P. J. ALWART.

SCREENING APPARATUS.

APPLICATION FILED MAY 15, 1918.

1,284,034.

Patented Nov. 5, 1918.

4 SHEETS—SHEET 1.

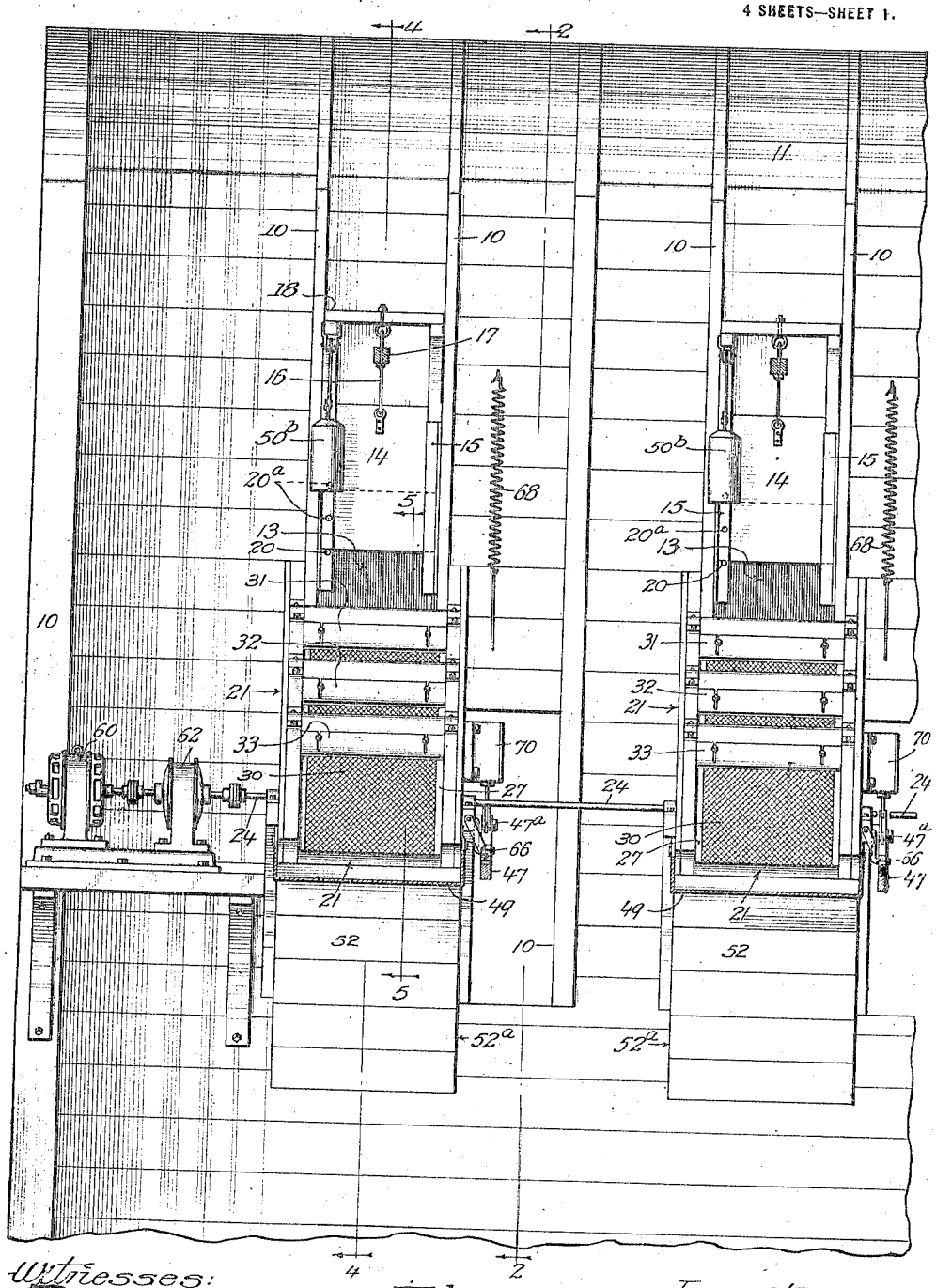



Fig. 1.

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4 SHEETS—SHEET 2.

Fig. 2.

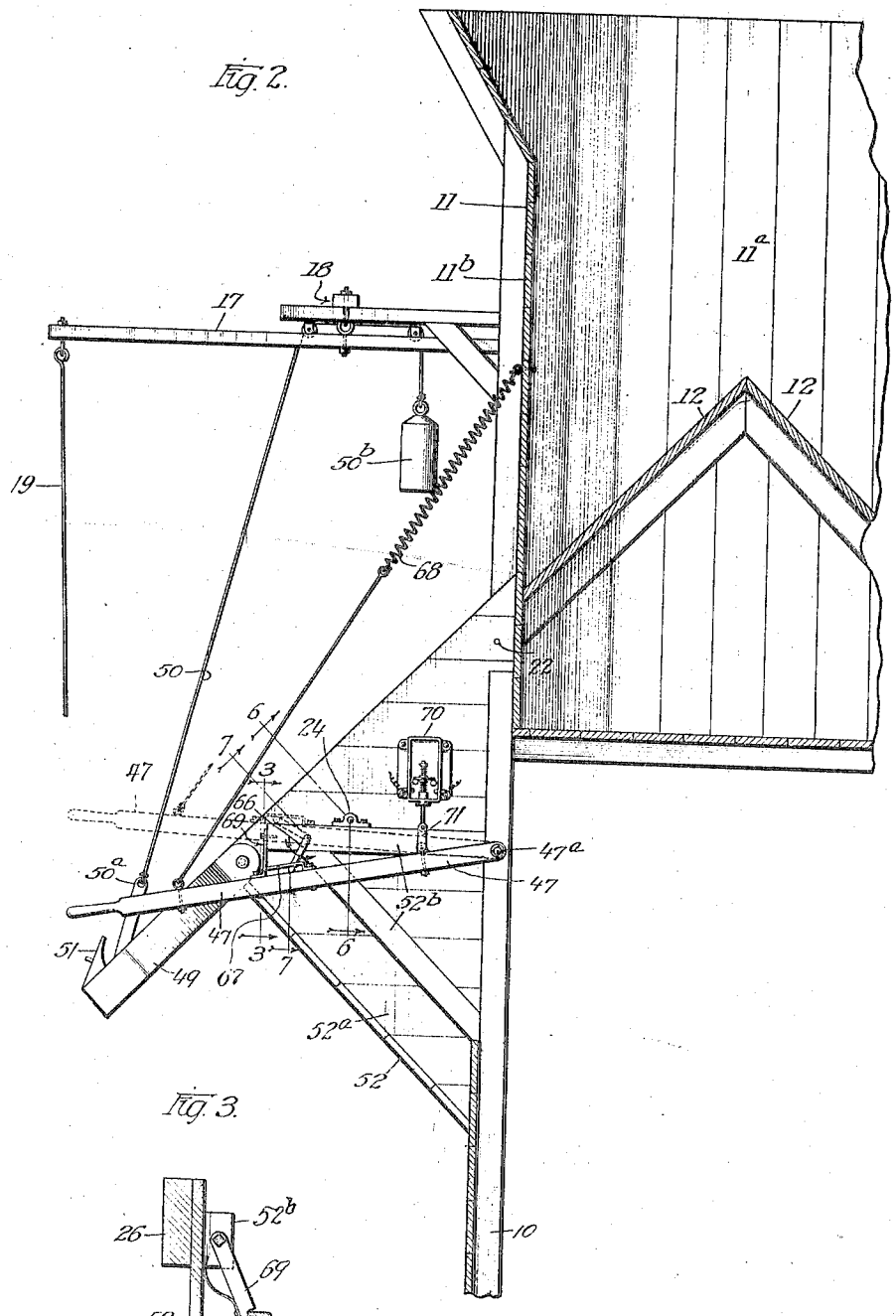



Fig. 3.




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4 SHEETS—SHEET 3.

Fig. 4.

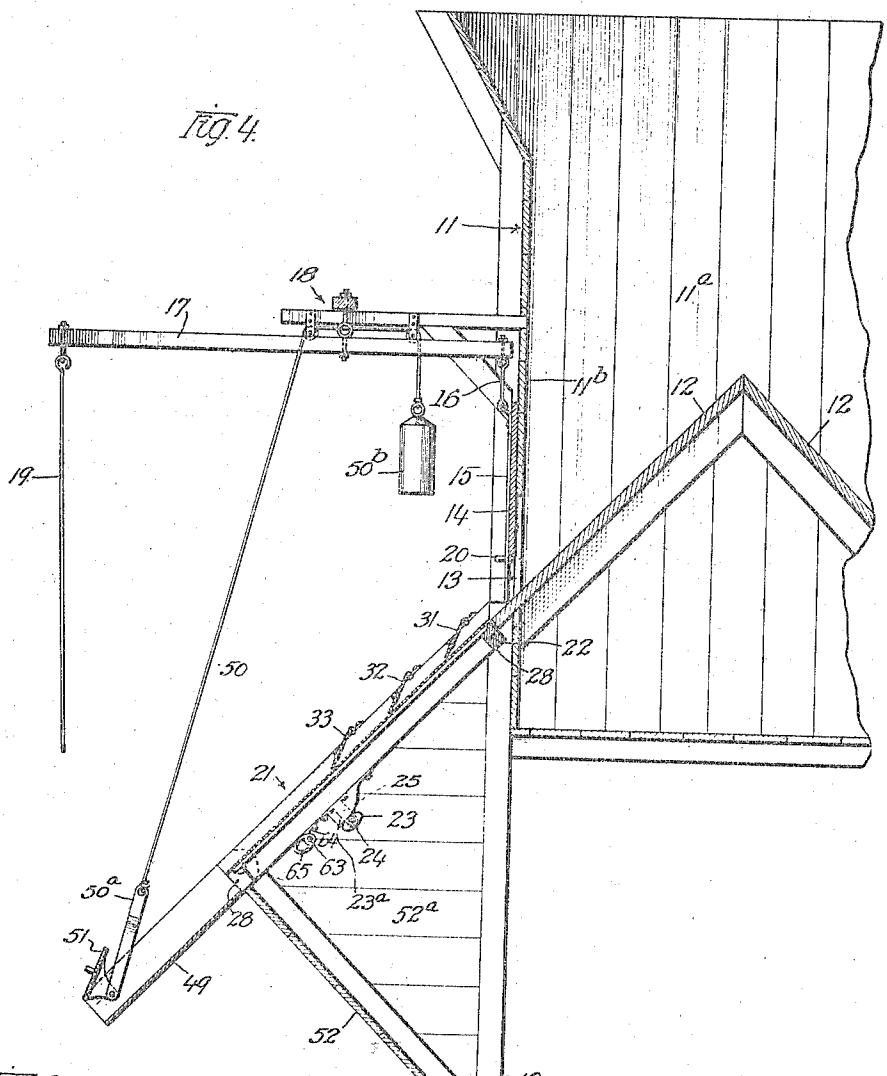
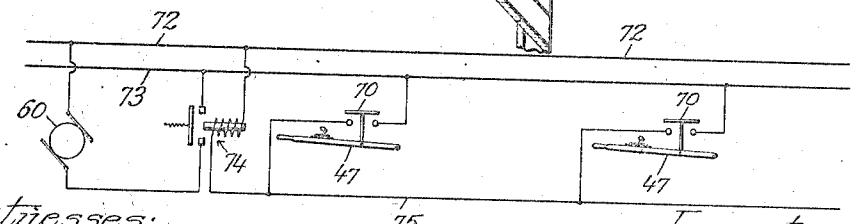



Fig. 8.




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4 SHEETS—SHEET 4.

Fig. 5.

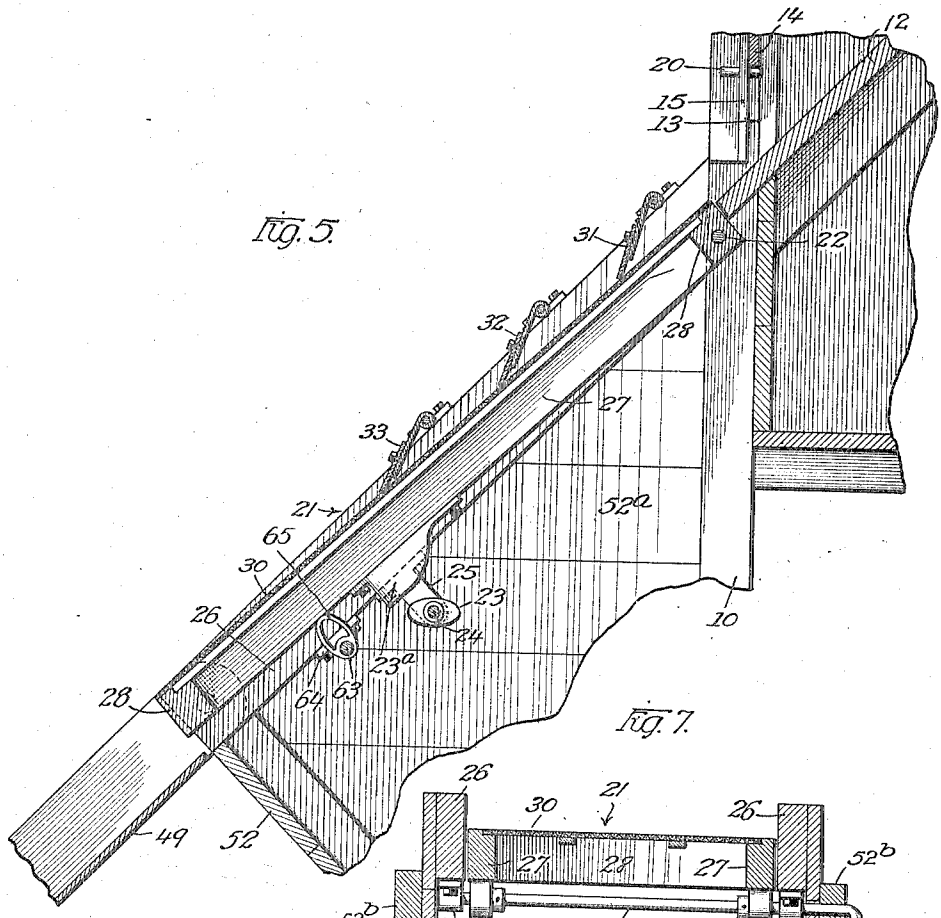
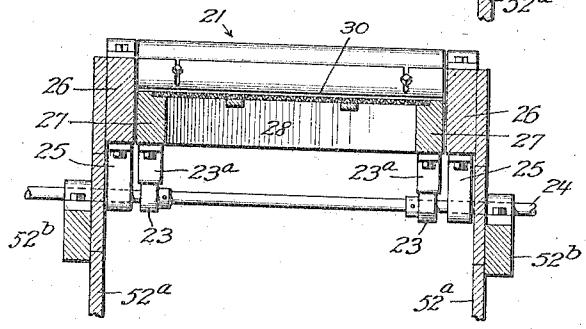



Fig. 7.




Fig. 6.




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THE SCIENTIFIC PRESS CO., PHOTO-LITHO., WASHINGTON.

# UNITED STATES PATENT OFFICE.

PAUL J. ALWART, OF CHICAGO, ILLINOIS.

## SCREENING APPARATUS.

1,284,034. Specification of Letters Patent. Patented Nov. 5, 1918.

Application filed May 15, 1918. Serial No. 234,586.

*To all whom it may concern:*

Be it known that I, PAUL J. ALWART, a citizen of the United States, and a resident of Chicago, Cook county, and State of Illinois, have invented certain new and useful Improvements in Screening Apparatus, of which the following is declared to be a full, clear, and exact description.

This invention relates to screening apparatus and has been designed especially for use in screening coal, but it may be used for screening other materials, such as gravel, or the like. The invention is in the nature of an improvement upon Letters Patent issued to me on December 5, 1916, No. 1,207,262, for coal screens. In the coal screen shown and described in my prior patent, the hopper or bin has two screens, one on each side, whereas, in the present apparatus a battery of screens is employed, comprising any number of screens desired, or a battery of screens on each side of the bin or hopper, and is intended for use particularly in large yards where great quantities of material are handled. By arranging the screens to form a battery, all of the screens may be actuated by a single motor and a large number of wagons may be loaded at one and the same time. One of the objects of the present invention is to economize power and to save wear and tear upon screens when not in actual use screening coal or other material. Another object is to provide a screen and motor controlling device at each screen. Other objects and advantages will appear in the course of this specification, and with all of said objects and advantages in view, this invention consists in the several novel features hereinafter fully set forth and more particularly defined in the claims.

The invention is clearly illustrated in the drawings accompanying this specification in which:

Figure 1, is a front elevation of screening apparatus embodying a simple form of the present invention, and showing two complete screens; Fig. 2, is a vertical cross section taken on the line 2—2 of Fig. 1; Fig. 3, is a detail cross section taken on the line 3—3 of Fig. 2; Fig. 4, is a vertical cross section taken on the line 4—4 of Fig. 1; Fig. 5, is a detail vertical cross section taken on the line 5—5 of Fig. 1; Fig. 6, is a detail cross section taken on the line 6—6 of Fig. 2; Fig. 7, is a detail cross section taken on the line 7—7 of Fig. 2, and Fig. 8, is a diagrammatic view of the electrical apparatus used in connection with the screens.

In the embodiment of the invention illustrated in the drawings, 10, designates the uprights of a frame work which support the hopper or bin 11. The bottom 12, of said hopper or bin is preferably inclined downward from the middle line of the bin to discharge openings 13. Said discharge openings 13, are shown in one wall $11^b$, only, but as in the apparatus of my prior patent, they may be located in both side walls. The hopper or bin may be of any desired length to accommodate as many screens as is desired, and it may be divided by walls $11^a$, between the screens to provide separate compartments for different grades of material. The discharge openings 13, are located between the lower ends of the bottoms 12, and the tops of the screens 21, and said openings are controlled by doors 14, which slide in ways 15, secured to the walls $11^b$, of the structure. The doors may be supported by any suitable means at different heights and for convenience, I show a pin or bolt 20, for each door, which may be placed in any one of holes $20^a$, in the bars which form ways 15. If desired, a lever 17, fulcrumed on a frame 18, may be connected to each door 14, by a link 16, and a link 19, may be connected to the other end of the lever to enable a person standing upon the ground or a wagon to raise the door 14, if the necessity for it arises.

The screens 21, are pivotally supported at their upper ends on rods 22, secured in the frame work of the structure, and said screens extend between stationary side frame members 26, which lie parallel with said screens and project forward and downward from the sides $11^b$, of the structure. Side walls $52^a$, and inclined front walls 52, at the lower end of each screen provide a chute for receiving the finer material which is separated from the coarser material by the screen, and convey it to a receptacle underneath the hoppers or bins 11.

As in my prior patent, each screen 21, comprises a rectangular frame 27, 28, and a sieve or screen 30, secured thereto which may be of any suitable or desirable mesh, and pivotally mounted upon the stationary side frame members 26, are transversely ex-

tending gates 31, 32, 33, that retard the flow of the coal or other material down the surface of the screen. A delivery chute 49, is hingedly secured to the lower end of the side frame members 26, and its free end may be supported by a bail 50[a], and a rope or cable 50, which may extend over pulleys supported by the frame 18, and have a counter weight 50[b], secured to it. A swinging gate 51, pivotally secured to the lower end of the chute 49, serves to check the flow of coal, and this chute and gate may be used when delivering the cleaned coal into bags.

The parts thus far described are substantially made in accordance with the parts shown and described in my prior patent and have been more fully set forth in said patent. In the present apparatus, however, a number of screens 21, are employed on each side of the structure and all of the screens on the same side of the structure are agitated by one motor which can be controlled from any of the screens, whereby one or any number of the screens may be agitated at the same time, and the remaining ones may remain stationary.

The motor 60 (see Fig. 1), which may be an electric motor, is connected to a driving shaft 24, through speed reducing gearing 62, and said driving shaft 24, extends under all of the screens on one side of the structure and is journaled in bearings 25, which may be supported on the stationary side frame members 26. On said driving shaft 24, are secured cam blocks 23, which are located underneath the frame members 27, of the screens, and are adapted to strike against shoes 23[a], secured to said side frame members 27, to thereby agitate the screens. Means are provided for holding the screens out of contact with the cam blocks 23, when the screens are not in use, and said means may comprise a screen lifting shaft 63, one for each screen, and journaled in bearings 64, secured to the underside of the stationary side frame members 26. Lifting arms or cams 65, are provided upon said shaft 63, and when turned to the proper position, are arranged to engage with the under side of the frame members 27, of the screens, to lift said screens sufficiently to clear the shoes 23[a], from the path of movement of the cam blocks 23. Each screen lifting shaft 63, has a crank arm 66, upon one end which is connected to a controlling lever 47, pivotally mounted on the structure, as at 47[a].

The connection between the crank arm 66, and lever 47, may comprise a strap 67, secured to the upper edge of the lever 47, which leaves a slot into which project the bent end of the crank arm 66. The arrangement is such that when a lever 47, is depressed or swung downward, the crank arm is turned in the direction of the arrow in Fig. 2, from the position shown in dotted lines to that shown in full lines in said figure and the cams or arms 65, are moved from the position, holding the screen out of contact with the cams 23 (see Fig. 5) to one in which the screen rests upon said cams 23, (see Fig. 4) and is agitated thereby during rotation of the shaft 24. Each lever 47, is normally held in its operative position by a spring 68, connected to the lever and to an adjacent portion of the structure. A spring pressed detent or pawl 69, fastened to a bracket 52[b], may be employed for holding down the lever 47, against the action of the spring 68.

In order that the motor may remain inactive except when one or more of the screens are to be operated, a remote control switch 70, is associated with each lever 47, which switch controls the circuit to the motor 60. The switch 70, may be of any suitable form and is shown as secured on the side wall 52[a], and its actuating rod is connected to the lever 47, by a link 71. In the electric circuit shown in Fig. 8, the electric conductors 72, 73, for the motor 60, run to a magnet switch 74, which is normally held open. The solenoid of the magnet switch is in circuit with all of the remote control switches 70; these circuits are readily traced in Fig. 8, at 72, 75. By closing a circuit through any of the remote control switches 70, the solenoid of the magnet switch 74, is energized and, the motor circuit established through said magnet switch.

In the operation of the apparatus, coal, or other material to be screened, is placed in the bins 11, and the gates 14, adjusted to allow the material to flow down the screens. As in the coal screens of my prior patent, the gates 31, 32, 33, prevent the coal from running down the screens when they are stationary. If it is desired to load a wagon with screened coal or other material, the wagon is driven underneath any screen and the lever associated with that screen is depressed. The cams or arms 65, of that screen are thereby swung down far enough to bring the shoes 23[a], of that screen upon the cams 23. Simultaneously the switch 70, connected with the depressed lever is closed and the circuit through the solenoid of the magnet switch is closed, thereby closing the motor circuit. The driving shaft 24, is thereby set in motion and the screen, whose lever is depressed, is agitated by the cams 23, and the coal permitted to run down the screen, where it is cleaned and the clean coal delivered to the wagon. It is to be observed that the other screens are supported out of contact with their cams 24, by the cams or arms 65, so long as the operating levers of said screens remain raised. If, while one screen is in operation, it is desired to use another screen, the lever for that screen is depressed, there-

by bringing the screen into working contact with its agitating cams 23, which are rotating, by reason of the closed circuit made by the lever of the first mentioned screen. A circuit through the switch of the second mentioned screen is now closed, and if the lever of the first mentioned screen is raised to stop agitation of its screen, the circuits through the magnet switch and motor are not interrupted, but the motor continues to run, and any screen which has been lowered to the agitating cams is agitated thereby. Thus, so long as any lever is depressed the motor continues to run, and the screen of each lever which is depressed, is agitated by the cam driving shaft, but as soon as any lever is raised, agitation of its screen ceases, and material ceases to run down it.

From the above it is apparent that the motor remains at rest until at least the lever of one screen is depressed, that all of the screens, whose levers are not depressed remain stationary, while the one or those whose levers are depressed, are set into motion.

More or less variation of the exact details of construction is possible without departing from the spirit of this invention; I desire therefore, not to limit myself to the exact form of the construction shown ad described, but intend, in the following claims, to point out all of the invention disclosed herein.

I claim as new and desire to secure by Letters Patent:

1. In screening apparatus, a bin having a plurality of discharge openings, a battery of screens, each screen extending forwardly and downwardly from a discharge opening, retarding gates resting upon said screens, means for agitating said screens including a single motor driven shaft, means associated with each screen for disconnecting it from the agitating means, and means for setting said motor in motion from any screen and simultaneously moving said screen into operative relation with said screen agitating means.

2. In screening apparatus, a bin having a plurality of discharge openings, a battery of screens, each screen of which projects forwardly and downwardly from a discharge opening, retarding gates resting upon said screens, a single motor driven shaft having screen agitating means thereon, said screens being normally held out of operative relationship with said screen agitating means, and means under the control of a single lever for each screen, for setting said motor in motion, and operatively connecting the screen, associated with the lever, with the screen agitating means.

3. In screening apparatus, a bin having a plurality of discharge openings, a plurality of inclined screens extending from said openings, retarding gates resting upon said screens, a single driving shaft for all of said screens, cams on said shafts for agitating the screens, an electric motor for driving said shaft, a magnet switch in the motor circuit, a screen lifting shaft associated with each screen, means on said screen lifting shafts arranged to hold said screens out of contact with the cams on the driving shaft when in one position and to lower said screens into contact with said cams when in another position, means associated with each screen for rocking said screen lifting shafts, including a controlling lever, and a remote controlled switch associated with each lever and operated thereby to close a circuit through the magnet switch.

4. In screening apparatus, a bin having a plurality of discharge openings, a battery of screens, each screen of which projects forwardly and downwardly from a discharge opening, a single motor driven shaft for all of said screens, having screen agitating means thereon, means associated with each screen for normally holding said screens out of engagement with said screen agitating means, and means associated with each screen for setting in motion said motor and simultaneously bringing its screen into working relation with the agitating means.

5. In screening apparatus, a bin having a plurality of discharge openings, a plurality of screens extending from said openings, a single motor driven shaft, means thereon associated with each screen for agitating the same, means associated with each screen for disconnecting said screen from the agitating means, including a controlling lever, and a control device for said motor operated by said controlling lever, and arranged to set said motor in motion when the lever is moved to operative position.

6. In screening apparatus, a bin, a battery of screens communicating with said bin through discharge openings, a single motor driven shaft for all the screens of the battery, cams on said shaft for agitating each screen, means associated with each screen for disconnecting said screen from the cams associated with it, said means including a controlling lever and electric switches for starting and stopping the motor, there being one switch associated with each lever, operated by said lever, and operating to close a circuit to the motor when the lever is moved to operative position.

7. In screening apparatus, a battery of inclined screens, retarding gates resting on said screens, a single driving shaft for all of said screens, an electric motor for driving said shaft, cams on said shaft engaging said screens for agitating the same, a screen lifting shaft associated with each screen, cams on said lifting shafts arranged to engage said screens to thereby raise the same out of working engagement with the cams on the driving shaft, a crank arm on each

screen lifting shaft, a controlling lever for each screen connected to said crank arm, and a remote control switch for each screen operatively connected with the controlling lever for the screen, said remote control switch operating to close a circuit to said motor when the controlling lever is moved to operative position.

8. In screening apparatus, a bin having a plurality of discharge openings, a battery of screens, extending forward and downward from said discharge openings, a motor driven shaft extending under all of the screens of the battery, cams on said shaft for engaging and agitating said screens, screen lifting shafts, one for each screen, screen lifting members on said screen lifting shafts adapted to engage and lift said screens when the shafts are turned from inoperative to operative position, each screen lifting shaft having a crank arm on one end, controlling levers, one for each screen, operatively connected with the crank arm of its screen lifting shaft, and electric switches, one for each screen, operatively connected with the controlling lever of the screen, and arranged to close a circuit through the motor when the operating lever of any screen is moved to bring said screen into engagement with its agitating cams.

May 7th, 1918.

PAUL J. ALWART.

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