

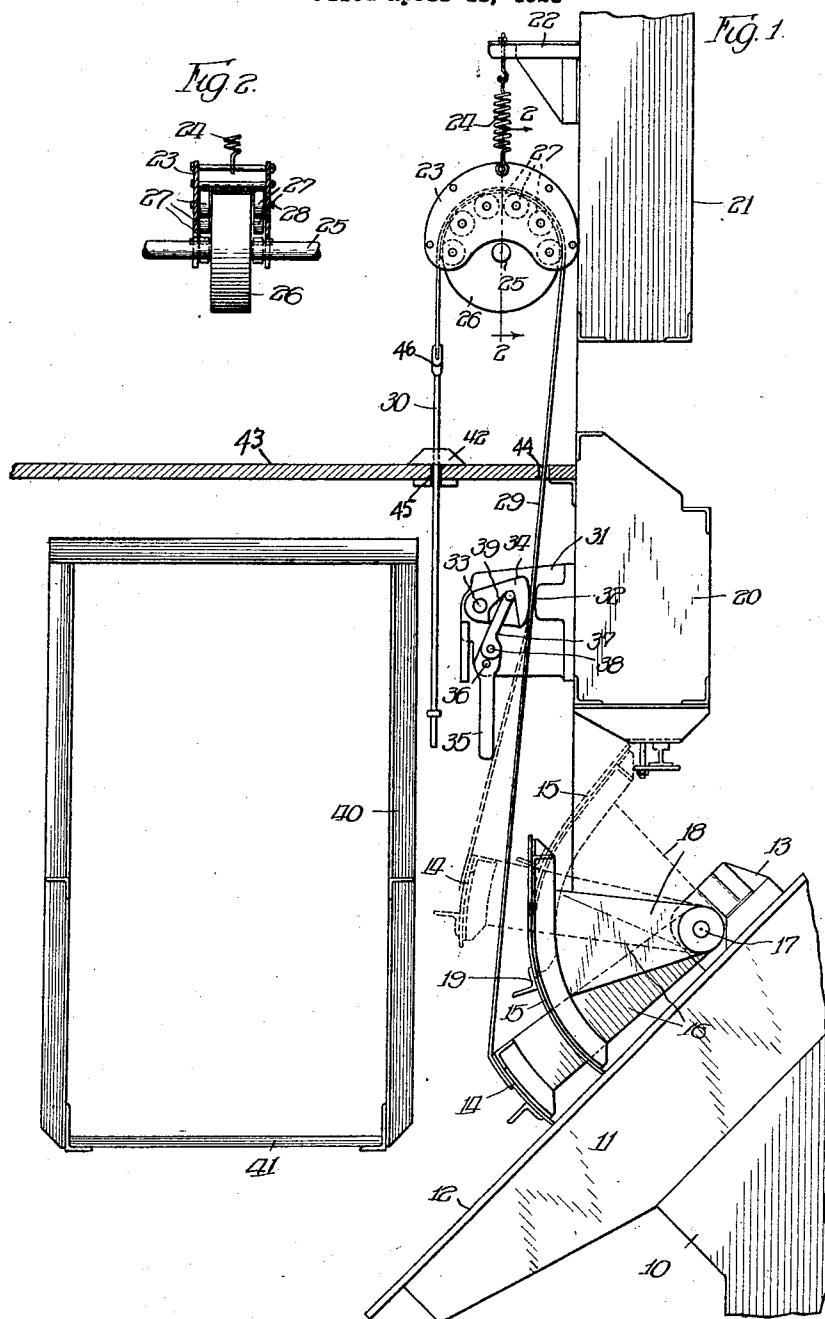
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J. C. HAYES, JR

STOCK BIN GATE

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Witness:
A. Burkhardt

Inventor:
John C. Hayes Jr.
By Wilkinson Huxley Carmichael Knight
Attys

UNITED STATES PATENT OFFICE.

JOHN C. HAYES, JR., OF CHICAGO, ILLINOIS, ASSIGNOR TO FREYN, BRASSERT & COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF MAINE.

STOCK-BIN GATE.

Application filed April 11, 1921. Serial No. 460,554.

To all whom it may concern:

Be it known that I, JOHN C. HAYES, JR., a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Stock-Bin Gates, of which the following is a specification.

My invention relates to stock bin gates and also to means of operating the same, and has particular reference to gates which are used for the control of ore, limestone, coke and the like in the storage bins used in connection with blast furnace operations, and particularly for the control of ore, coke, limestone and the like, which is placed into skip cars and then hoisted to the top of the blast furnace for charging the furnace.

One object of my invention is the provision of stock bin gates which can be controlled by the operator with a minimum amount of effort and which are positive in their action and which will positively cut off the flow of material therethrough and prevent the material from passing under the gates. In gates of this kind where the material consists of lumps or other large pieces, it often happens that the gate will be lowered upon one of the lumps of material, so that the gate is partially held open, thus allowing the finer particles of material to escape under the gate and flow down upon the car after it is filled, thereby giving detrimental excess weights, or upon the track, necessitating a great deal of work in keeping the tracks cleaned out. In addition to this loss of material in this manner, if the gate does not function properly it is necessary sometimes for workmen to remove the lump of material from under the gate, so that it may be closed securely and prevent the material flowing downward in the stock bin.

Another object of my invention is the provision of stock gates and means for operating the same whereby the heavy gates are lifted from closed into open position by a power arrangement and then allowed to fall by gravity into closed position. Heretofore gates of this character have been handled manually and therefore had to be sufficiently light to enable the workmen to handle them easily and quickly and because they are not controlled by gravity they

do not shut off the flow of material as readily nor as securely as heavier gates.

Another object of my invention is the provision of double gates spaced apart from each other and adapted to be opened at the same time, this provision of gates providing means which effectively closes the chute from the ore because if a lump of material catches under one of the gates and it is held open slightly the other will drop down into closed position and thus the material will be prevented from passing outward under the gates.

Another object of my invention is the provision of double gates spaced apart from each other, opened by a power arrangement and positively closed by gravity in such manner as to permit such close control of amounts of material discharge from the bins into the scale car as to assure accurate weights of material in the scale car, thereby avoiding the usual detrimental excess weight of ore and limestone being charged into the blast furnace.

The upper gate is so arranged as to be opened and closed by the movement of the lower gate to which means are attached for raising and lowering the same for opening and closing the chute leading from the ore bin.

These and other objects of my invention will be more fully and better understood by reference to the accompanying sheet of drawings, and in which—

Figure 1 is a side elevational view of my improved invention, the gates being shown in closed position in full lines and in open position in dotted lines; and

Figure 2 is a detail view of the drum over which the member used for opening and closing the gates passes.

Referring now specifically to the drawings and in which like reference characters refer to like parts throughout, the inclined floor 12 of the bin is secured to inclined beams 11 supported by a member 10. Secured to the floor 12 in any approved manner and spaced apart from each other substantially the distance of the length of the doors are members 13, only one of said members being shown in the drawings. Stock bin doors 14 and 15 are pivotally supported from shaft 17 by arms 16 and 18 respec-

tively, the shaft 17 being supported by the members 13. The door 15 is set above the door 14 and inside of the arms 16 to which the door 14 is secured, so that the ends of the door 15 are adjacent to the arms 16 upon which the door 14 is mounted. Secured to the door 15 and projecting slightly beyond the ends thereof is an angle 19 which is adapted to be engaged by the arms 16 as the door 14 is raised in the manner hereinafter described and thus the door 15 is carried up into an open position by the door 14 so that both of the doors 14 and 15 may be opened simultaneously. A part 20 of the stock ore bin structure is shown, and also a part 21 to which a bracket 22 is secured and which has a sheave 23 secured to the end thereof by means of a spring 24. Mounted upon the framework of the ore bin in any suitable manner is a shaft 25 which is connected to any source of power, said shaft 25 having a pulley 26 mounted thereon inside of the sheave 23. The pulley 26 may be covered with any frictioning material, such as leather, or the like, to better engage the door operating member hereinafter described. Secured to the outer walls, but on the inside thereof, of the sheave 23 are a plurality of rollers 27, said rollers being rotatively mounted upon pins 28 secured to the walls of said sheave 23. Secured to the gate 14 is a flexible member 29 which passes upward from the gate 14 through the sheave 23 over the rollers 27 and downward and has a handle 30 secured thereto. Secured to the frame member 20 is a bracket 31 having a projection 32 thereon, said flexible member 29 passing over the projection 32. Mounted upon the member 31 by means of a pin 33 is a cam member 34, the active face of which is curved and is positioned immediately adjacent the projection 32 and when in open position provides a space through which the flexible door operating member 29 passes. A handle 35 is secured to the said member 31 by means of a pin 36 and has a member 37 secured thereto by means of a pin 38, said member 37 being mounted in a recess 39 in the cam member 34, the purpose of this cam member and projection 32 being to hold the gates in open position should it be desired to have them remain open for any length of time. A framework 40 is shown to which a platform 41 is secured and upon which the operator stands during the operation of the doors. A floor 43 is shown which is secured to the portion 20 of the ore bin in any suitable manner, and which has an opening 44 therein through which the flexible member 29 passes and a second opening 45 through which the handle 30 extends. A stop 42 is attached to the floor 43 having an opening therethrough in register with the opening 45 in the floor 43 and which engages a clip 46 on the upper end of

the member 30 so as to limit the movement of the member 30. If the stop 42 was not provided damage might result to the doors 14 and 15 or to some other part of the apparatus during the operation thereof.

In the operation of the device the operator standing upon the platform 41 grasps the handle 30 and if he desires to open the doors he pulls downwardly upon the handle 30 which brings the flexible member 29 into frictional working contact with the rotating pulley 26 whereby the door 14 is raised into an open position. During the raising or opening movement of the door 14 the arm 16 thereof engage the angle 19 upon the door 15, thus lifting the latter at the same time until the doors are in the position shown in the dotted lines of Figure 1, or any intermediate position. If it is desired to hold the doors in any open position the operator may turn the handle 35 a slight amount to permit the cam member 34 to drop downwardly for engaging and gripping the member 29 between the cam member 34 and the projection 32 on the bracket 31. Upon releasing the member 30, the spring 34 raises the flexible member out of contact with the pulley 26 so that the flexible member is not destroyed by the friction developed between it and the roller 27. When the operator desires to close the doors he turns the handle 35 in a reverse direction into the position shown in Figure 1, which releases the flexible member 29 and permits the doors 14 and 15 to drop by gravity down to the position shown in full lines in Figure 1. If it should so happen that the door 15 drops upon a lump of material the door 14 will probably pass downward so that the flow of material is effectively shut off and if the door 14 should engage a place of material the door 15 will probably not be held out of contact with the floor 12 but will pass downward so that the flow of material over the floor 12 will be effectively shut off.

While I have described more or less precisely the details of construction, I do not wish to be understood as limiting myself thereto, as I contemplate changes in form and the proportion of parts and the substitution of equivalents as circumstances may suggest or render expedient without departing from the spirit or scope of my invention.

I claim:

1. In combination, a bin having a discharge opening, and a plurality of gates adapted to open and close said discharge opening, the said gates being spaced apart from each other and mounted upon a common center and swinging in different arcs in radially overlapped relation.

2. In combination, a bin having a discharge opening, and a plurality of pivotally mounted gates adapted to open and close said discharge opening, the said gates being

spaced apart from each other and swinging in different arcs in radially overlapped relation.

3. In combination, a bin having a discharge opening and a plurality of pivotally mounted gates whereby the discharge opening is opened and closed, each of the said gates having a common center of mounting and spaced apart from each other and swinging in different arcs in radially overlapped relation, the said gates being curved and presenting a convex surface toward said pivotal mounting.

4. In combination, a storage bin having a discharge opening, supporting means, a gate pivotally connected to said supporting means, a second gate mounted below said first mentioned gate and having arms secured to said supporting means outside the ends of the said first mentioned gate, means upon the first mentioned gate for contact with the arms of the second mentioned gate when the said second gate is raised, and means common to both gates for opening the said gates successively.

5. In combination, a storage bin having an inclined floor and a discharge opening, a plurality of gates whereby the said open-

ing is opened and closed, blocks secured to the floor upon which the gates are mounted, arms connecting the said gates to the said blocks, one set of said arms being outside of the other set of said arms and passing the ends of one of the said gates, and means carried by one of said gates for engagement with the arms of the other gate when the same is opened.

6. In combination, a storage bin having an inclined floor and a discharge opening, blocks secured to the floor upon which the stock gates are mounted, a gate pivotally mounted by means of connecting arms to the said holding members, a second gate positioned below the first mentioned gate and having arms pivotally mounted upon said holding means, the connecting arms of the second mentioned gate being beyond the ends of the first mentioned gate, means upon the first mentioned gate for engagement with the second gate when the same is raised, and means secured to the second mentioned gate for raising the same.

Signed at Chicago, Illinois, this 28th day of March, 1921.

JOHN C. HAYES, Jr.