

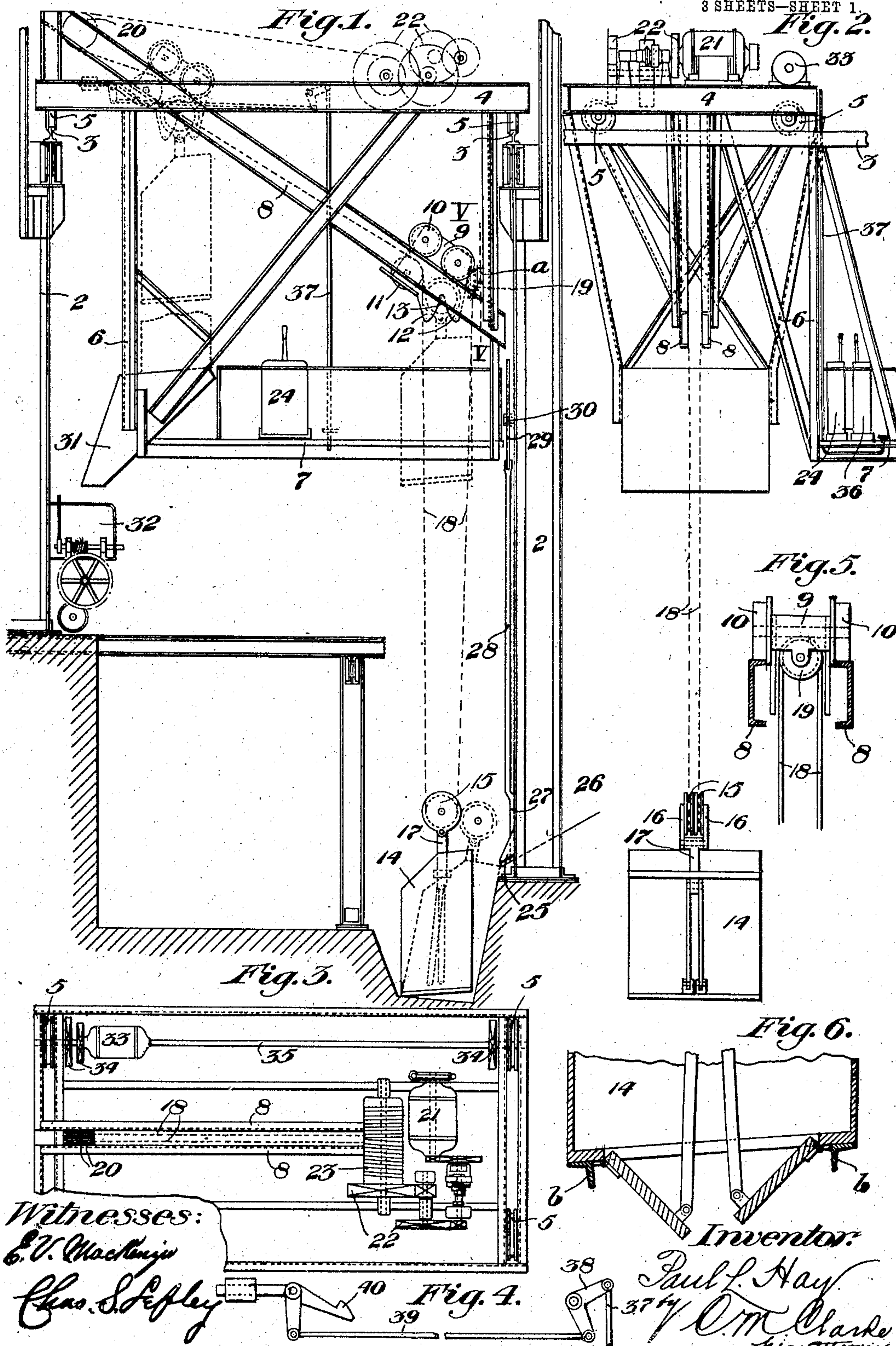
No. 789,974.

PATENTED MAY 16, 1905.

P. L. HAY.  
APPARATUS FOR HANDLING LOOSE MATERIAL.

APPLICATION FILED APR. 16, 1904.

3 SHEETS—SHEET 1.



Witnesses:

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Chas. S. Sefley

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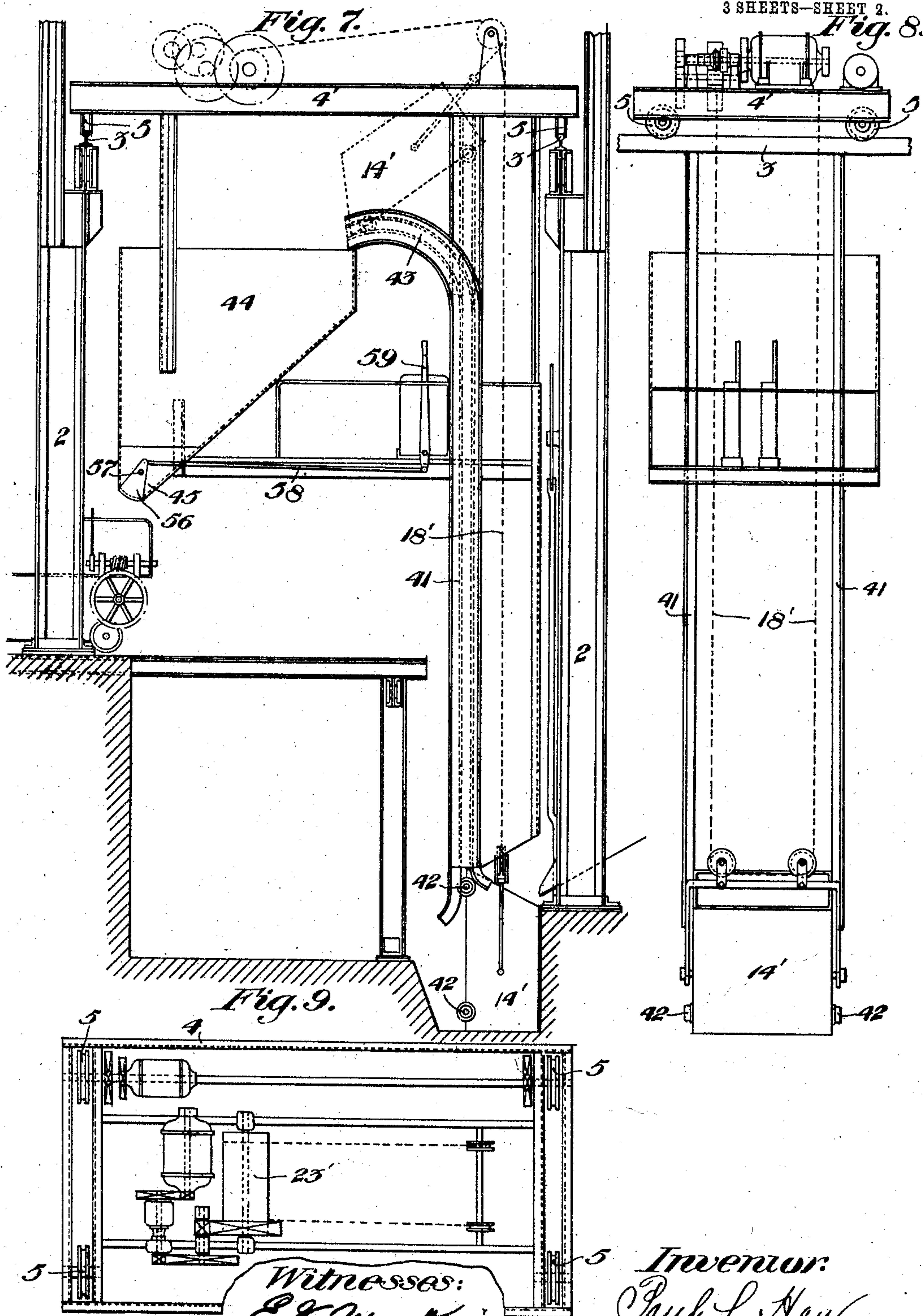
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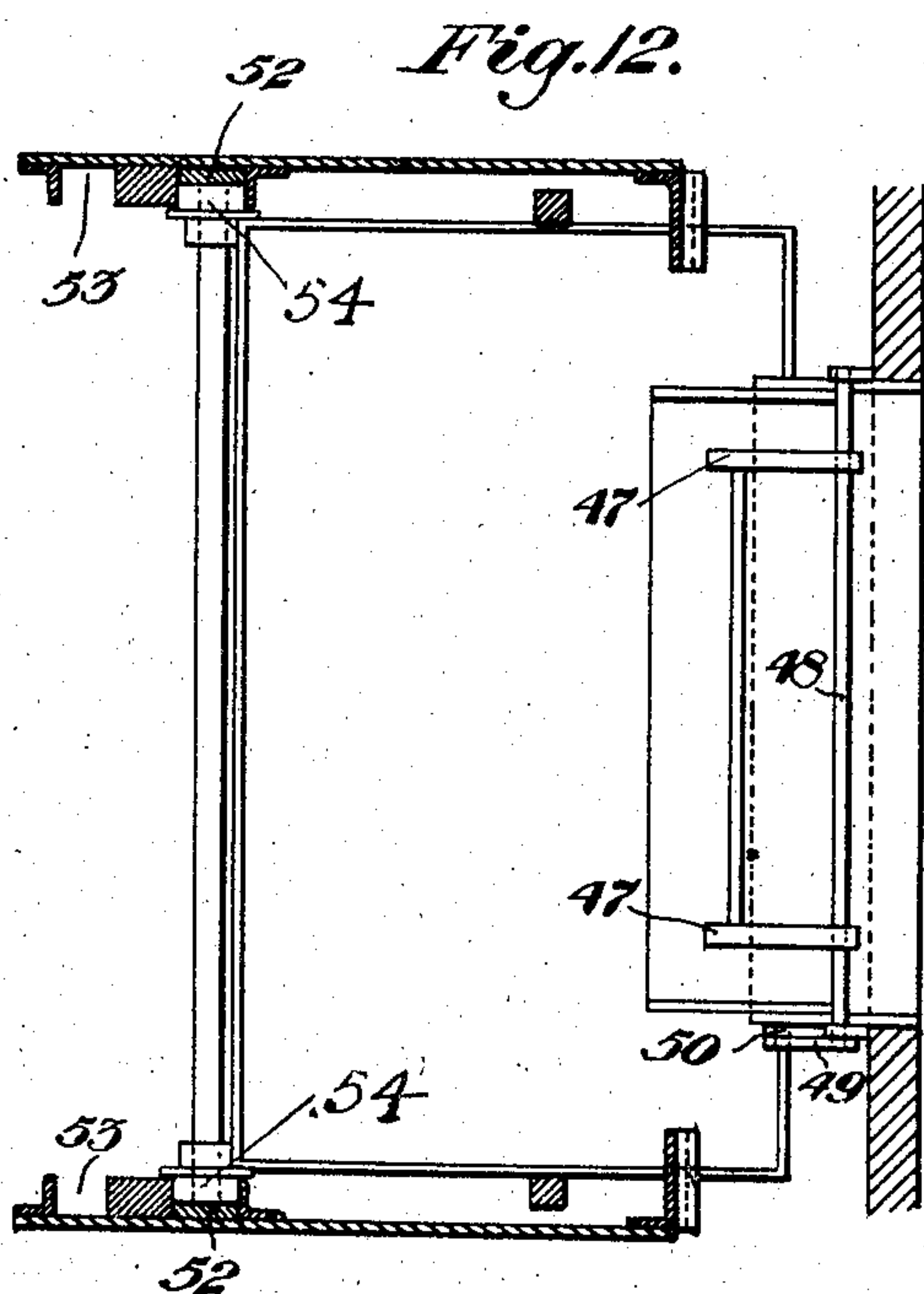
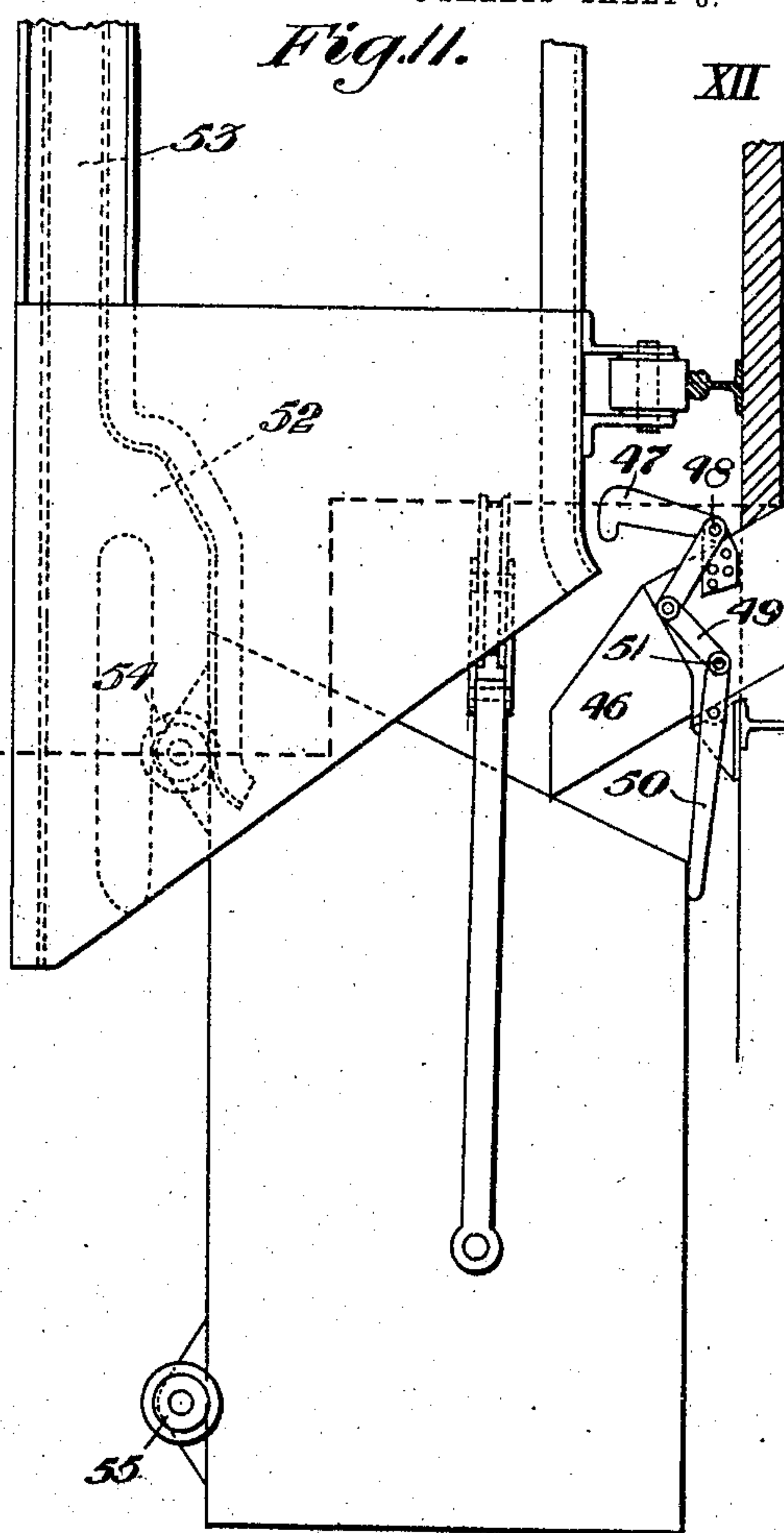
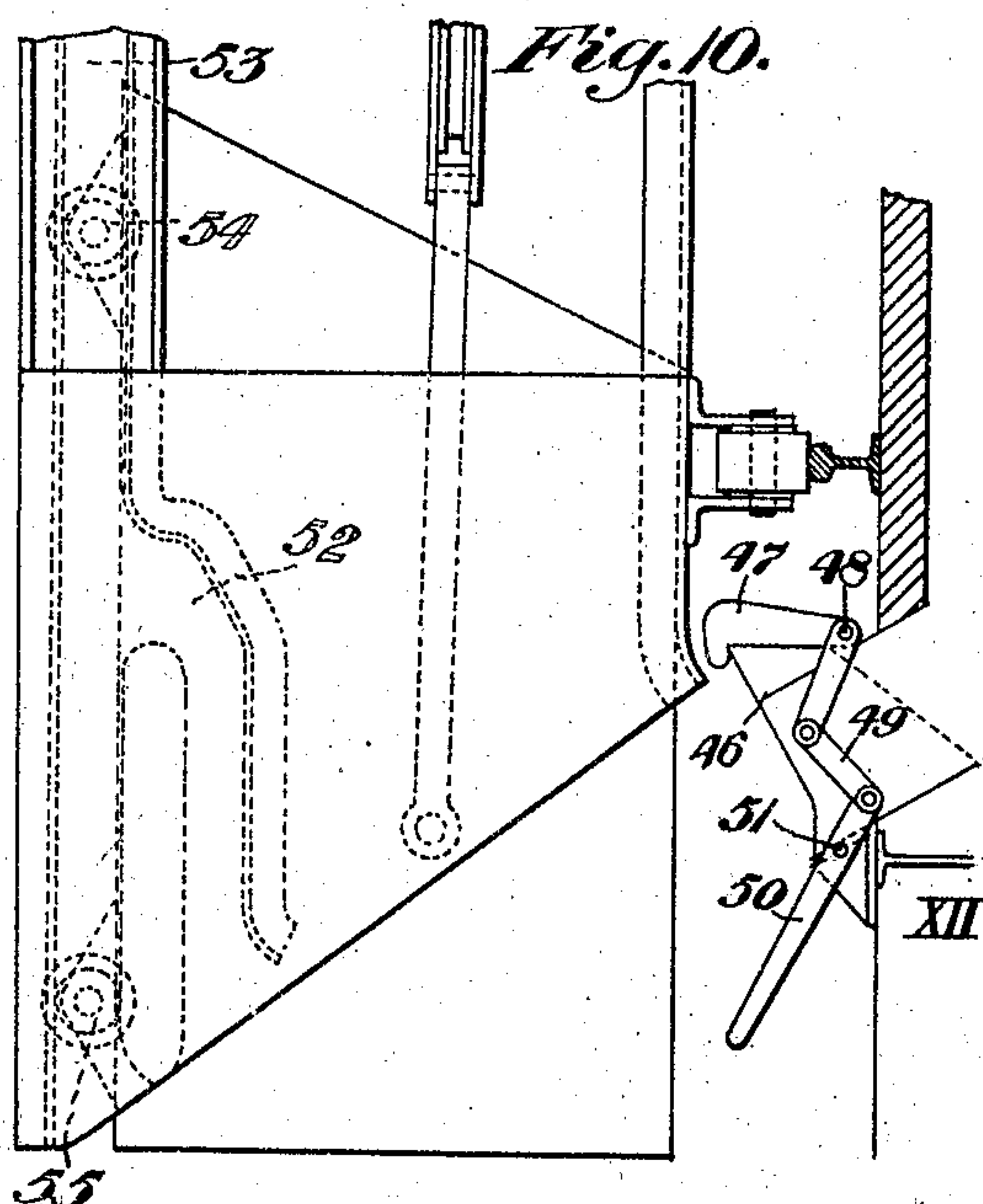
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3 SHEETS—SHEET 3.



Witnesses:  
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# UNITED STATES PATENT OFFICE.

PAUL L. HAY, OF PITTSBURG, PENNSYLVANIA.

## APPARATUS FOR HANDLING LOOSE MATERIAL.

SPECIFICATION forming part of Letters Patent No. 789,974, dated May 16, 1905.

Application filed April 16, 1904. Serial No. 203,421.

*To all whom it may concern:*

Be it known that I, PAUL L. HAY, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Apparatus for Handling Loose Material, of which the following is a specification, reference being had therein to the accompanying drawings, forming part of this specification, in which—

Figure 1 is an end elevation of my improved coal-handling apparatus incorporated with the structural framing of a plant and arranged in operative relation to a coal-bunker and a furnace-stoker. Fig. 2 is a side elevation looking toward the stoker. Fig. 3 is a plan view of the top of the carriage, showing the motors and gearing. Fig. 4 is a detail view of the trolley-lock. Fig. 5 is a cross-section on the line V V of Fig. 1. Fig. 6 is a partial sectional detail view of the bucket, showing the drop-bottom. Fig. 7 is an end elevation similar to Fig. 1, showing a storage-bin mounted on the carriage and a modified construction of hoist. Fig. 8 is a side elevation of the traveling structure of Fig. 7. Fig. 9 is a plan view of Fig. 7. Fig. 10 is a view in side elevation illustrating a modified construction of hoisting-bucket and gate. Fig. 11 is a similar view showing the bucket lowered and the gate open to discharge into it. Fig. 12 is a cross-section of Fig. 11, on the line XII XII.

My invention refers to apparatus for hoisting, conveying, and delivering coal or other loose material, and is especially designed for the purpose of distributing the coal from a common storage bin or bunker or other source of supply to various points of consumption in measured quantities.

The invention also has in view the use of a reservoir in combination with the hoisting and conveying mechanism and includes, together with these elements, an improved hoisting-bucket, with the means for raising and lowering it, the trolley-lock and lever, the motors, and the means for controlling them, together with an improved automatically-actuated discharging-gate.

Referring now to the drawings, 2 2 are the

posts or other structural elements of a building-framework with which my apparatus is incorporated, provided with tracks 3 3, adapted to support the carriage 4, resting upon wheels 5, running on the tracks.

The carriage is provided with a suspended framework 6 and a pulpit or controller-stand 7, to one side thereof, adapted to carry the motor-controllers and the operator of the machine. Incorporated with the framing 6 is an inclined track, preferably formed of two structural members, as channels 8 8, side by side, and adapted to provide a runway for a trolley 9, provided with supporting-wheels 10. Two sheave-wheels 11 are journaled in the lower portion of the trolley, and it is also provided with downwardly-extending horns 12, having inwardly and upwardly tapering guiding-faces, providing the socket or recess 13 for the journal of the bucket-sheaves.

14 is the bucket provided with two supporting-sheaves 15, journaled between supporting sides 16, connected with the bucket upon a spindle or shaft 17.

A cable 18 passes around equalizing-sheave 19, mounted in the trolley 9, and passes down at each side around sheaves 15 and upwardly around sheave-wheels 11, also mounted in the trolley. Idler-sheaves 20 are mounted in the upper portion of the framework, located conveniently at the upper end of the trolley-tracks 8, around which the double-strand cable 18 passes.

21 is a motor mounted on the carriage, adapted to transmit motion through gearing 22 to a drum 23, around which cable 18 is wound and by which it may be taken up or paid out.

24 is a controller mounted in the pulpit 7, connected in the usual manner with the motor 21 and provided with the usual operating-handle and electrically connected with the source of power and motor, which connections are not necessarily shown.

The trolley is arrested at the bottom of the inclined tracks by a suitable abutment or stop *a*, so located that when the bucket is lowered by gravity upon paying out the cable it will fall to a position in front of the outlet-



opening 25 of a coal-bunker 26. The bottom of the bucket is slightly inclined, as is also the supporting-floor below the opening 25, causing the bucket to tip forwardly against or toward the wall immediately below the opening in convenient position to receive a charge of coal.

The opening 25 is closed by a gate 27, connected by a rod or bar 28, extending upwardly in front of the bunker and attached to the end of an operating-lever 29, pivoted at 30 to the post 2 or upon any other convenient portion of the permanent structure and at a height corresponding with the level of the operator's pulpit or stand 7.

The carriage is provided with a chute 31 at the delivery side, adapted to receive the contents of the bucket and to deliver them into a stoker-hopper 32 or into any other suitable receptacle. In the arrangement shown in the drawings the stoker or hopper or a series of them supplying furnaces are located at the other side of the area traversed by the carriage beyond the bunker 26, it being designed to distribute the coal to the hoppers as required. The bucket 14 is provided with an opening bottom of any suitable design or construction, as indicated in Fig. 6, thereby allowing the coal to be discharged downwardly into the chute when the bucket is lowered upon supporting-framework *b* of the carriage.

For the purpose of propelling the carriage along the tracks I employ a motor 33, geared by toothed wheels 34 with one of the axle-shafts 35, as shown, which motor is controlled to operate in either direction by a separate controller 36, mounted in the pulpit similar to the controller 24.

37 is a lever mounted on the carriage, extending downwardly within reach of the operator, as shown, and connected to a lever 38, provided with a rod or bar 39, adapted to actuate a trolley-lock 40, which engages the trolley 9, so as to hold it at its elevated position independent of the cable 18.

The operation is as follows: The carriage is brought in front of the bunker and the bucket is lowered to a position below the outlet 25 and charged with coal, when the motor 21 is switched, in winding up the cable 18 and raising the bucket to a position immediately below the trolley, its sheave-shaft engaging the horns 12. Continued winding of the cable draws the trolley and bucket up the inclined tracks 8 until they arrive at the upper position, when the trolley is engaged by the lock. The motor is then reversed, allowing the bucket to fall to a position immediately above chute 31, when its contents are discharged thereinto and pass into the hopper of the stoker, when the bucket is again raised to engage the horns of the trolley and sufficiently high to relieve the lock from binding. The trolley is then unlocked by lever 37, and

the cable is paid out, lowering the trolley to bottom of tracks 8 and dropping the bucket for a new charge.

In Figs. 7, 8, and 9 I have shown a modified construction wherein the traveling carriage is provided with depending guiding ways or channels 41, adapted to receive the wheels 42 of the bucket 14', curved branch grooves 43 extending outwardly therefrom in front at the top. In this construction the bucket is raised vertically only by cable 18', passing around suitable guiding-sheaves, to the winding-drum 23', and at its highest position the top wheels 42 ride outwardly through the curved guide 43, the back or bottom of the bucket being elevated somewhat higher, thereby tipping the bucket and discharging its contents. The top wheels 42 are preferably narrow in width to insure the tipping operation, the bottom wheels extending beyond them to insure retention in the vertical track. Supported from the carriage 4' and incorporated with its framework in any suitable manner is a hopper or storage-bin 44, having a delivery-chute or terminal 45, corresponding to the chute 31 and adapted to deliver into the stoker-hopper 32. The end of chute 45 is closed by a gate 56, pivoted at each side of the chute at 57 and operated by a connecting-rod 58 and lever 59, mounted on the carriage 4'. Otherwise the construction of the apparatus and its manner of operation is the same as heretofore described.

For the purpose of automatically discharging from the coal-bunker into the bucket I have provided a pivoted end chute 46, adapted to be thrown up by the bucket, in rising closing the bin, as in Fig. 10, and adapted to be released by the bucket in descending, so as to allow the contents of the bunker to fill the bucket, as in Fig. 11. 47 is a chute-lock having a hooked terminal adapted to engage the edge of the chute by gravity, mounted on pivoted shaft 48, provided with an operating-lever 49, connected by a link with a lever 50, pivoted at 51. In its normal position when the lock 47 has dropped down into engagement with the edge of the chute the lever 50 extends outwardly into the path of the descending bucket, so that when the lever is depressed backwardly by the bucket the lock 47 will be disengaged, allowing the chute to fall downwardly and over the top of the bucket after it has passed down to the lowered position shown in Fig. 11. For the purpose of bringing the bucket into contact with the lever 50 immediately before the bucket has reached the limit of its downward travel I have provided a by-pass guide 52, leading off laterally from the main vertical wheel-guides 53. The suspending-sheaves for the cables of the bucket are also located to one side in the direction of the desired lateral travel of the bucket, so that when the upper wheels 54 arrive at such by-pass guide



they will switch over, thus allowing the bucket to swing inwardly against lever 50. For the purpose of preventing the lower wheels 55 from also swinging into the by-pass 52 their faces are somewhat wider than the faces of the wheels 54, so that they will not enter the relatively smaller channels of the by-pass guides. In raising the bucket the wheels will be deflected backwardly into the main channel 53, thus allowing the bucket to swing back from contact with the lever, thereby allowing the lock 47 to engage the edge of the chute as it is wiped up by the ascending bucket.

The foregoing construction is readily appropriated to the carriage structure already described and will obviate the disadvantages of a bunker chute or gate requiring manual operation.

What I claim is—

1. The combination with a stationary supply-bin having a discharge-opening, of an overhead traveling carriage mounted on tracks, a vertically-traveling bucket, raising and lowering mechanism therefor, a motor and connected gearing adapted to raise, lower and shift the bucket, and an independent motor adapted to propel the carriage along the tracks, substantially as set forth.

2. The combination with a stationary supply-bin having a discharge-opening, of an overhead traveling carriage mounted on tracks, a trolley, a vertically-traveling bucket, raising and lowering mechanism therefor, an arresting-lock for the trolley, a lever for actuating said lock, a motor and connected gearing adapted to raise and lower the bucket, and an independent motor adapted to propel the carriage along the tracks, substantially as set forth.

3. The combination with a stationary supply-bin having a discharge-opening, of an overhead traveling carriage mounted on tracks, a vertically-traveling bucket, raising and lowering mechanism therefor, means for shifting the bucket laterally, and power-imparting devices for actuating the bucket and for propelling the carriage, substantially as set forth.

4. The combination with a stationary supply-bin having a discharge-opening, of an overhead traveling carriage mounted on tracks, a vertically-traveling bucket, raising and lowering mechanism therefor, means for shifting the bucket laterally and maintaining its raising and lowering functions, and power-imparting devices for actuating the bucket and said shifting means and for propelling the carriage, substantially as set forth.

5. The combination with a stationary supply-bin having a discharge-opening, of an overhead traveling carriage mounted on tracks, a vertically-traveling bucket provided with an opening bottom, raising, lowering and shifting mechanism therefor, and

power-imparting devices for actuating the bucket and for propelling the carriage, substantially as set forth.

6. The combination with a traveling carriage, of an inclined track thereon, a trolley arranged to travel on said inclined track, a trolley-lock arranged to engage the trolley and hold it at a raised position, mechanism mounted on the carriage within reach of the operator for releasing the trolley-lock, a bucket, and means engaging the trolley for raising and lowering the bucket, substantially as set forth.

7. The combination with a traveling carriage, of an inclined track thereon, a trolley arranged to travel on said inclined track, a trolley-lock arranged to engage the trolley and hold it at a raised position, mechanism mounted on the carriage within reach of the operator for releasing the trolley-lock, a bucket, and means engaging the trolley for raising and lowering the bucket, and for shifting the trolley up and down the inclined track, substantially as set forth.

8. The combination with a traveling carriage, of an inclined track thereon, a trolley adapted to travel on said inclined track, a bucket, and means for raising and lowering the bucket, with a pivoted latch for locking the trolley in a raised position, and lever-actuated mechanism for releasing said latch, substantially as set forth.

9. The combination with a longitudinally-traveling carriage, of a transverse inclined track thereon, a trolley provided with supporting-wheels mounted on said track and having sheave-wheels and guide-horns, a trolley-lock arranged to engage the trolley and hold it at a raised position, lever-actuated mechanism for releasing said lock, a winding-drum and motor, a cable engaging the trolley-sheave wheels, and a bucket suspended by the cable, substantially as set forth.

10. The combination with a stationary supply-bin having a discharge-opening and a gate therefor, with a fixed gate-opening mechanism; of an overhead traveling carriage mounted on tracks, a vertically-traveling bucket, raising and lowering mechanism therefor, and means mounted on the carriage for raising and lowering the bucket and for propelling the carriage along the tracks, substantially as set forth.

11. The combination with elevated tracks, of a carriage mounted thereon depending between the tracks provided with a delivering-chute, a vertically and laterally traveling bucket, raising and lowering mechanism therefor, and means for propelling the carriage along the tracks, substantially as set forth.

12. The combination with elevated tracks, of a carriage mounted thereon depending between the tracks provided with a delivery-



chute, a closing-gate for the chute with operating mechanism therefor mounted on the carriage, a vertically and laterally traveling bucket, raising and lowering mechanism  
5 therefor, and means for propelling the carriage along the tracks, substantially as set forth.

13. The combination with a traveling carriage, of a vertically and laterally traveling  
10 bucket suspended therefrom, and an adjustable delivery-chute, with means actuated by the bucket for releasing said chute, substantially as set forth.

14. The combination with a traveling carriage, of a vertically and laterally traveling  
15 bucket suspended therefrom, an adjustable delivery-chute adapted to be raised by the bucket, and means actuated by the bucket

for causing the chute to assume a position to deliver into the bucket, substantially as set forth. 20

15. The combination with a traveling carriage, of a vertically and laterally traveling bucket suspended therefrom, an adjustable delivery-chute adapted to be raised by the  
25 bucket, a latch adapted to hold the chute raised, and a lever connected with the latch adapted to be engaged by the bucket to release the latch, substantially as set forth.

In testimony whereof I affix my signature 30  
in presence of two witnesses.

PAUL L. HAY.

Witnesses:

JAS. J. McAFEE,  
C. M. CLARKE.