

O. H. DICKERSON.

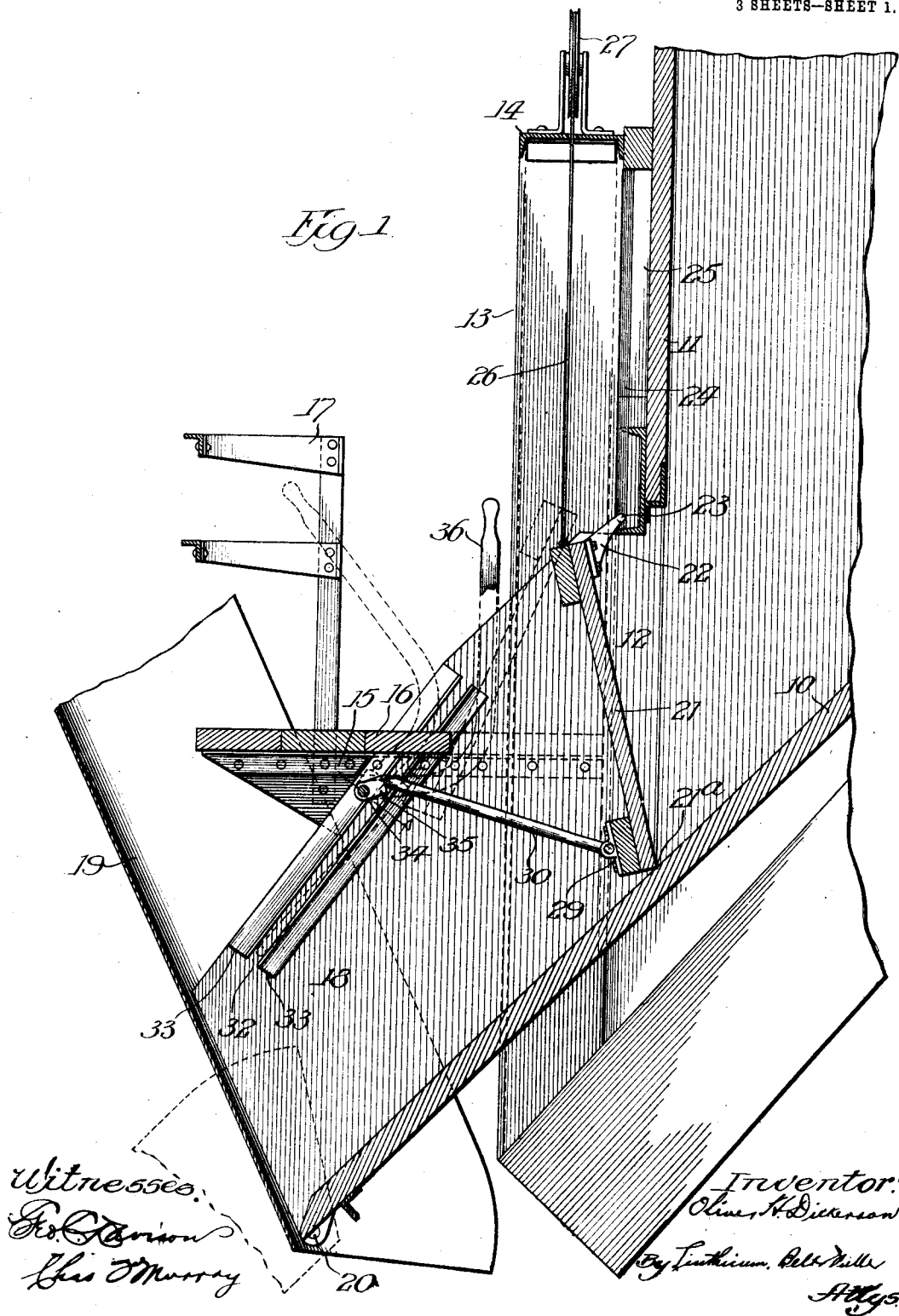
BIN DOOR.

APPLICATION FILED MAR. 24, 1911.

1,036,582.

Patented Aug. 27, 1912.

3 SHEETS—SHEET 1.



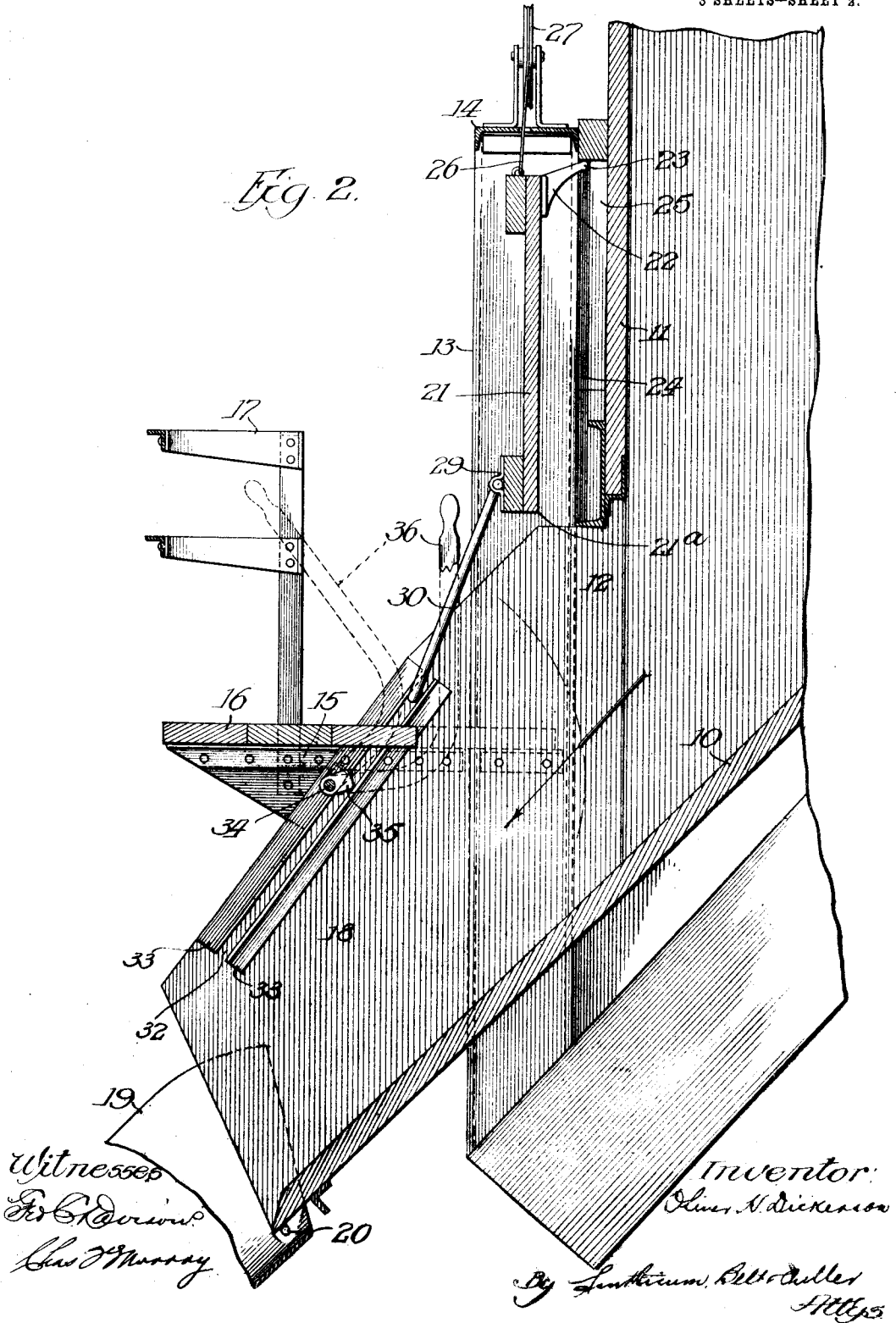
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3 SHEETS—SHEET 2.

Fig. 2.

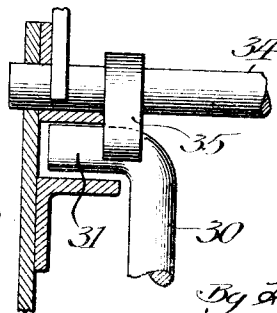
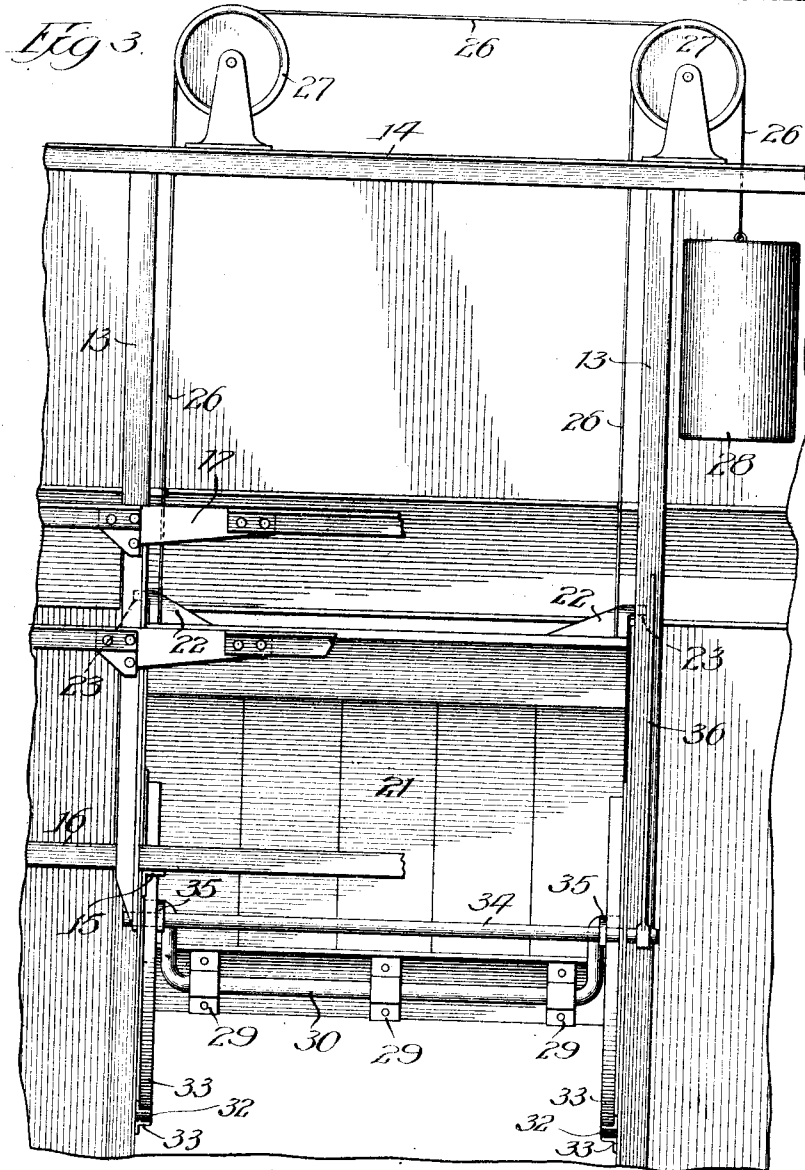


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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

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BIN-DOOR.

1,938,582.

Specification of Letters Patent.

Patented Aug. 27, 1912.

Application filed March 24, 1911. Serial No. 616,688.

To all whom it may concern:

Be it known that I, OLIVER H. DICKERSON, a citizen of the United States, residing at Duluth, in the county of St. Louis and State of Minnesota, have invented certain new and useful Improvements in Bin-Doors, of which the following is a specification.

My invention relates to closing means for bins adapted to contain ore, coal or other similar materials and has particular reference to a door of this character which may be opened under heavy pressure and which may be closed at any time during the discharge of the material through the discharge opening.

In the storage and handling of large quantities of ore, coal, etc., and particularly open ore, it is customary to convey the material from the mines to a port, hauling the ore cars to the tops of large bins or containers into which the ore is discharged. The ore carrying vessel is then moored at the dock on which the bins are located and the ore discharged into the hold of the vessel by means of suitable troughs or chutes. It will be understood that a large amount of ore is usually stored in these bins and that therefore the door which closes the discharge opening of the bin is under heavy pressure, due to the weight of the material above the same and that the opening of the door under such circumstances is attended with many difficulties. Furthermore, after the door is opened, it has been found exceedingly difficult to close the opening because of the momentum of the ore passing through the opening.

Therefore, the principal objects of my invention are to provide a door which may be easily opened under heavy pressure from above and which may be also closed at any time without undue expenditure of power, allowing the momentum of the material itself to assist in closing the door.

My invention will be more readily understood by reference to the accompanying drawings wherein—

Figure 1 is a side elevation, partly in section, showing a portion of a bin and discharge chute and the closure in normal position; Fig. 2 is a similar view showing the door in elevated position; Fig. 3 is a front elevation, some of the parts being broken away and Fig. 4 is a fragmentary detail of

the connection between the door brace or strut and the guide therefor.

Referring more particularly to the drawings it will be seen that the bin to which my improved closure is fitted is composed of an inclined lower floor 10, a front wall 11 having an opening 12 therein. The front wall 11 of the bin is partially supported by vertical beams 13 capped by a channel beam 14. The upright standards 13 are provided with right angled extensions 15 on which are mounted planks 16 adapted to form a platform on which the operator may stand. A guard or railing 17 is also provided. The slanting floor 10 of the bin, at a point outside of the bin, becomes a trough having a vertical guard flange 18. A chute 19, shown in Fig. 1 in elevated position and in Fig. 2 in operative position, is pivoted at 20 on the lower end of the slanting floor 10.

A vertically movable swinging door 21 is adapted to close the opening 12 as shown in Fig. 1, this door being provided at its upper end with brackets 22 having integral trunnions 23 thereon. These trunnions are guided in a groove 24, formed in a member 25 which is secured to the front wall 11 of the bin. The door is counterbalanced by means of cables 26 passing over sheaves 27 mounted on the channel 14 and carrying on their opposite ends a counterweight 28. The door 21 is provided on its lower outer face with brackets 29 within which is carried a bail or strut having projecting arms, at the outer ends of which are provided trunnions 31 as best shown in Fig. 4. These trunnions are guided in the ways 32, formed by securing angles 33 to the sides 18 of the trough heretofore described. Within the upper angles 33, is mounted a shaft 34 having keyed thereto short lever arms or cams 35, adapted to project into the plane of the groove 32. A handle 36 is also keyed to the shaft 34, the handle being shown in Fig. 1 in full lines indicating the position of the short lever 35 disposed in the plane of the groove 32 and in dotted lines with the lever 35 out of this plane.

The operation of my improved bin door is as follows: Assuming the door in position shown in Fig. 1 and with a load of material against the door, the operating handle 36 is thrown to the dotted line position of Fig. 1, thus removing the short lever arm 35

from beneath the trunnions 31 of the strut 30. This permits the trunnions 31 to follow the groove 32 and the door 21 to swing outward, all as shown in the dotted lines in Fig. 1. The door is then raised without interference from the material passing down the trough until it has reached the full line position of Fig. 2. The handle 36 is so arranged that it cannot remain in the dotted line position, that is, its center of gravity is always to the right of the shaft and the lever arm or cam 35 will normally project in the groove 32. As the door is raised, the trunnions 31 will strike the cam 35, throw the operating handle to the dotted line position and pass upward, the operating handle then returning to the full line position with the cam 35 projecting into the path of travel of the trunnions 31. Should it be necessary to close the door during the discharge of material through the opening, the door is released and allowed to fall of its own weight. After it has descended to the point where the trunnions 31 contact the cam 35, the point 21^a of the door will begin to describe a path in the arc of a circle as shown in Fig. 2, that is, in a line substantially unopposed to the path of travel of the material at that time. The force of the material will in this manner assist in seating the door in the opening, the trunnions 31 being held against further descent by the cam lever 35. In this way the flow of the material may be stopped, using the momentum of the material to assist in such closing action.

It will be understood that my device is capable of modifications many of which will be apparent to those skilled in the art and I do not, therefore, wish to limit my invention to the exact construction herein shown and described.

I claim:

1. A device of the class described, comprising, in combination, a bin having an opening in one wall thereof, a closure for said opening adapted for swinging and vertical movement, a guide-way associated with said bin, and a strut on said closure, said strut being adapted for sliding movement in said guide-way, substantially as described.

2. A device of the class described, comprising, in combination, a bin having a discharge opening therein, vertical and diagonal guide-ways associated with said bin, a closure for said discharge opening, and parts associated with said closure which are adapted to slide in said vertical and diagonal guide-ways, substantially as described.

3. A device of the class described, comprising, in combination, a bin having suitable walls and an inclined floor, one of said walls having a discharge opening, vertical and diagonal guide-ways associated with said bin, a door having parts associated therewith, which are adapted to cooperate

with said vertical and diagonal guide-ways, and a shiftable stop mounted in said diagonal guide-ways, substantially as described.

4. A device of the class described, comprising, in combination, a bin having walls and an inclined floor, one of said walls being provided with a discharge opening, guide-ways associated with said bin, one of said guide-ways being inclined, a closure for said discharge opening, said closure being provided with a fixed part cooperating with one of said guide-ways, and a swinging strut cooperating with another of said guide-ways, substantially as described.

5. A device of the class described comprising, in combination, a bin having walls and an inclined floor, one of said walls being provided with a discharge opening, guide-ways associated with said bin, one of said guide-ways being inclined, a closure for said discharge opening, said closure being provided with a fixed part cooperating with one of said guide-ways, a swinging strut cooperating with another of said guide-ways, and a shiftable stop mounted in one of said guide-ways, substantially as described.

6. A device of the class described comprising, in combination, a bin having walls and a sloping floor, one of said walls being provided with a discharge opening, vertical and inclined guide-ways associated with said bin, a closure for said discharge opening, said closure being provided with a portion cooperating with said vertical guide-ways and being provided also with a swinging strut adapted for cooperation with said inclined guide-way, and a stop positioned in said inclined guide-way and adapted to assist in holding said closure against said discharge opening, substantially as described.

7. A device of the class described comprising, in combination, a bin having walls and a sloping floor, one of said walls being provided with a discharge opening, guide-ways associated with said bin, a door for said discharge opening, said door having a shifting pivot and being provided with portions cooperating with said guide-ways, and means associated with said door adapted to cause said door in its closing movement to follow a path substantially unopposed to the path of travel of the material being discharged from said bin, substantially as described.

8. A device of the class described comprising, in combination, a bin having a discharge opening therein and provided with vertical and inclined guide-ways exterior thereof, a closure for said opening, said closure having rigid and swinging parts cooperating respectively with said vertical and inclined guide-ways, and a shiftable stop mounted in said inclined guide ways, substantially as described.

9. A device of the class described comprising

ing, in combination, a bin having a discharge opening therein, vertical guide-ways exterior of said bin and above said discharge opening, inclined guide-ways also exterior of the bin and on substantially the same horizontal plane as said opening, a door for said opening, said door having a fixed portion co-operating with said vertical guide-ways, a swinging strut having portions coöperating with said inclined guide-ways, and a gravity actuated shiftable stop mounted in said inclined guide-ways, substantially as described.

OLIVER H. DICKERSON.

Witnesses:

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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."