

No. 662,672.

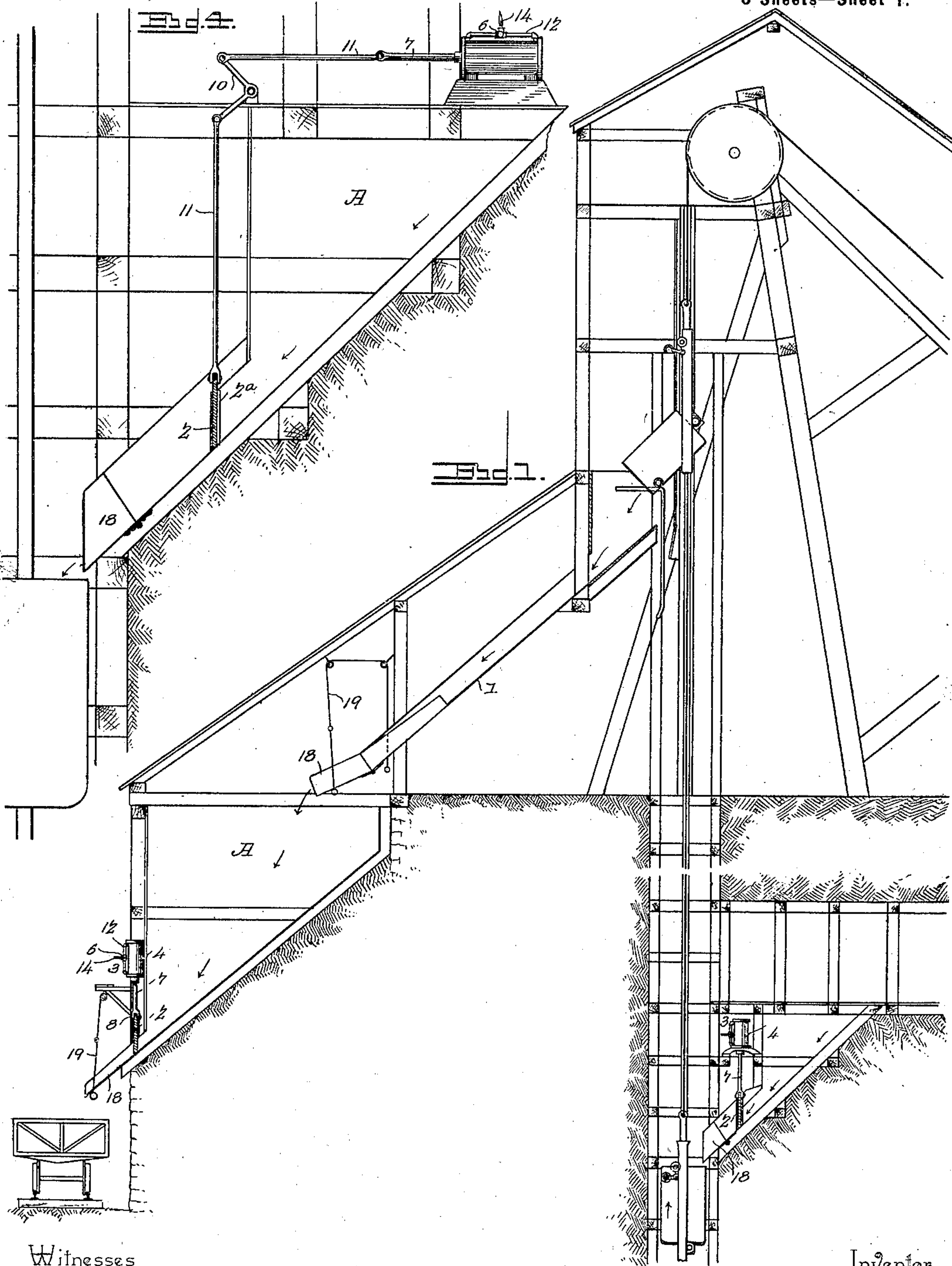
Patented Nov. 27, 1900.

J. S. HICKEY.
CHUTE CLOSURE.

(Application filed Mar. 28, 1900.)

(No Model.)

3 Sheets—Sheet 1.



Witnesses
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By *his* Attorneys,

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J. S. Hickey

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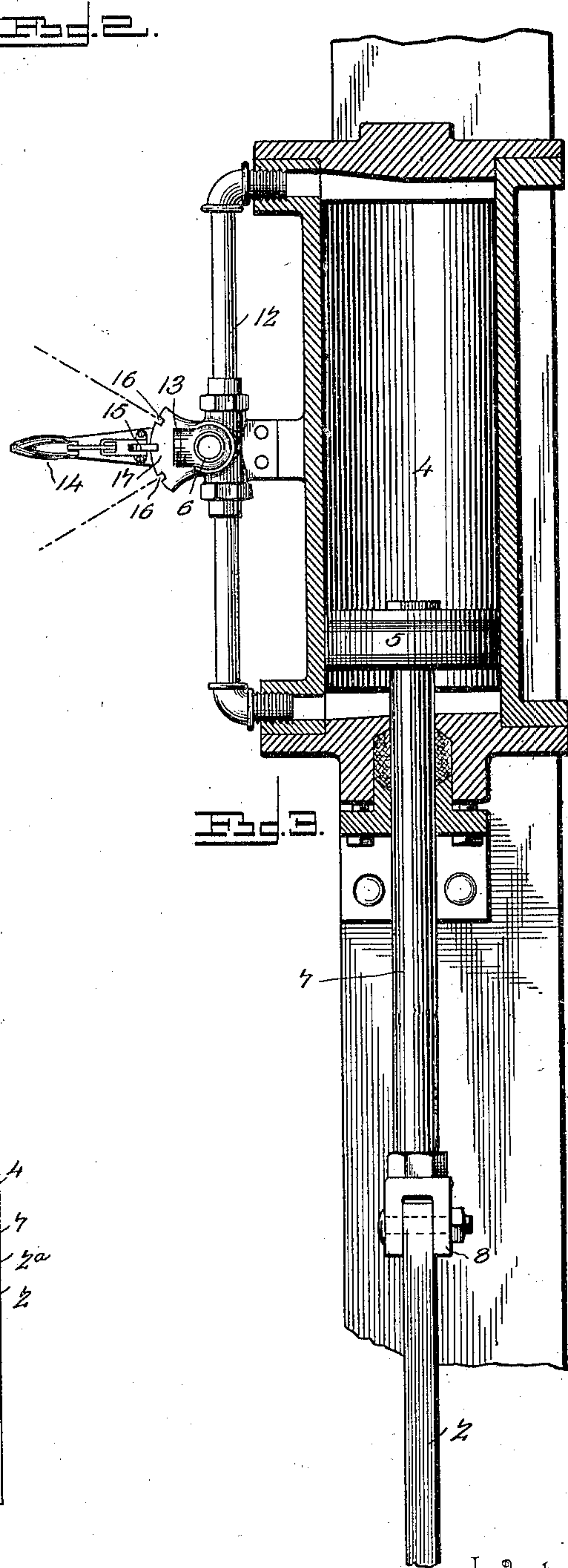
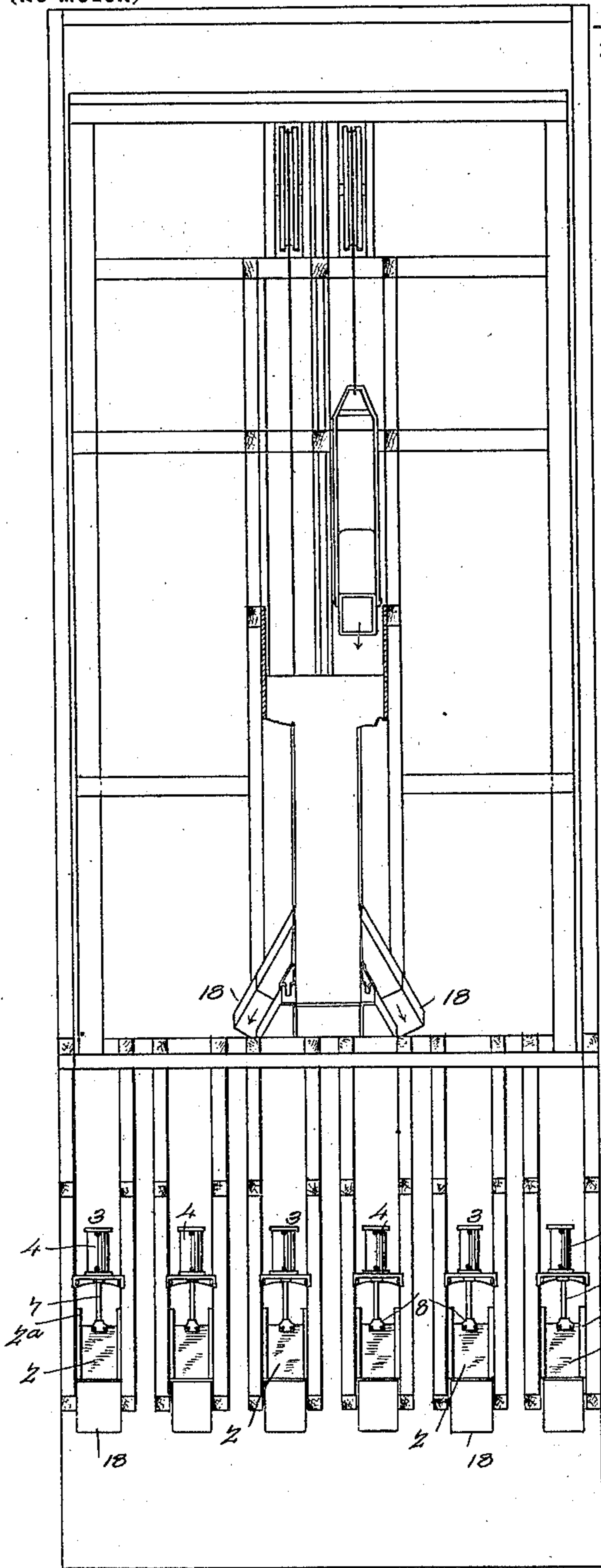
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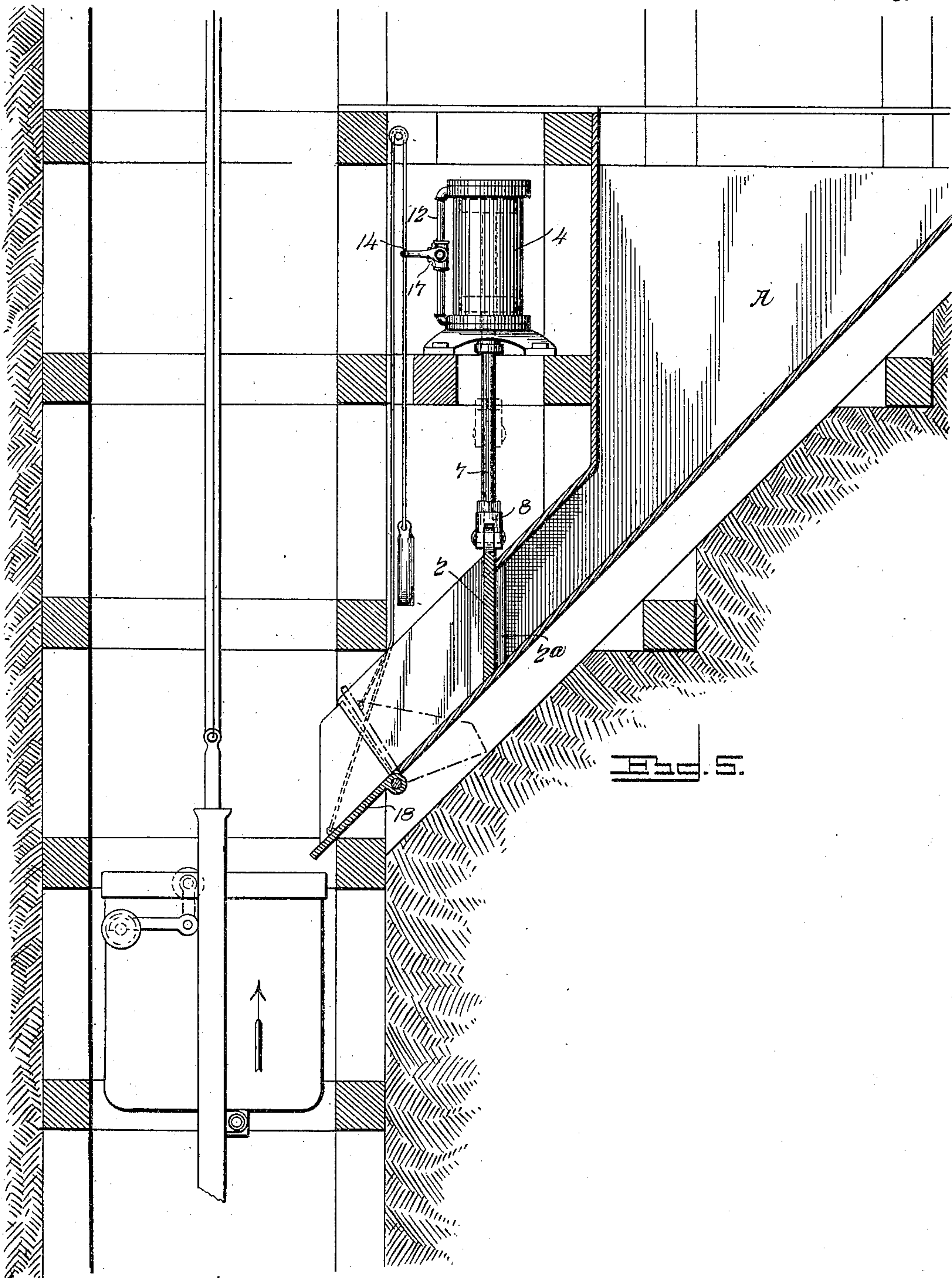
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3 Sheets—Sheet 3.



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UNITED STATES PATENT OFFICE.

JOHN S. HICKEY, OF ANACONDA, MONTANA, ASSIGNOR OF ONE-HALF TO
JAMES H. EGBERT, OF SAME PLACE.

CHUTE-CLOSURE.

SPECIFICATION forming part of Letters Patent No. 662,672, dated November 27, 1900.

Application filed March 28, 1900. Serial No. 10,528. (No model.)

To all whom it may concern:

Be it known that I, JOHN S. HICKEY, a citizen of the United States, residing at Anaconda, in the county of Deer Lodge and State of Montana, have invented a new and useful Chute-Closure, of which the following is a specification.

My invention is an improved chute-closure for loading and unloading, particularly adapted for use in coal and other mines and the like in discharging coal or ore from a bin into a skip or car, one object of my invention being to provide a chute-gate and power apparatus therefor whereby the gate may be instantly closed in an inclined chute through which a mass of coal, ore, or the like is being discharged, so as to cut off the flow or discharge of the coal or ore from the bin to the car or skip.

Another object of my invention is to combine with an inclined chute, as of a bin, a cut-off gate and a fluid-pressure apparatus for applying power to the gate whereby the latter may be instantly forced through the mass of coal or ore passing through the chute, so as to close the latter and cut off the discharge of coal or ore from the bin through the chute.

My invention consists in the peculiar construction and combination of devices, hereinafter fully set forth, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a diagrammatic sectional elevation of a mine and shaft house in which the bins are provided with my apparatus for cutting off the flow or discharge of the ore or coal from the bins. Fig. 2 is a diagrammatic elevation of a bin having a plurality of discharge-chutes provided with my improved cut-off gates and fluid-pressure mechanisms embodying my improvements. Fig. 3 is a detail sectional view of a fluid-pressure apparatus embodying my improvements with the piston-rod thereof connected to a cut-off gate. Fig. 4 is a diagrammatic sectional elevation of a coal or ore bin provided with my improved apparatus in which the fluid-pressure cylinder is disposed horizontally and indirectly connected to the cut off gate. Fig. 5 is a detail view, partly in section, of a chute and its closure constructed in accordance with my invention.

Heretofore in coal and other mines the bins in the various levels communicating with the hoisting-shaft and in which bins the coal or ore is dumped from the tram-cars preparatory to the discharge thereof into the hoisting-skips have been each necessarily constructed of a capacity not exceeding that of a single skip, owing to the practical impossibility of cutting off the flow of the mass of coal or ore downward on the inclined bottom and discharge-chute of the bin when the discharge-gate is open, this precaution being taken in order to prevent the overloading of a skip and the overflow thereof and the falling of coal or ore therefrom because of the great danger attendant upon the falling of coal or ore from a skip, particularly in a deep mine. This necessity heretofore existing of limiting each coal or ore bin at the intersections of a level with the hoisting-shaft to the capacity of a single skip has entailed great expense, inconvenience, and loss of time and correspondingly reduced the output of the mines. By my improved devices I obviate this difficulty and enable the capacity of the bin to be increased to any desired extent, so that a number of skips may be successively loaded from the same bin without the necessity of refilling the latter before loading each skip and without danger of overloading skips and causing coal or ore to drop therefrom into the shaft.

In the embodiment of my invention I combine with the inclined bottom and discharge-chute 1 of a bin, such as illustrated at A or of any other preferred construction, a cut-off gate 2, which, being transversely disposed in the chute and guided in vertical ways 2^a in the sides of the chute, is disposed at a relatively acute angle to the inclined bottom of the chute and bin and inclosing moves at an angle converging acutely with that of the path or direction of the mass of moving coal or ore on the inclined bottom of the bin and chute, whereby the said gate when being closed is disposed obliquely to the line of countervailing force represented by the mass of moving ore or coal, this disposition of the gate greatly facilitating the closing thereof through said mass of moving ore or coal in order to cut off the discharge of the same.

A fluid-pressure apparatus (indicated at 3) consisting, essentially, of a cylinder 4, a piston 5, a valve 6 to introduce fluid-pressure, as compressed air, steam, or the like, alternately to the end of the cylinder, and a piston-rod 7 is employed in connection with each of the cut-off gates 2. As shown in Figs. 1, 2, and 3, the cylinders are vertically disposed and suitably supported, and the heads of their piston-rods are connected directly to the cut-off gates, respectively, as at 8, Fig. 3; but in some instances it is found convenient or necessary to dispose the fluid-pressure cylinder and piston horizontally, as at Fig. 4, in which event I connect the piston-rod 7 indirectly to the gate 2 by means of a bell-crank lever 10 and pitmen 11, said pitmen, respectively, being interposed between and connecting said bell-crank lever to the piston-rod and the cut-off gate.

The valve 6 is interposed centrally between feed and exhaust pipes 12, which communicate with the ends of the cylinder and the service-pipe 13, said valve being of a construction adapted to supply fluid under pressure to one end of the cylinder, while exhausting from the opposite end thereof, and said valve is provided with a handle-lever 14, which has a spring-pressed detent 15, adapted to engage the stop-notches 16 of a segment-disk 17, said stop-notches being coincident with the limits and intermediate point of the play of the said valve. It will be understood from the foregoing that the said valve is manually operated by an operator stationed at the bin and that upon the application of fluid-pressure on one side of the piston the latter will be forced outwardly in the cylinder, thereby cutting and closing the gate through the mass of moving coal or ore on the inclined chute or inclined bottom of the bin, hence instantly cutting off the discharge of coal or ore therefrom, and hence enabling the bin to be constructed of any desired capacity without incurring risk of overloading the skips.

At the discharge end of each chute I provide the latter with a pivoted apron 18, which may be operated either by a suitable handle-lever or by a counterweighted cord, as at 19, said apron being adapted to be turned upward to a vertical position on the discharge end of the chute after the cut-off gate has been closed and in a position where it is out of the way of the skip, so as not to interfere with the raising and lowering thereof.

Having thus described my invention, I claim—

1. The combination of a bin for ore, coal or the like, a discharge-chute connected with said bin, a cut-off gate disposed transversely in said chute and movable in a right line

therein, said gate and the bottom of said chute being arranged at an acute angle with relation to each other and converging in the direction of the lower line of force represented by a moving mass descending the chute, the discharge portion of the chute extending beyond said gate, a motor connected to said gate and adapted to force the same through the said mass of material and thereby close the chute, and a hinged counterweighted apron at the discharge end of the chute, substantially as described.

2. The combination of a bin for ore, coal, or the like, a discharge-chute connected with said bin, a cut-off gate disposed transversely in said chute and movable in a right line therein, said gate and the bottom of said chute being arranged at an acute angle with relation to each other and converging in the direction of the line of force represented by a moving mass descending the chute, the lower discharge portion of the body of the chute extending a distance beyond the point at which the gate is located and a motor connected to said gate and adapted to force the same through the said mass of material and thereby close the chute, for the purpose set forth, substantially as described.

3. The combination of a bin for ore, coal or the like, a discharge-chute connected with said bin, a cut-off gate disposed transversely in said chute and movable in a right line therein, said gate and the bottom of said chute being arranged at an acute angle with relation to each other and converging in the direction of the lower line of force represented by a moving mass descending the chute, the discharge portion of the chute extending beyond said gate, a motor connected to said gate and adapted to force the same through the said mass of material and thereby close the chute, and a hinged apron at the discharge end of the chute, substantially as described.

4. The combination with a bin having a discharge-chute with an inclined bottom, and a cut-off gate disposed transversely in said chute and movable in a right line at an acute angle to the bottom of the chute, said cut-off gate being located at a distance from the discharge end of the chute, of a motor connected to the gate, for the purpose set forth, and a lever whereby the operation of said motor may be regulated, substantially as described.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

JOHN S. HICKEY.

Witnesses:

B. B. BLISS,

I. H. GOODWIN.