(No Model.)

S. B. HART.

GRAIN CONVEYER.

No. 420,788. Patented Feb. 4, 1890.

Fig. 1.

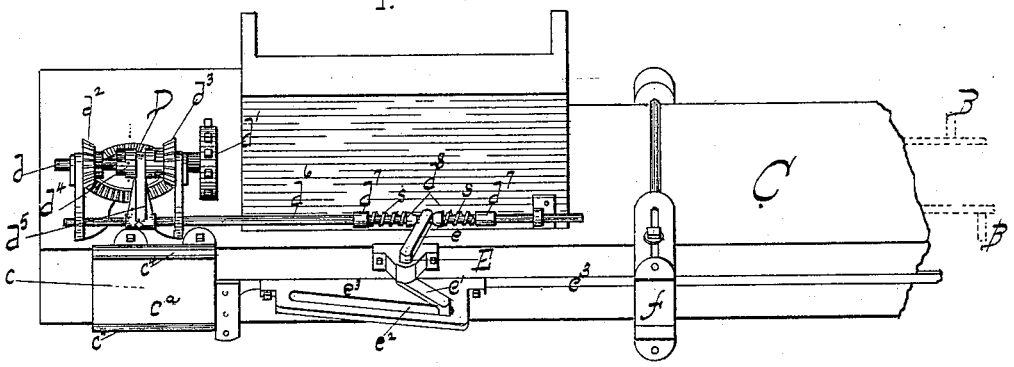


Fig 2

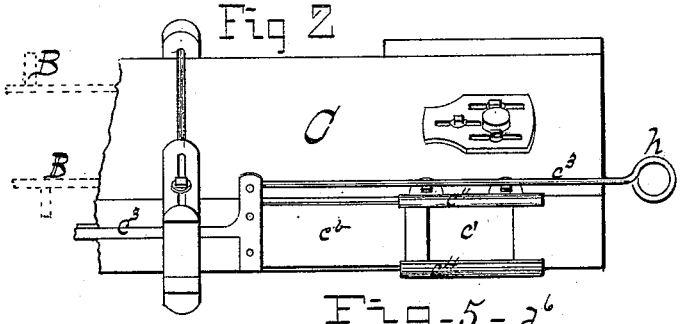


Fig. 5. d^6

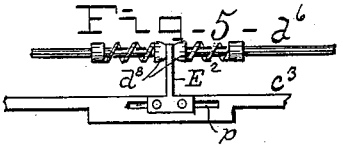


Fig 3

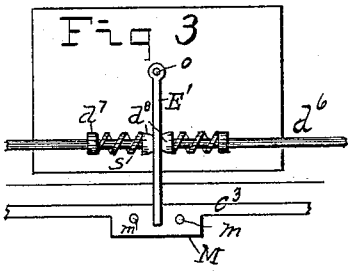
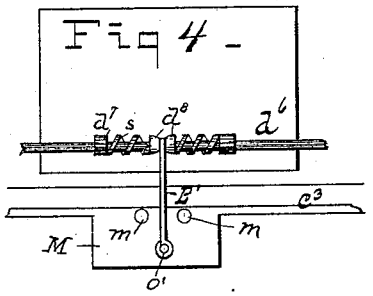


Fig 4.



Witnesses
Harry Bitner
W. McGill.

Inventor
Stacy B. Hart

By His Attorneys
Hill & Dixon.

UNITED STATES PATENT OFFICE.

STACY B. HART, OF PEORIA, ILLINOIS.

GRAIN-CONVEYER.

SPECIFICATION forming part of Letters Patent No. 420,788, dated February 4, 1890.

Application filed August 24, 1888. Serial No. 283,688. (No model.)

To all whom it may concern:

Be it known that I, STACY B. HART, of Peoria, in the county of Peoria and State of Illinois, and a citizen of the United States of America, have invented certain new and useful Improvements in Grain-Conveyers, of which the following is a specification.

In the drawings, Figure 1 is a perspective view showing one end of the conveyer-tube with the operating devices attached thereto. Fig. 2 is a similar view of the end of the conveyer opposite to that shown in Fig. 1. Figs. 3, 4, and 5 are detached views showing different modifications in the form of the device by which the simultaneous reversal of the grain-valves and grain-conveyer is effected.

Similar reference-letters indicate the same or corresponding parts.

In the combined thrashing and winnowing machines commonly termed "grain-separators" it is often desirable, for rapid economic work, to employ two wagons to receive the grain from the machine, and to provide the latter with a reversible conveyer which will alternately discharge the grain at its opposite sides, in order that the wagons may not interfere with each other. When one wagon is nearly loaded at one side of the machine, the other is brought into position at the opposite side, whereupon, by merely reversing the action of the conveyer and the position of the grain-valves, the discharge is changed from one wagon to the other without intermitting the operation of the separator.

For the purpose of enabling the grain to be discharged alternately at opposite sides of the machine, it is already customary to provide the separator with an elevator adapted to receive the grain from the screens or shakers, raise it to a sufficient height, and dump it into a conveyer-tube arranged transversely across the top of the separator, with its ends projecting beyond the sides of the machine and provided with parts controlled by alternately-operating valves, so that by moving a handle or lever at either side of the machine one of the valves can be closed and the other opened simultaneously, and to make the action of the conveyer reversible, so that by moving another handle or lever it may be caused to force the grain to and discharge it through the part that is open at the time, whichever it may be.

By making the valve-reversing device and the conveyer-reversing device independent of each other, so as to be operated only by separate movements of the hand or hands of the attendant, as heretofore, not only is the labor of the attendant increased, but close attention and prompt action are rendered necessary on his part to prevent the choking of the conveyer or the loss of the grain by any delay in the proper relative adjustment of the valves and conveyer.

The object of my invention is to render substantially impossible any improper adjustment of the valves relative to the action of the conveyer; and to such end it consists in so combining the valve-reversing device with the conveyer-reversing device that both are operated simultaneously and in the proper manner with relation to each other by a single movement of the hand of the attendant.

In the drawings, C indicates the grain-conveyer adapted to be arranged transversely of the separator-frame. The device which forces the grain along in the conveyer-tube C may be of any appropriate form and mode of operation, the revolving endless-chain and scraper device B shown in the drawings being merely typical of conveyer devices in general. The two grain-ports, arranged at or near the opposite ends of the conveyer-tube, are represented at c c', and are provided with grain-valves c^a c^b, so connected, for example, by a rod c^3 that the opening of either will close the other and the closing of either will open the other, the form of the connecting device being immaterial to the purposes of my invention so long as it is adapted to this simultaneous operation of the valves, and the form of the valves being immaterial so long as they are adapted to perform their work, and to be simultaneously reversed, as described. The action of the grain-conveyer may be reversed in various ways—for example, in endless-chain conveyers by the means represented in Fig. 1. In this figure the endless chain or belt is operated by a pulley or sprocket-wheel arranged within the conveyer-tube and having a bevel-pinion D affixed to the outer end of the shaft. A short shaft d, continuously driven in one direction by a sprocket-wheel or other suitable driver d', is arranged parallel to the face of the pinion D

and provided with two loose bevel-pinions d^2 d^3, which mesh into the opposite edges thereof. A sliding clutch d^4 is mounted on the shaft d, between the two pinions d^2 d^3, so as to alternately engage with and revolve either of said two pinions, and is feathered to the shaft d, so as to rotate continuously therewith. A sliding rod d^6 is connected to the clutch d^4 by means of a forked arm d^5 to enable the attendant at will to bring the clutch d^4 into engagement with either of the two pinions d^2 d^3, and thus drive the conveyer in either direction, or by holding the clutch intermediate between said pinions d^2 d^3, so as to be out of engagement with both, to stop the action of the conveyer. Inasmuch as the principle of the first part of my invention consists, broadly, in adapting the conveyer and grain-valves to be reversed simultaneously by a single movement of the hand of the attendant, it follows that means by which this result is effected may be widely varied without departing from the principle of the invention, and, indeed, must be varied more or less with every variation in the form of the valves or the mode of driving or reversing the conveyer. I will therefore describe certain forms of such means applicable to the valves and reversing devices hereinabove set forth, leaving it to the skill and judgment of the constructor to make such changes as may be necessitated by any variation from said form of valves and reversing devices.

The valves in the form above described slide longitudinally of the bottom of the conveyer-tube in cleats c^4, and open their respective parts when they move inward. When the valve c^a, Fig. 1, is closed, the operative or lower portion of the endless chain must move to the right in order to carry the grain to the other part. (Shown in Fig. 2.)

If the driving-wheel d' is arranged to rotate in such direction that its teeth (visible in the drawings) move downward, as shown in Fig. 1, the pinion d^3 must be engaged with the clutch d^4, when the valve c^a is closed and the pinion d^2 must be similarly engaged when the valve is open, in order to carry the grain to the proper port; hence, with the construction shown in said drawings the clutch must move to the right when the valve moves to the left, and vice versa. In such case a lever of first order or its practical equivalent must be used between the valve and clutch in order to cause them to move simultaneously in opposite directions when the position of either is reversed, and such is therefore the form of the connecting device herein shown. There are various ways in which such lever device may be actuated for the purpose referred to; but I prefer the arrangement shown in Fig. 1, which is as follows, viz: to construct the connecting device E in the form of a double-crank shaft having its cranks e e' somewhat oblique to each other, as shown, one of said cranks e being forked to embrace the rod d^6 between hubs or pins d^7, and the other being provided with a wrist-pin which plays in an inclined cam-slot e^2, arranged in a plate e^3, which is attached to and moves with the rod c^3. The plate e^3 should be guided accurately, and this may be accomplished in any suitable manner—as, for example, by countersinking the rod c^3, or the edge of the plate, in a groove in the bottom of the conveyer-tube, and confining the rod in the groove by a bracket or stop f, (which may also be employed to secure and adjust the conveyer-tube in place on the frame of the machine, if desired.) The crank-arm e may be connected to the rod d^6 by means of a block or blocks d^8, which slide on the rod and are held in position by the yielding force of a spring or springs s, arranged between them and the stops d^7, if preferred, which will virtually render the clutch a spring-clutch in both directions of its action. Any movement of c^3 to open the valve c^a, Fig. 1, will now engage the clutch with the pinion d^2, and any movement of the rod to close the valve will release the clutch from pinion d^2 and engage it with pinion d^3, while a movement sufficient only to half open or close the valve, will disengage the cluth from both pinions and stop the conveyer, the inclined cam-slot e^2 operating also to lock the lever in whatever position it may occupy at any time, and to allow the valve a greater range of movement than the clutch. It is perfectly obvious, however, without the aid of a separate illustrative drawing, that the driving-wheel d' may be arranged to normally run in the opposite direction to that hereinabove described, and that the valves c^a c^b may be arranged to close their parts when moved inward and open them when moved outward. If both of these changes be made, the relation of the valve movement to the clutch movement will continue substantially unchanged, the two rods c^3 d^6 will be required to move in opposite directions, and a lever or other equivalent device for compelling such opposite movement will still be necessary; but if either of said changes be made alone the conditions will change, the clutch and valve will be obliged to move in the same direction, in order to effect the simultaneous adjustment required, and the lever will be unnecessary. In such case the connection between the clutch or its actuating-rod and the valve or its actuating-rod may be effected by making the connection E in the form of a lever of the second or third orders, as shown in Figs. 3 and 4, where the straight lever E′ takes the place of the lever E. In Fig. 3 this lever is pivoted to the conveyer-tube at o, embraces the rod d^6 between the blocks d^8, and hangs down between two pins m m on the rod c^3, or an enlargement thereof marked M. In Fig. 4 the lever E is pivoted to the enlargement M below the pins m m and extending up between them to reach the rod d^6. In both of these forms a movement of the valve-actuating rod

c^3 in either direction will first bring one of the pins m against the lever E′ and then carry the lever along with it, moving the rod d^6 in the same direction; or said connection may be made in the form of an arm extending (and communicating motion) from one of said movable parts to the other, as shown in Fig. 5, where the rod c^3 is provided with an arm E^2, extending upward and embracing the rod d^6. In this form to give the rod c^3 greater limits of motion than the rod d^6 the arm E^2 is not rigidly attached to the former, but slides back and forth in a slot p, allowing a certain movement of the rod c^3 in either direction before it becomes rigid therewith and transmits the motion of said rod to rod d^6. In all of these constructions it will be noticed that the rod c^3 is allowed a greater range of movement than the rod d^6. This is merely because the valves shown here are slide-valves and require greater movement in closing and opening than the usual forms of clutches actuated by the rod d^6; or in the form of an arm extending (and communicating motion) from one of said movable parts to the other, as shown in Fig. 7; but where the two connecting parts are constructed to have equal ranges of movement the valve and clutch or their actuating-rods may be attached rigidly together, or the two rods may be extended to the end of the conveyer-tube and there provided with handles so arranged as to be grasped together in one hand, and thus operated simultaneously as the equivalent of a single handle.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination of the conveyer-tube provided with openings at its opposite ends, valves for closing said openings, means for moving the contents of the conveyer-tube alternately in either direction, and a connecting device adapted to simultaneously reverse the action of the conveyer and operate the valves, as and for the purpose stated.

2. In a reversible conveyer, a valve-operating rod connected with the gearing of the conveyer and adapted to reverse said gearing simultaneously with the operation of the valves.

3. In a reversible conveyer, a valve-operating rod carrying a cam-slot e^3, a crank-arm E, pivoted to the conveyer-tube, with one end sliding in the cam-slot e^3 and the other connected with the shifting parts of the gearing of the conveyer, whereby the movement of the valve-operating rod reverses said gearing simultaneously with the operation of the valves.

STACY B. HART.

Witnesses:
CHAS. S. HILL,
HARRY BITNER.