

Jan. 27, 1953

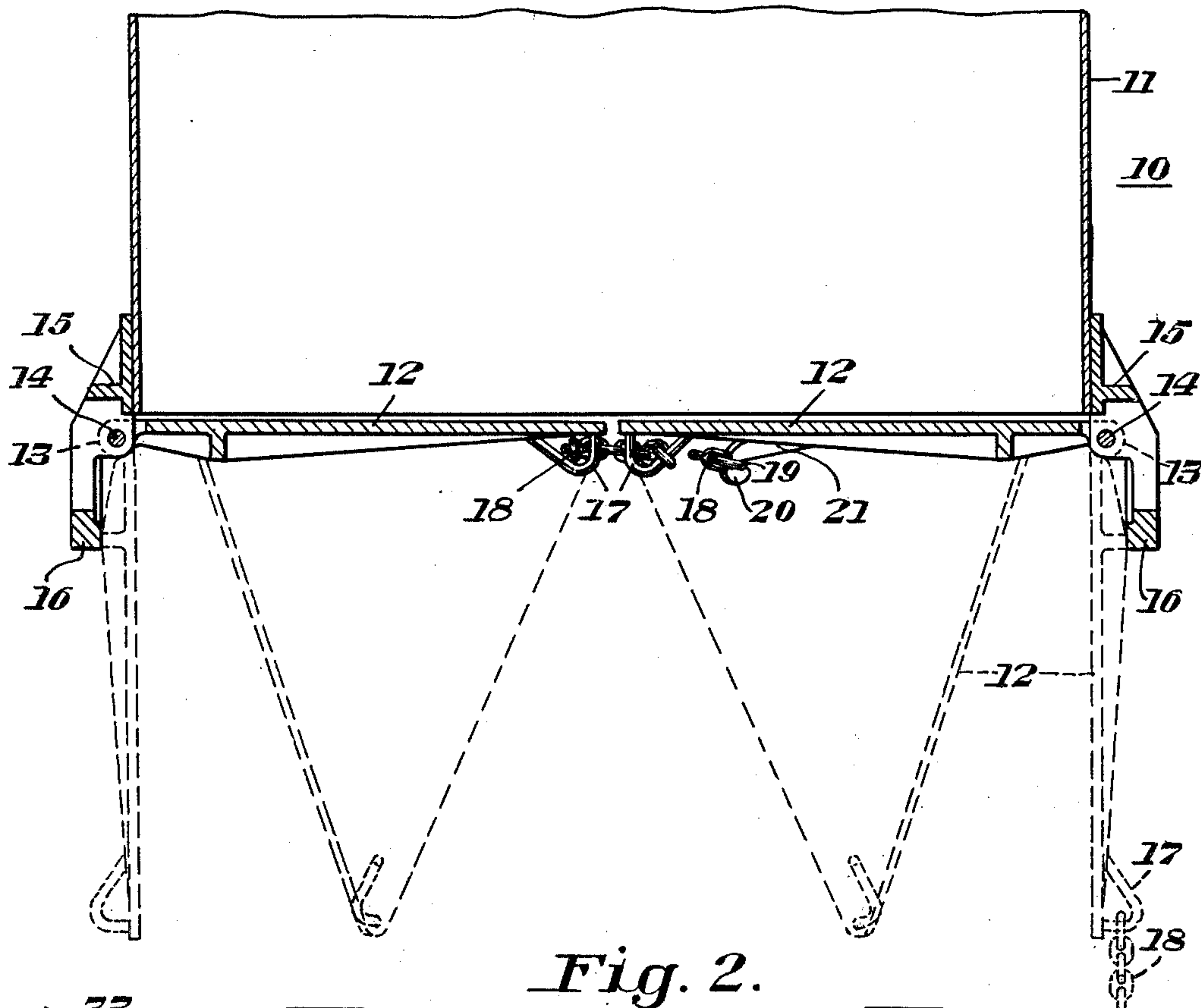
C. MORGAN  
BOTTOM-DUMP CHARGING BUCKET AND DOOR  
CLOSING MECHANISM THEREFOR

2,626,828

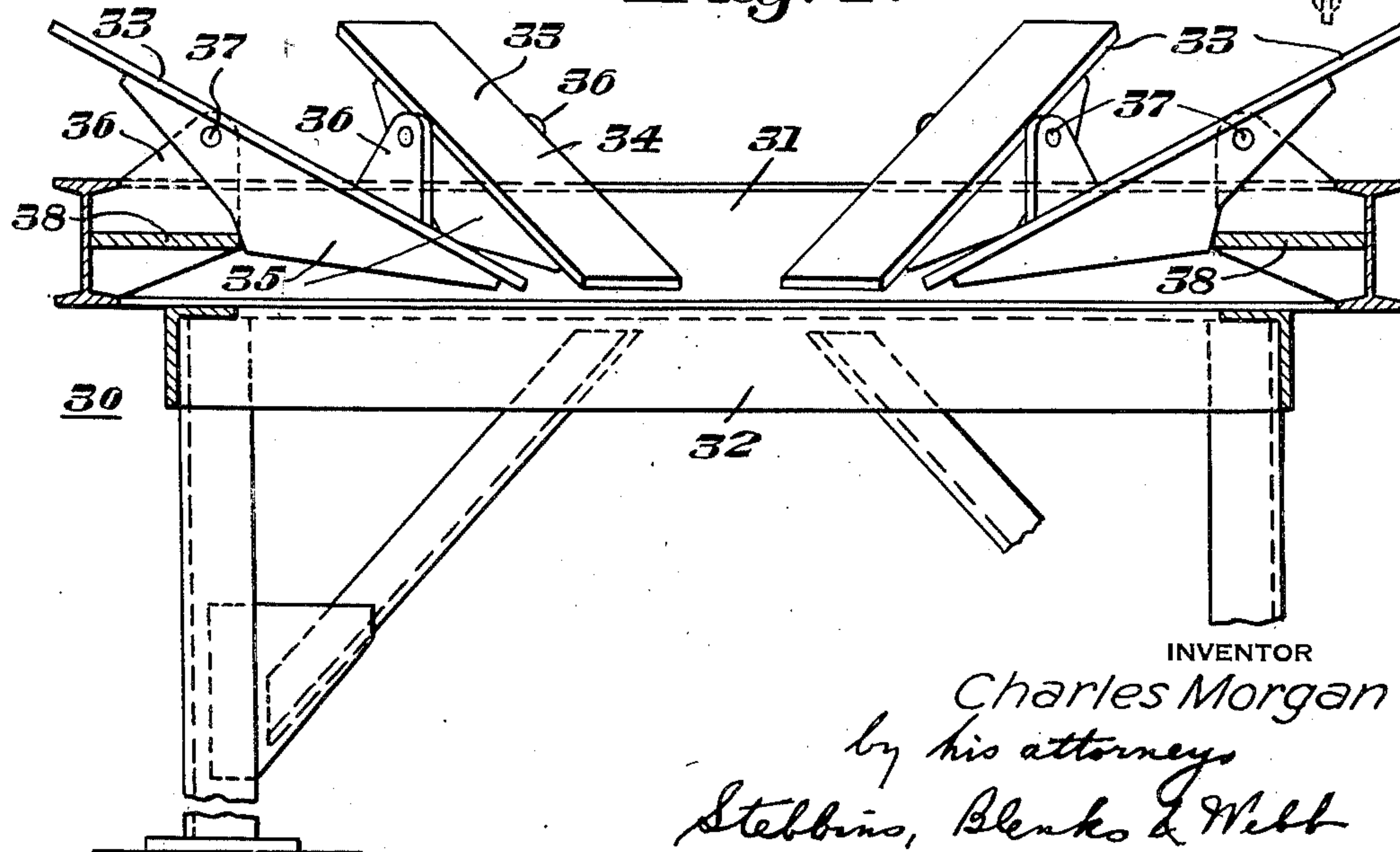
Filed Feb. 2, 1946

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*Fig. 1.*



*Fig. 2.*



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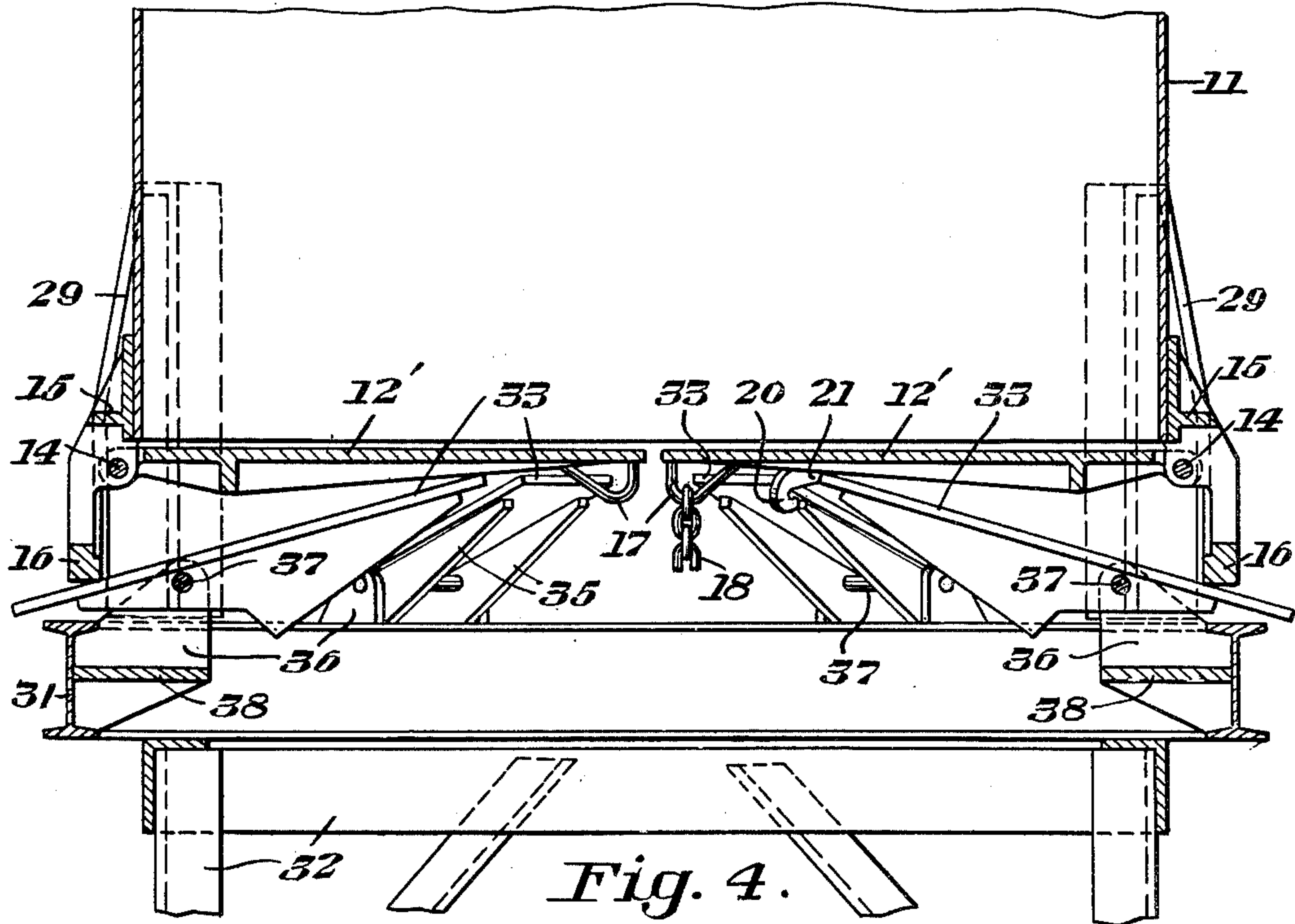
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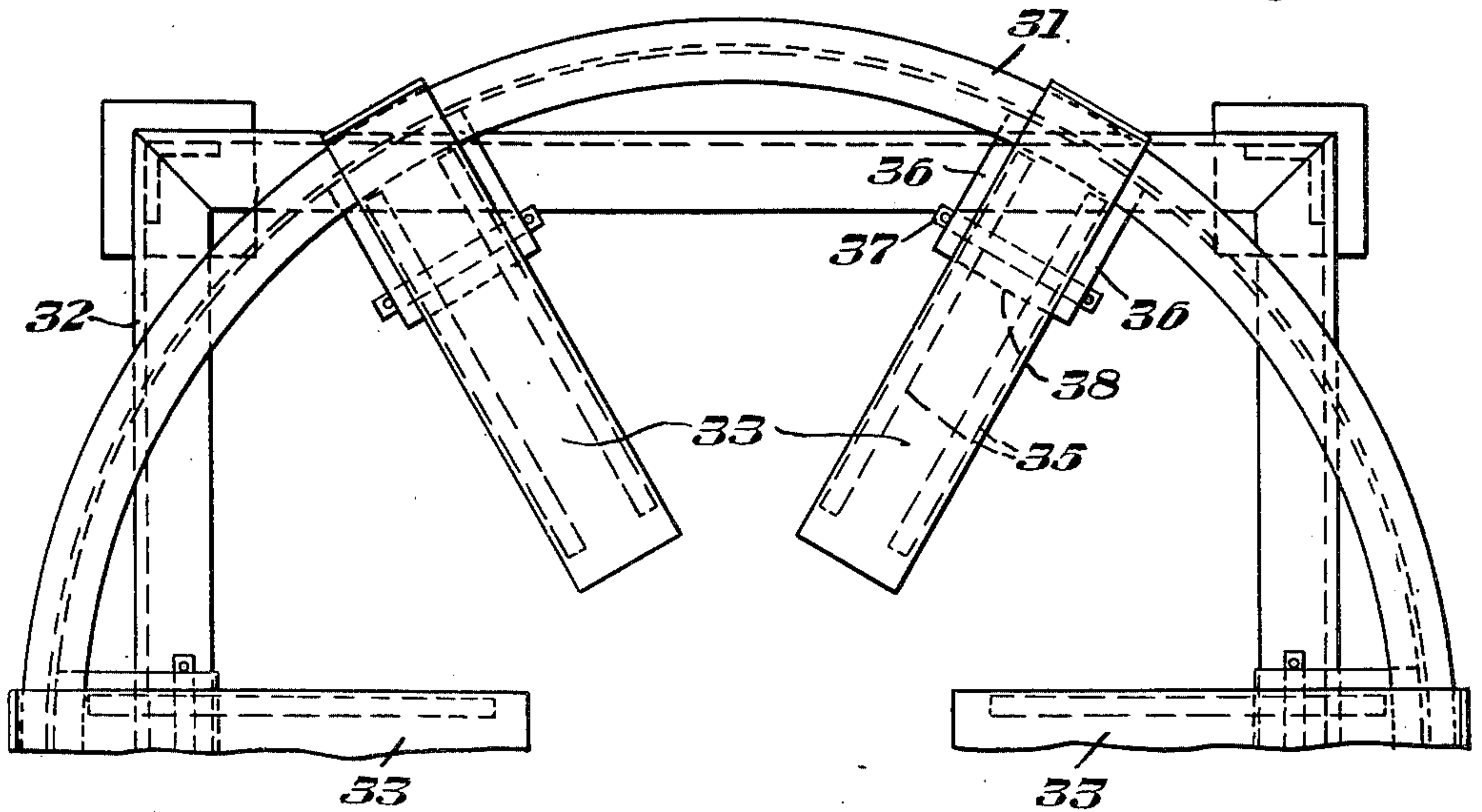
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*Fig. 3.*



*Fig. 4.*



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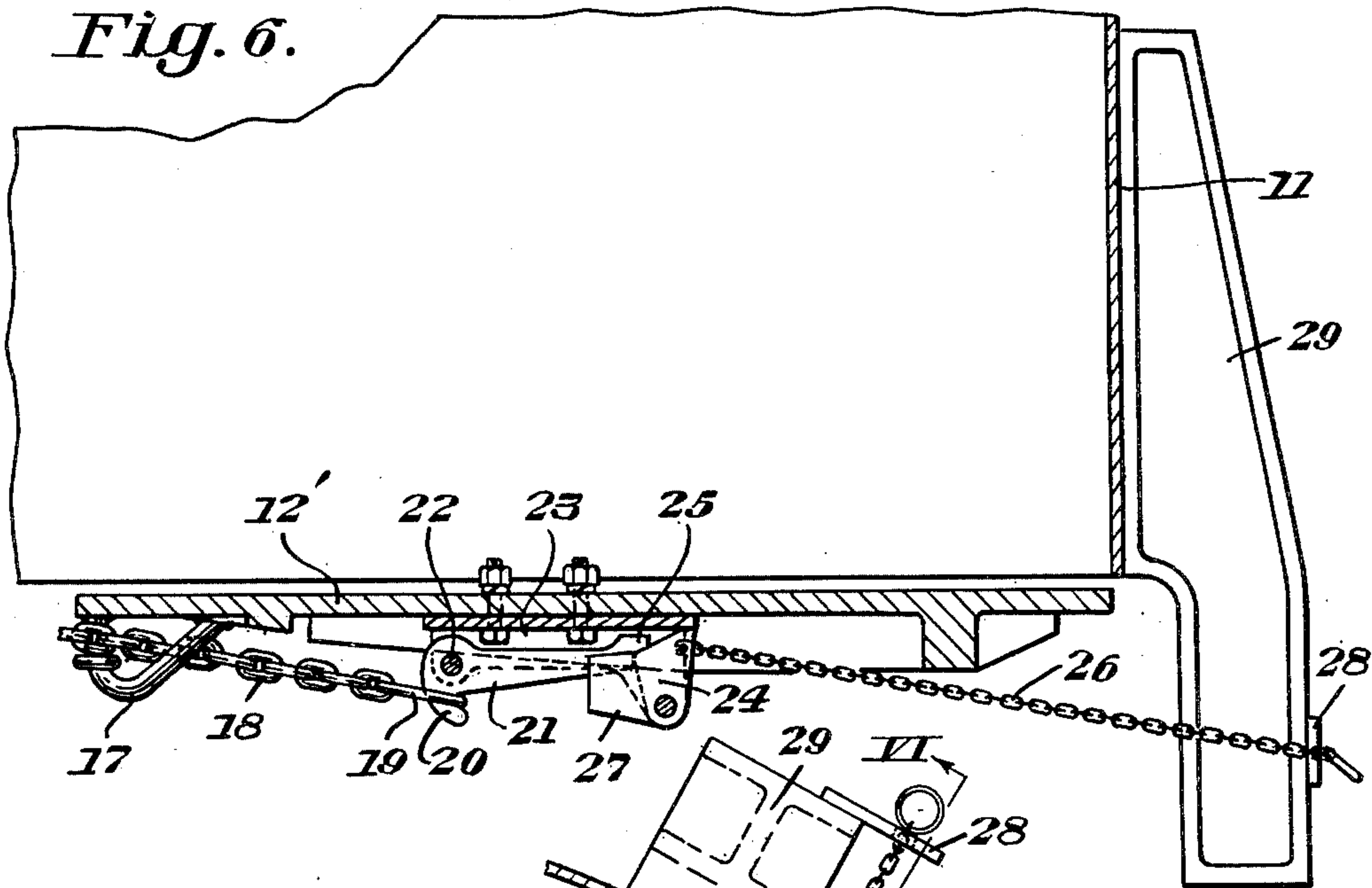
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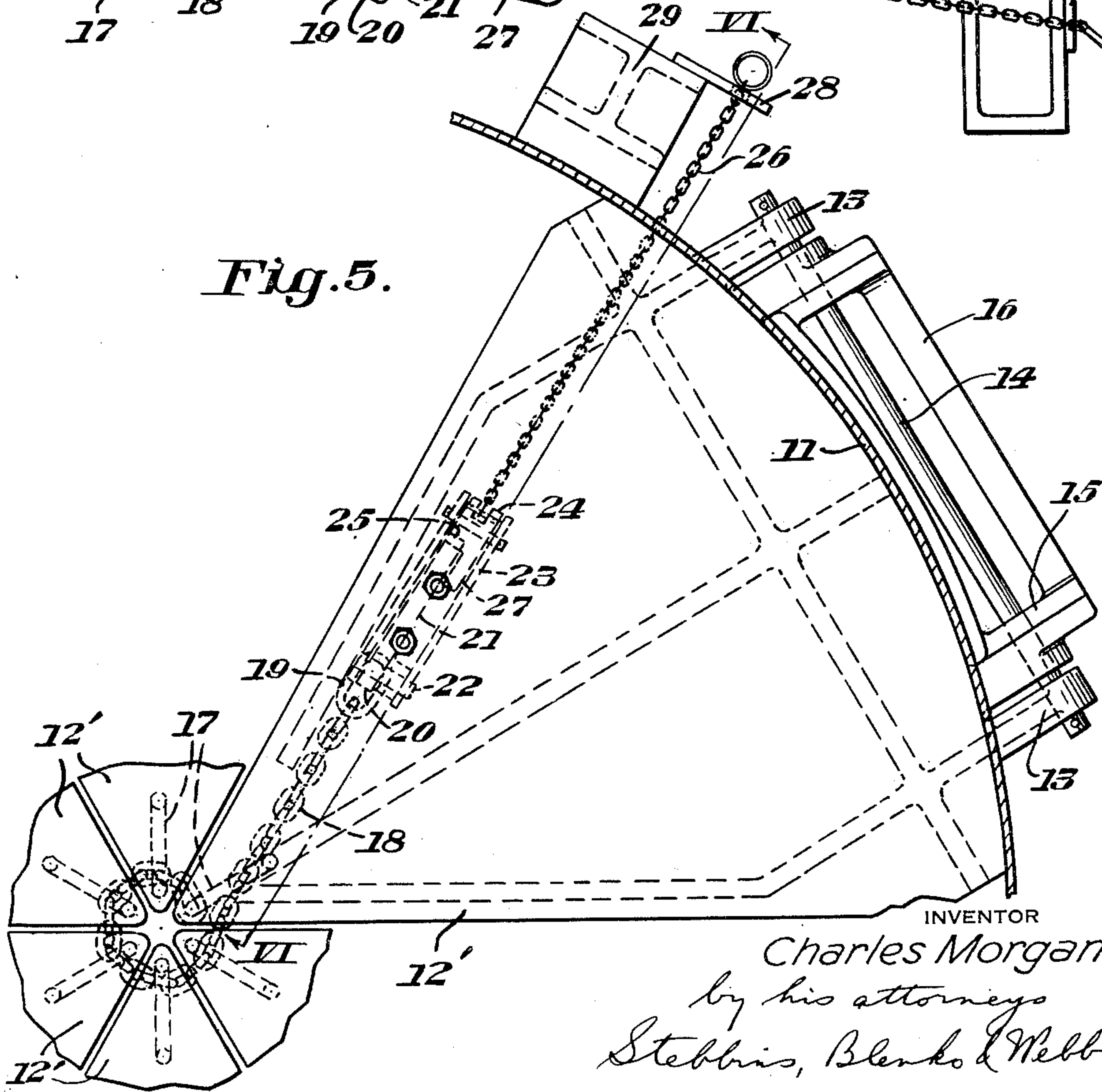
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*Fig. 6.*



*Fig. 5.*



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## UNITED STATES PATENT OFFICE

2,626,828

BOTTOM-DUMP CHARGING BUCKET AND  
DOOR CLOSING MECHANISM THEREFORCharles Morgan, Warren, Ohio, assignor to Cop-  
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Application February 2, 1946, Serial No. 645,107

6 Claims. (Cl. 294—69)

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This invention relates to a charging bucket of the bottom-dump type, including a side wall and a bottom composed of a plurality of sector plates hinged to the side wall. In particular, the invention concerns means for releasably securing the sector plates in closed position and apparatus for swinging the plates from open to closed position.

One form of door-closing mechanism and a releasable latch for a bottom-dump charging bucket is disclosed in Hicks Patent 2,350,611. It is an object of this invention to improve on the patented construction and provide a simple, effective mechanism for closing the bottom plates of a bucket and releasably securing them in closed position. Particularly, it is an object of the invention to utilize the weight of the bucket for exerting the effort necessary to close the sector plates, instead of relying on a manually applied force.

In a preferred embodiment, the invention comprises a trigger mechanism which may conveniently be mounted on one of the sector plates, for releasably holding a tension member, such as a chain, cable or the like, threaded through loops or hooks secured to the sector plates adjacent their apices. The trigger mechanism is adapted to be manually tripped when it is desired to discharge the contents of the bucket through the bottom thereof. The door-closing mechanism comprises a plurality of levers, one for each sector plate, pivoted at a point intermediate their ends and adapted to be engaged by the apices of the sector plates as the bucket is lowered. The bucket has bearing means thereon adapted to engage the outer end portions of the levers after the sector plates have been partially closed, whereby on further lowering of the bucket, the weight thereof is effective to force the sector plates into fully closed position, after which they may be secured therein by threading the tension member through the loops or hooks and setting the trigger mechanism.

A complete understanding of the invention may be obtained from the following detailed description and explanation thereof which refer to the accompanying drawings illustrating a preferred embodiment. In the drawings,

Figure 1 is a vertical central section through a bucket having the invention applied thereto;

Figure 2 is a similar view showing the door-closing mechanism;

Figure 3 is a similar view showing the relative positions of the parts when the bucket has been lowered to final position on the closing mechanism;

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Figure 4 is a partial plan view of the door-closing mechanism;

Figure 5 is a partial horizontal section through the bucket; and

Figure 6 is a partial section taken along the plane of line VI—VI of Figure 5.

Referring now in detail to the drawings, a charging bucket 10 comprises a side wall 11 generally cylindrical, provided with a suitable suspending bail (not shown). The bottom of the bucket is composed of a plurality of sector plates or doors 12. Each sector plate has ears 13. A hinge pin 14 passes through aligned holes in the ears 13 and a hinge bracket 15 secured to the side wall 11 adjacent the bottom thereof. Each bracket 15 has a downward extension providing a bearing portion 16 for a purpose which will appear shortly.

Each sector plate 12 has a loop or eye 17 adjacent its apex through which a tension member such as a chain 18 may be threaded to tie the apices of the several sector plates together, thereby holding them substantially in closed position. As shown in Figure 5, one end of the chain is permanently attached to the eye of one sector plate designated 12'. The other end of the chain has a ring 19 adapted to engage a hook end 20 formed on an arm 21 mounted below the sector plate 12'. The arm 21 is journaled on a pin 22 extending through the spaced walls of a bearing block 23 bolted to the sector plate 12'. A detent 24 is adapted to hold the arm 21 in substantially horizontal position by engagement with the notched end 25 thereof. The upper portion of the detent serves as a stop by engagement with block 23 to limit counterclockwise rotation of the detent. A chain 26 extending outwardly beyond the side wall of the bucket permits the detent to be pulled aside, thereby tripping the arm 21. The detent has an extension 27 which limits the angular movement thereof and also acts as a counterweight tending to hold it in the illustrated position. The outer end of chain 26 may conveniently pass through a hole in a plate 28 secured to one of the supporting legs 29 extending downwardly from the side wall of the bucket.

It will be apparent that when the chain 26 is pulled, the tension on the chain 18 resulting from the load on the sector plates will cause the arm 21 to rotate clockwise to a position in which the ring 19 slips off the hook portion 20. Thereafter, the sector plates are free to swing downwardly and outwardly as the free end of the chain 18 flies through the eyes or loops 17. When it is desired to reload the bucket, the sector plates



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must be returned substantially to horizontal position, the chain 18 rethreaded through the loops thereof and the arm 21 reset with the detent 24 after the ring 19 has been brought into engagement with the hook portion 20. For this purpose, I provide a door-closing mechanism shown more particularly in Figures 2, 3 and 4.

The door-closing mechanism indicated generally at 30 comprises a base ring 31 supported on a frame 32 fabricated from structural members, and radially disposed levers 33 pivotally mounted on the ring in circumferentially spaced relation. Each lever 33 comprises a top plate 34 and side plates 35. The pivotal mounting of each lever includes spaced brackets 36 extending inwardly from the ring 31 and a shaft 37 extending through aligned holes in the brackets and side plates 35. A stop plate 38 extends inwardly from the ring 31 between the brackets 36 to engage the edges of the side plates 35 and hold the lever in inwardly down-tilted position. The pivot point of the lever is intermediate its ends and remote from both but nearer the outer than the inner end whereby the inner end tends to descend by gravity until the side plates 35 engage the stop plate 38.

When the bucket has been dumped, the sector plates forming the bottom take the positions shown in dotted lines in Figure 1. The downward extensions 16 on the brackets 15 serve as stops to limit the outward movement of the sector plates. To close the sector plates, the bucket is suspended over the door-closing mechanism 30 with the apex of each sector plate aligned with the outer end of one of the levers 33 as illustrated in Figures 1 and 2. The bucket is then lowered until the apices of the sector plates strike the top plate 33 of the levers. Because of the down-tilted position of the latter, the sector plates start to close as their apices slide down the top plates of the levers. After the bucket has been lowered a predetermined amount, the downward extensions 16 on the hinge brackets 15 engage the outer ends of the levers 33 as shown in Figure 3 and the weight of the bucket as it continues to be lowered thereupon becomes effective to swing the levers 33 upwardly, thus bringing the sector plates to substantially horizontally position. With the sector plates held horizontal, it is a simple matter to thread the chain 18 through the loops 17 of the several plates by hand and secure the free end thereof to the hook portion 20 of the pivoted arm 21. The bucket may thereupon be lifted from the door-closing mechanism and moved to the desired point for refilling. The levers 33, of course, descend to the positions illustrated in Figure 2, as the bucket is lifted therefrom. The legs 29 limit the downward movement of the bucket when it is placed on the door-closing mechanism by engagement with the ring 31 and also serve to support the bucket when it is set down elsewhere.

It will be apparent from the foregoing that the trigger mechanism disclosed herein for releasably securing the end of the chain holding the sector plates in closed position is characterized by simplicity in construction and effectiveness in operation. The pivoted arm to the hook end of which the chain is attached is safely held in latched position by the detent 24 at all times, regardless of the impact of material dumped into the bucket, thus guarding against accidental opening of the bucket. At the same time, the sector plates are immediately released when the detent 24 is shifted by pulling on the chain 26.

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The resetting of the chain-holding mechanism, furthermore, may be effected easily and quickly.

The door-closing mechanism is particularly advantageous in that it utilizes the weight of the bucket to apply to the sector plates the force necessary to close them, thus obviating any manual effort except that involved in threading the chain through the sector loops. The closing mechanism, furthermore, is simple and rugged in construction and requires no special care or attention. In fact, the only precaution to be observed is in respect to the approximate alignment of the apices of the sector plates with the several tilting levers before lowering the bucket onto the closing mechanism.

Although I have illustrated and described herein but a preferred embodiment of the invention, it will be recognized that changes in the details of construction disclosed may be made without departing from the spirit of the invention or the scope of the appended claims.

I claim:

1. In a door latching mechanism for a bottom-dump charging bucket or the like, in combination, a rotatable arm pivotally connected to the bottom of said charging bucket or the like, a hook portion on said arm adapted to be engaged by a tension member tending to rotate said arm in a direction to release said tension member, and a detent pivotally connected to said bottom adjacent another portion of said arm, said detent being movable into latched position with said other portion of said arm between said detent and said bottom, and an extension on said detent to engage said bottom to prevent said arm from forcing said detent out of said latched position.

2. In a door latching mechanism for a bottom-dump charging bucket or the like, in combination, a rotatable arm pivoted to the bottom of said charging bucket or the like, a hook portion on one extension of said arm adapted to be engaged by a tension member of said charging bucket or the like, a latch portion on another extension of said arm extending generally close to said bottom, and a detent connected to said bottom adjacent the end of said latch portion away from said pivot and adapted to be movable into and out of latching position relative to said latch portion, said pivot being positioned intermediate said hook portion and said latch portion.

3. In a door latching mechanism for a bottom-dump charging bucket or the like, in combination, a rotatable arm pivoted to the bottom of said charging bucket or the like, a hook portion on one extension of said arm adapted to be engaged by a tension member of said charging bucket or the like, a latch portion on another extension of said arm extending generally close to said bottom, a detent connected to said bottom adjacent the end of said latch portion away from said pivot and adapted to be movable into and out of latching position relative to said latch portion, said pivot being positioned intermediate said hook portion and said latch portion, and means for normally maintaining said detent in latch portion engaging position.

4. In a door latching mechanism for a bottom-dump charging bucket or the like, in combination, an arm pivotally connected to the bottom of said charging bucket or the like and adapted to have limited rotation between latching and unlatching positions, a hook portion on one extension of said arm adapted to be engaged by a tension member of said charging bucket or the like, a latching portion on another extension of



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said arm extending generally close to said bottom, and a detent pivotally connected to said bottom adjacent said latch portion and adapted to have a limited rotation to move it into and out of latching position relative to said latch portion, said latch portion and said detent being so mounted as to turn substantially in the same direction during unlatching.

5. In a door latching mechanism for a bottom-dump charging bucket or the like having sector plate doors and a flexible tension member to hold said doors closed when looped around the apices thereof, in combination, an arm pivotally connected to the bottom of one of said sector plate doors by a generally horizontal pivot pin for limited rotation between latching and unlatching positions, a hook portion on one extension of said arm adapted to be engaged by said tension member, a latching portion on another extension of said arm extending generally close to the bottom of said sector plate door, said latching portion being longer than said hook portion, a detent pivotally connected by a generally horizontal pivot pin to the bottom of said sector plate door adjacent the end of said latch portion away from said pivot pin for limited rotation into and out of latching position relative to said end, said end and said detent in latching position being in toggle joint relation under the pull of said tension member urging said end away from the bottom of said sector plate door.

6. In a door latching mechanism for a bottom-dump charging bucket or the like having sector plate doors and a flexible tension member to hold said doors closed when looped around the apices thereof, in combination, an arm pivotally con-

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nected to the bottom of one of said sector plate doors by a generally horizontal pivot pin for limited rotation between latching and unlatching positions, a hook portion on one extension of said arm adapted to be engaged by said tension member, a latching portion on another extension of said arm extending generally close to the bottom of said sector plate door, said latching portion being longer than said hook portion, a detent pivotally connected by a generally horizontal pivot pin to the bottom of said sector plate door adjacent the end of said latch portion away from said pivot pin for limited rotation into and out of latching position relative to said end, gravity means to maintain said detent in its latching position, and means extending parallel to said bottom of said sector plate door to the side of said bucket for moving said detent to unlatching position.

CHARLES MORGAN.

#### REFERENCES CITED

The following references are of record in the file of this patent:

#### UNITED STATES PATENTS

Number	Name	Date
537,258	Wilcox	Apr. 9, 1895
1,490,874	Webb	Apr. 15, 1924
1,563,949	Baker	Dec. 1, 1925
2,163,386	Sweitzer	June 20, 1938
2,228,060	Lescher et al.	Jan. 7, 1941
2,338,617	Baker	Jan. 4, 1944
2,350,611	Hicks	June 6, 1944
2,387,457	McIlwrick et al.	Oct. 23, 1945