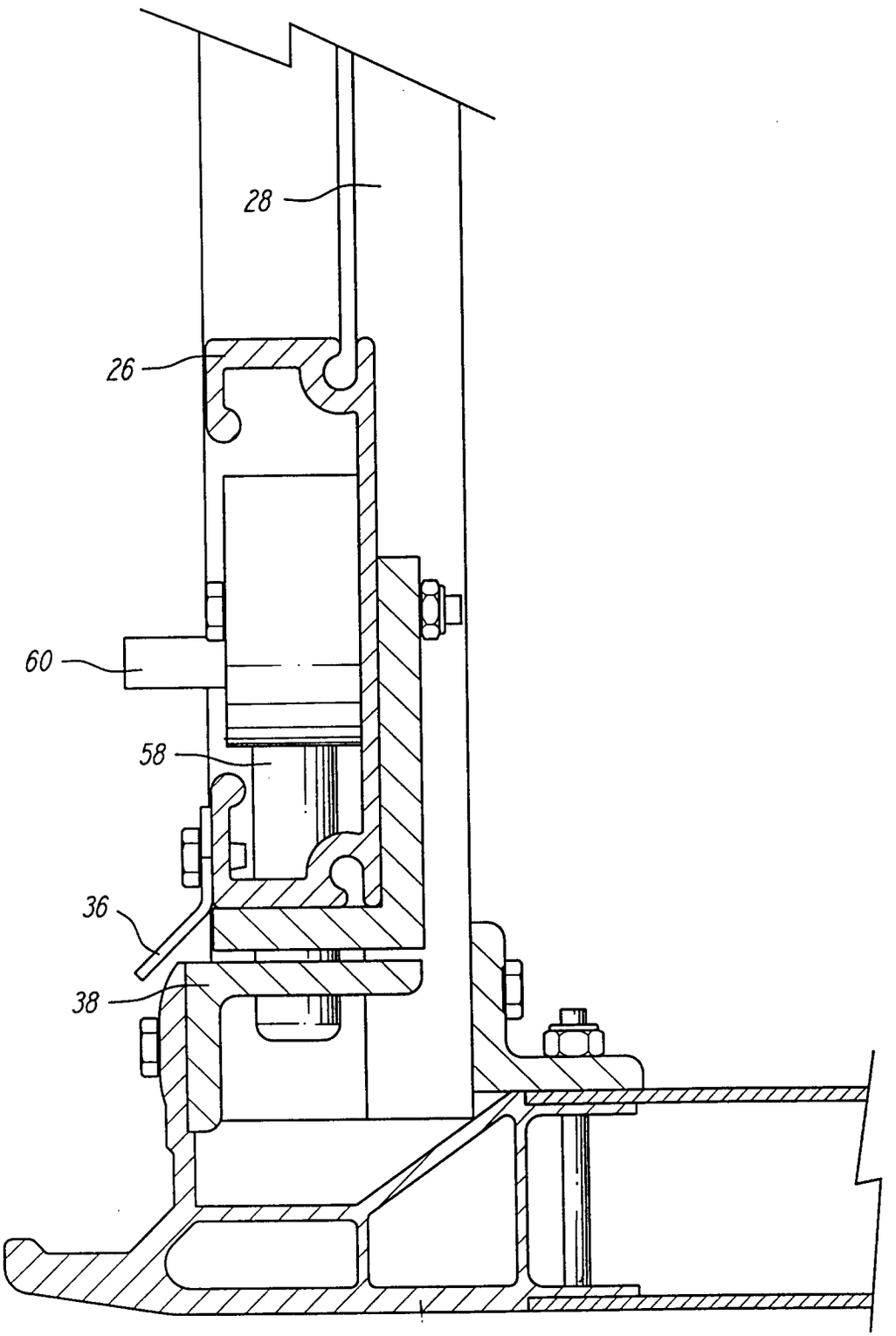


FIG. 10.

FIG. 12A.

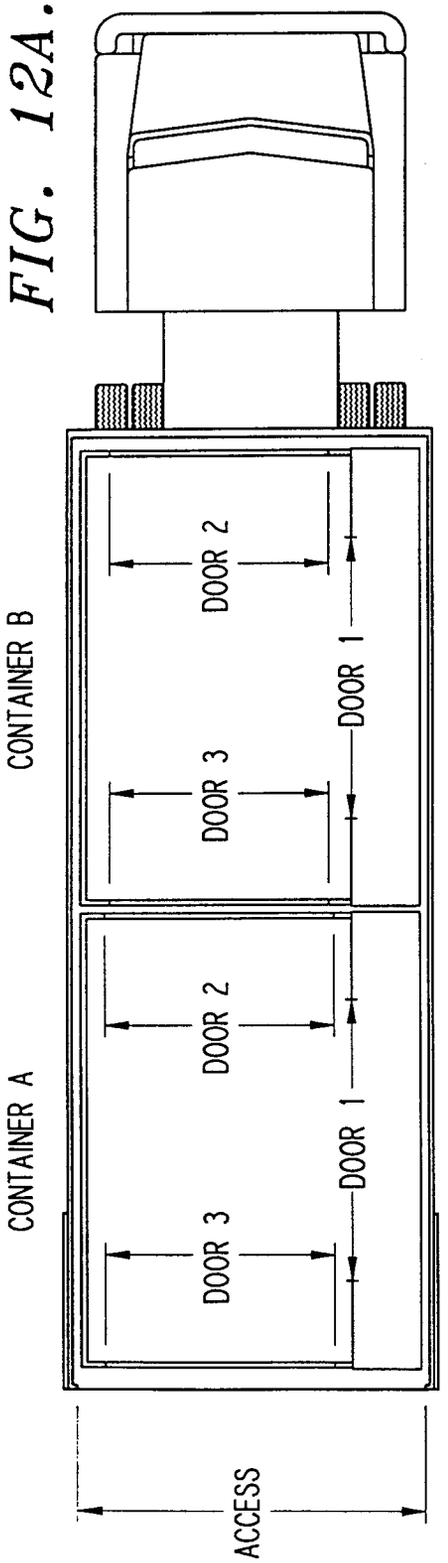
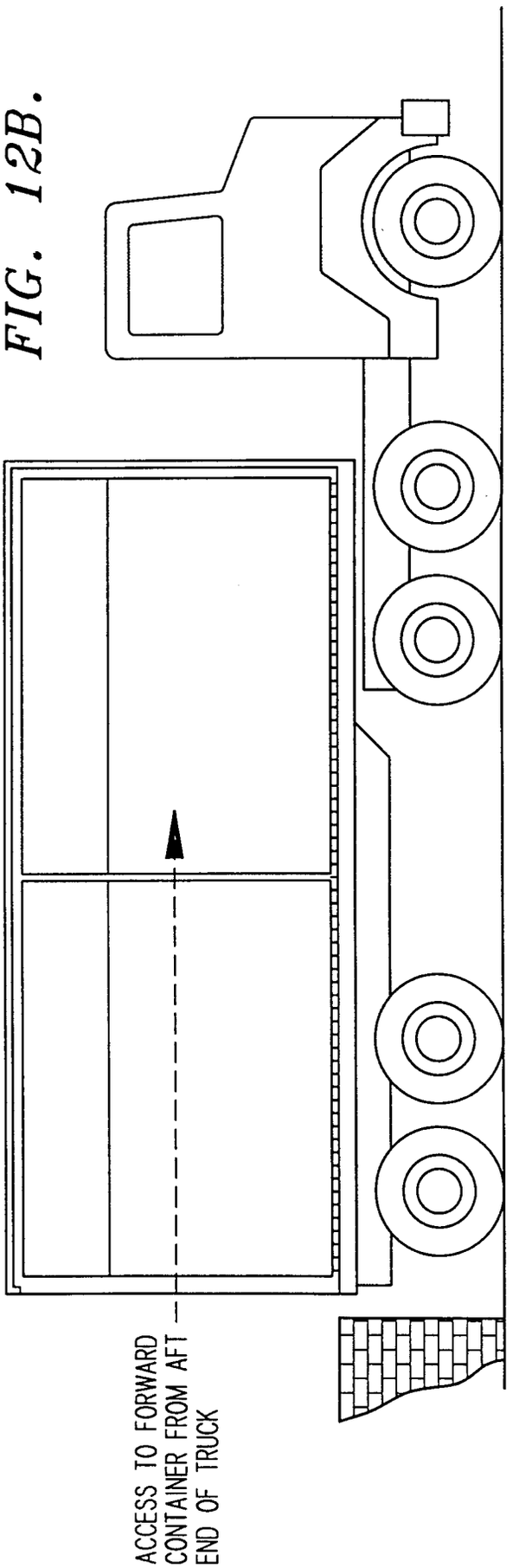


FIG. 12B.



European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 95 10 6016

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X Y	EP-A-0 541 832 (MASCHINENFABRIKEN BERNARD KRONE) * the whole document * ---	1,6 2,3,12	B65D88/02 B65D88/14 B65D90/00
Y	EP-A-0 533 626 (ALUSUISSE-LONZA SERVICES) * the whole document * -----	2,3,12	

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

B65D
E05C
E01C
E06B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	4 August 1995	Ostyn, T

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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