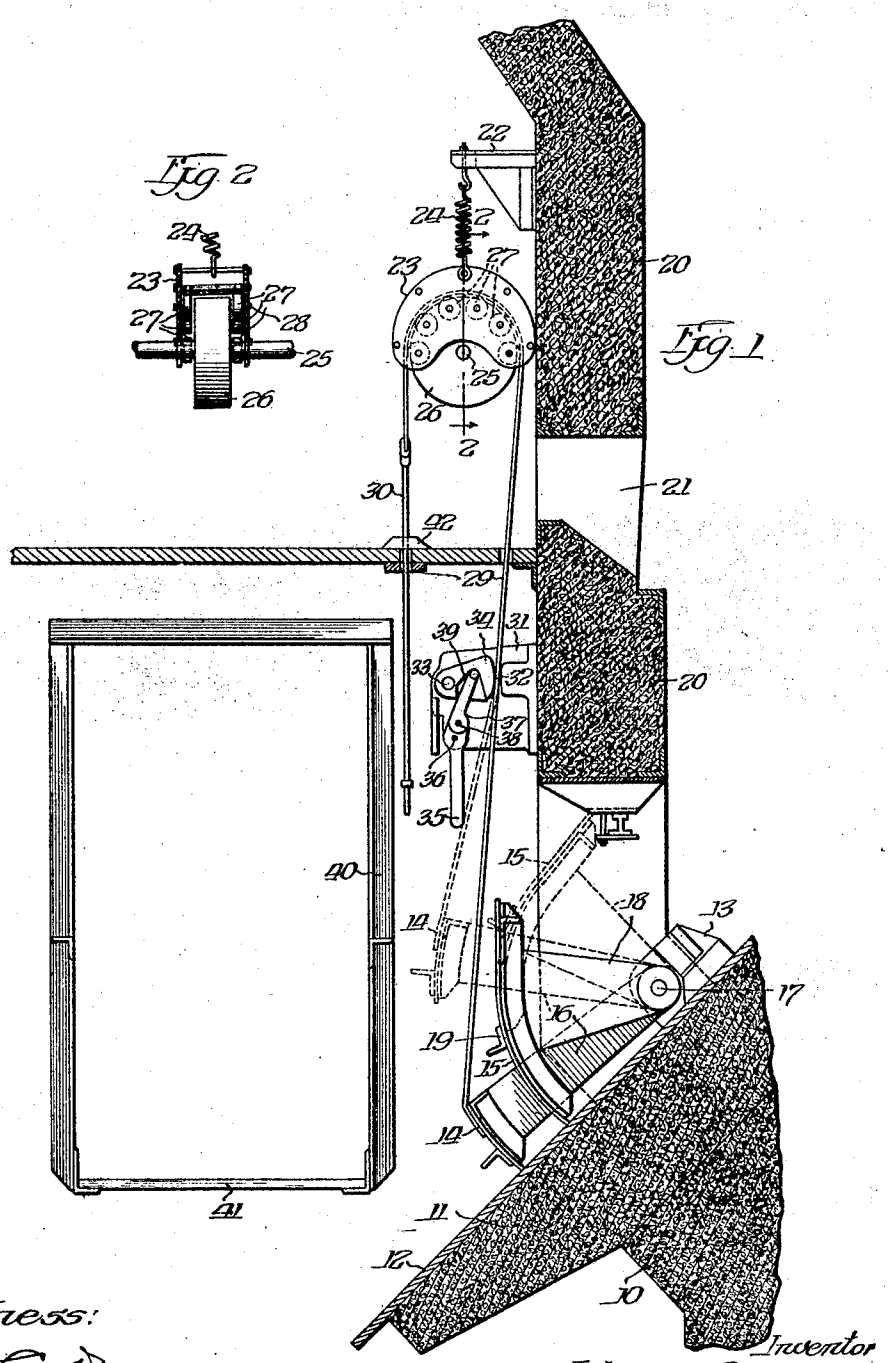
March 23, 1926. 1,577,636

J. C. HAYES, JR

APPARATUS FOR OPERATING BIN GATES

Original Filed April 11, 1921



Witness:

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Patented Mar. 23, 1926. 1,577,636

UNITED STATES PATENT OFFICE.

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APPARATUS FOR OPERATING BIN GATES.

Original application filed April 11, 1921, Serial No. 460,554. Divided and this application filed July 11, 1924. Serial No. 725,530.

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 Apparatus for Operating Bin Gates, of which the following is a specification.

My invention relates to door operating mechanism particularly for the operation of door controlling the discharge of ore, limestone, coke, coal and the like from storage bins having inclined floors, and is a division of my application Serial No. 460,554, filed April 11, 1921.

The primary object of my invention is the provision of a power operating device which will lift pivotally mounted doors and open them with means associated therewith for holding the door in open position if desired.

A further object of my invention is the provision of a power door operating means through which power is applied to the doors gradually through a friction pulley over which a flexible member operates and between which there is slippage if for any reason the doors will not open and thus avoid any danger of breakage, and which will also slip if the doors abut against the wall or other part of a structure after opening.

Another and further object of my invention is the provision of a door operating means which is simple in operation and which requires a minimum of power to operate the same.

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 drawing. Stock bin doors 14 and 15 are pivotally supported from shaft 17 by arms 16 and 18 respectively, 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. The front wall 20 of the stock ore bin structure is shown, having a poke hole 21 therein, a bracket 22 being secured to said wall 20 and which has a sheave 23 suspended therefrom by means of a spring 24. Mounted upon the frame work of the ore bin in any suitable manner is a power shaft 25 which is connected to any suitable source of power, the said shaft 25 having a pulley 26 mounted thereon and over which sheave 23 extends. 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 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 433 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 arms 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 piece 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. Door opening apparatus comprising in combination a line shaft, a pulley fixed to said line shaft, a sheave over said pulley having a guide way formed therein, and a lifting member normally out of engagement with said pulley but adapted to be brought into frictional contact therewith, the lifting member being normally carried by said sheave.

2. Door operating mechanism comprising in combination a power shaft, a pulley mounted thereon, a spring mounted sheave positioned over said pulley, rollers positioned in said sheave forming a guideway therein, a flexible door operating member passing over said pulley and over the rollers in said sheave, and spring mounted means adapted to normally hold said flexible member out of contact with said pulley, but allowing said member to be pulled into contact with said pulley.

3. Door operating mechanism comprising in combination a power shaft, a pulley mounted thereon, a flexible door operating member passing over said pulley, a spring mounted sheave over said pulley and means in said sheave to hold said flexible member normally out of contact with said pulley but allowing said flexible member to be pulled into engagement with said pulley.

4. Door operating mechanism comprising in combination a power shaft, a pulley mounted thereon, a flexible door operating member passing over said pulley, having one end secured to the door and one free end, a spring mounted sheave over said pulley and rollers in said sheave adapted to normally hold said flexible member out of engagement with said pulley.

5. Door operating mechanism comprising in combination a power shaft, a pulley mounted thereon, a flexible door operating member passing over said pulley, a spring mounted sheave over said pulley, means in said sheave to hold said flexible member normally out of contact with said pulley but allowing said flexible member to be pulled into engagement with the said pulley, and a locking member adapted to hold said gates in open position after being opened by the power mechanism.

6. Door operating mechanism comprising in combination a power shaft, a pulley

mounted thereon, a flexible door operating member passing over said pulley, a spring mounted sheave over said pulley, means in said sheave to hold said flexible member normally out of contact with said pulley but allowing said flexible member to be pulled into engagement with the said pulley, and a hand operated pivotally mounted toggle member adapted to engage said flexible member to hold the gates in open position.

Signed at Chicago, Illinois, this 7 day July, 1924.

JOHN C. HAYES, JR.