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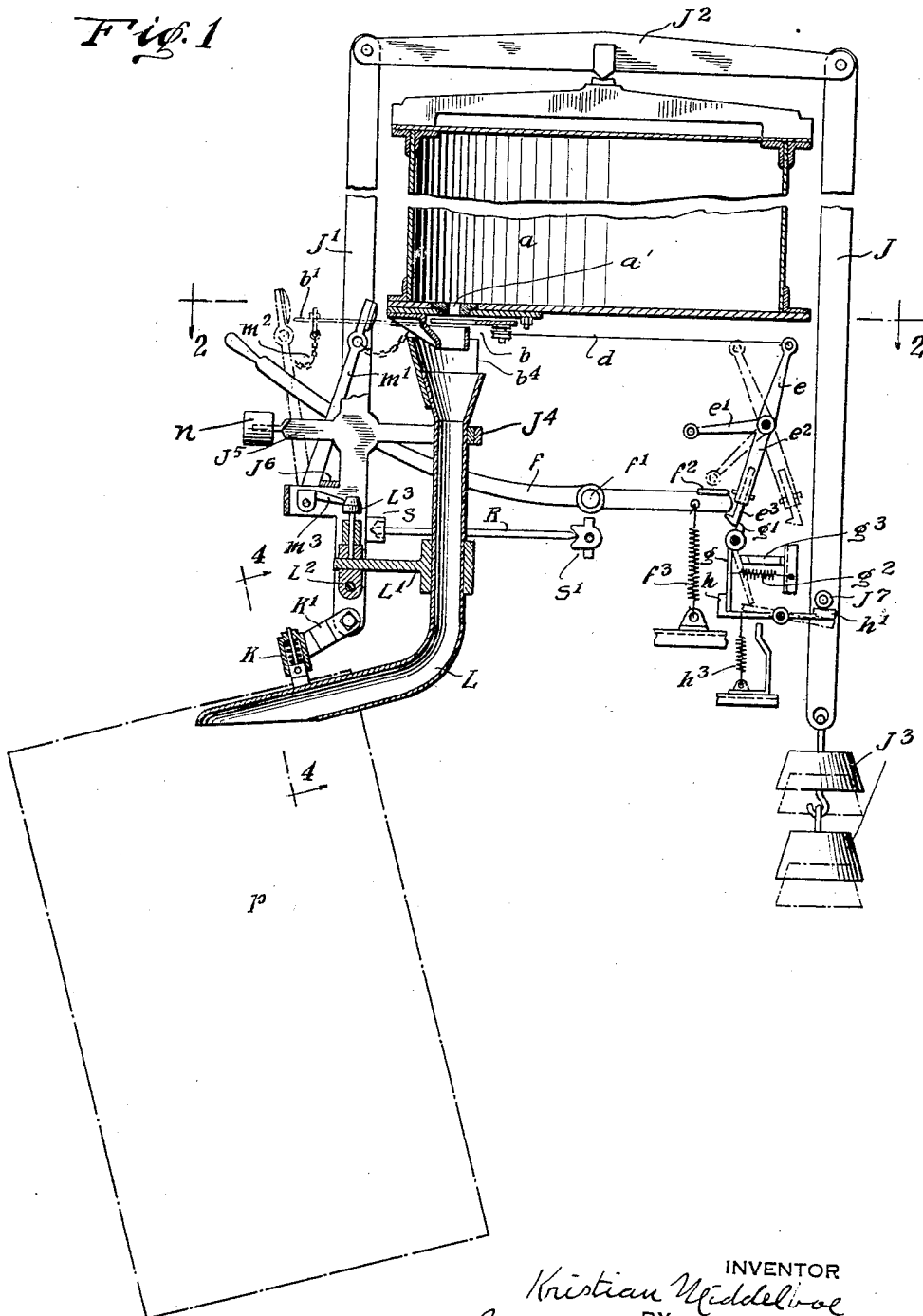
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1,851,017

BAG FILLING MACHINE

Filed Jan. 4, 1930

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

Fig. 2

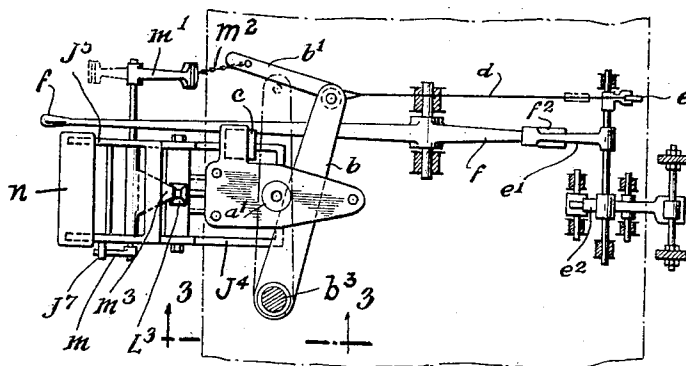


Fig. 3

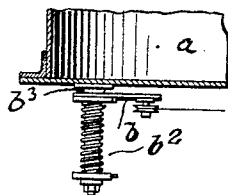
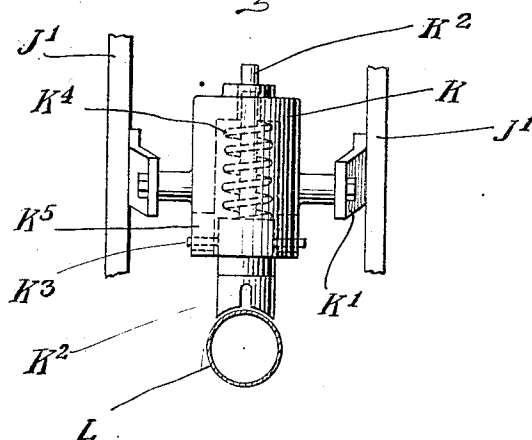


Fig. 4



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BAG FILLING MACHINE

Application filed January 4, 1930, Serial No. 418,514, and in Hungary January 14, 1929.

This invention relates to machines for filling bags with freely flowing pulverulent material, such as cement, and more especially to machines of this general character in which the bags are filled through spouts which are introduced within the bags. Such machines are commonly used for the filling of self-closing bags, known as valve bags, but the present invention is applicable to the filling of bags whether or not they are of the self-closing type. In another application for Letters Patent of the United States Serial No. 305,221, filed September 11, 1928, there is shown and described a machine of this general character in which the bag to be filled is held upon and supported by the filling spout during the operation of filling and is released therefrom when the predetermined quantity of material has been delivered into the bag. In that construction the filling spout is carried by one arm of a counter-balanced lever and a means is provided whereby, when the desired quantity of material has entered the bag, the lever is caused to swing on its axis and the inclination of the supporting part of the filling spout is increased sufficiently to permit the bag to slip from the spout. There is also provided a clamping device or presser by which, during the filling operation, the bag is clamped between the presser and the filling spout and when the supporting lever is swung upon its axis the spout is moved away from the presser so that the bag shall be free to slip from the spout, a means being provided to dislodge the bag from the inclined portion of the spout. The dislodging means is shown in that case as a striker which is arranged to be brought into contact with the bag at the proper time, preferably at the bottom of the bag near the corner, the effect of the striker being to cause the bag, the filling spout, and the supporting lever to swing about the axis of the lever, thereby increasing the inclination of the spout and insuring the dislodgment of the bag therefrom. In accordance with the present invention the filling spout, during the operation of filling, is held against movement with the bag clamped between itself and the presser, but when the predetermined weight of

material has been introduced into the bag the filling spout is released and, under the influence of gravity, the filling spout, with the filled bag, swings to such position that the bag will slip from the filling spout without the intervention of any other means. The release and discharge of the filling bag is thus effected automatically. To accomplish this result, there is combined with the filling spout and its support a weighing mechanism which, when the predetermined weight of material has been introduced into the bag, initiates the operation of the releasing device.

The invention will be more fully explained hereinafter with reference to the accompanying drawings in which it is illustrated, and in which:

Figure 1 is a view in sectional elevation of a machine in which the invention is embodied, the bin from which the material is supplied being partly broken out to save space.

Figure 2 is a view in horizontal section on the plane indicated by the broken line 2—2 of Figure 1, looking in the direction of the arrows.

Figure 3 is a detail view in section on the plane indicated by the broken line 3—3 of Figure 2, looking in the direction of the arrows, illustrating particularly the application of a spring to the slide or gate by which the flow of the material from the bin is permitted or stopped.

Figure 4 is a detail view in sectional elevation and on a larger scale, on the plane indicated by the broken line 4—4 of Figure 1, illustrating particularly the presser or clamping device.

The bin *a*, from which the material is supplied to the bags to be filled, is shown as having at *a*¹ an outlet for the discharge of the material, the delivery of the material being controlled by a gate *b*, pivoted on the bottom of the bin, as at *b*³, so that it may swing in a horizontal plane and provided, as shown at *b*² in Figure 3, with a torsion spring which tends to close the gate when it is released.

The material falls from the outlet *a*¹ through a funnel *b*⁴ into the flared upper end of the filling spout *L*, which is substantially L-shaped and is supported by a lever *L*¹

which is pivoted, as at L^2 , on a cross-rod between the two members of a suspension rod J^1 which hangs from one end of a balance lever J^2 from the other end of which hangs a weight rod J , at the lower end of which are hung the weights J^3 which counterbalance the weight of a bag p and its contents until the bag is filled to such a weight that it over-balances the weights J^3 , whereby are initiated the operations to be described.

The filling spout is shown in Figure 1 in the position which it assumes during the operation of filling and it is permitted to swing only in a counter-clockwise direction, as seen in Figure 1, being restrained from movement in the opposite direction by a bracket J^4 , supported by the members of the suspension rod J^1 . A counter weight n is supported by bracket arms J^5 on the opposite side of the suspension rod J^1 from the filling spout.

It will be observed that while the suspension rod is hung at its upper end from the balance lever J^2 and is capable of movement in a vertical direction, it is held from swinging to the right, under the influence of the weight of the filled bag, by radius rods R , which have their bearings at s and s^1 , as shown in Figure 1. The bag p to be filled is slipped upon the lower arm of the filling spout when the latter is swung upon the axis L^2 in a clockwise direction when the filling spout has been tilted to discharge the filled bag and the machine is to be set for the filling of an empty bag. When the bag has been placed in position on the filling spout the latter is swung to the position shown in Figure 1 and is there held, the bag being clamped between the lower arm of the filling spout and the presser K . The latter is supported by arms K^1 from the lower ends of the two members of the suspension rod J^1 and comprises a plunger K^2 which is shaped at its lower end to conform to the filling spout L . The plunger, supported in the main frame of the presser, is pressed downward by a spring K^4 and its movement is limited by pins K^3 which travel in slots K^4 of the main frame. By this means variations in thickness of the bags and slight relative movements of the filling spout are compensated for and the bag held from accidental dislodgment during the filling operation.

The filling spout is so proportioned that the center of gravity of the bag and its contents, during the operation of filling, is offset to the left, as shown in Figure 1, and the supporting lever L^1 , with the filling spout, must therefore be locked, during the operation of filling, against swinging upon the axis L^2 . Accordingly, the lever L^1 is extended upward from its axis L^2 and is provided with a stop L^3 , the movement of which to the left during the operation of filling is prevented by a detent m^3 which is carried by the shaft axis of a tripper arm or lever m^1 .

The lever m^1 is connected at its upper end with the gate b through a chain m^2 and an arm b^1 on the gate b , so that when the gate b is moved to a position to permit the flow of material from the bin into the filling spout the lever m^1 will be moved from the position shown by broken lines in Figure 1 to the position shown by full lines and the detent m^3 will be in such relation to the stop L^3 of the lever L^1 that movement of the lever L^1 and therefore of the filling spout L will be prevented. On the other hand, when the gate b is moved to the position shown by broken lines in Figure 2, to cut off the flow of material, the arm b^1 of the lever b will strike the lever m^1 and will cause it to move from the full line position of Figure 1 to the broken line position, thereby taking the detent m^3 out of the path of movement of the stop L^3 and permitting the filling spout to swing in a counter-clockwise direction under the influence of the unbalanced weight of the bag and its contents. The shaft axis of the lever m^1 is provided with an arm m which cooperates with a stop J^7 to limit the movement of the lever.

The gate b is moved from its closed position, shown by broken lines in Figure 2, to its open position shown by full lines in that figure against the tension of the spring b^2 , by a wire d which connects the gate b with a lever e which is pivoted on the frame of the machine and has an arm e^1 and an arm e^2 . In the closed position of the gate the end of the arm e^1 overlies the end f^2 of a hand lever f pivoted at f^1 and provided with a spring f^3 which returns it to a position of rest. When the empty bag has been placed on the filling spout as described, the long arm of the lever f is depressed and the short arm, contacting with the end of the arm e^1 , swings that arm and the lever e from the position shown by broken lines in Figure 1 to the position shown by full lines thereby opening the gate b and permitting the flow of material from the bin to the filling spout. As already described, the opening movement of the gate b effects movement of the lever m^1 from the position shown by full lines in that Figure 1, and through the cam-like coaction of the detent m^3 and the stop L^3 (which is properly shaped for that purpose), the lever L^1 and the filling spout L are swung to the position shown in Figure 1 and are locked in that position. The major part of the resetting movement of the filling spout is effected by the operator as soon as he has placed the bag in position on the spout. The cam-like coaction of the detent and the stop completes the movement and locks the parts in filling position.

After the filled bag has been dislodged from the filling spout the counterbalance weights J^3 raise the suspension rod and the parts connected therewith, including the filling spout, and pull down the weight rod J .

The latter carries a pin J^7 which, in the downward movement of the weight rod, contacts with the end h^1 of a detent lever h , causing it to coact with a tripper arm g of a latch g^1 . The latter is arranged to coact with a yielding portion e^3 of the latch lever e^2 and thereby hold the lever e and its connected parts in the position shown by full lines in Figure 1. The detent h is acted upon by a spring h^3 which, when the pin J^7 of the weight rod J is raised from the end h^1 of the lever h , as the bag is filled to the predetermined weight, pulls down the corresponding end of the detent h , releases the tripper arm g and so effects the release of the arm e^2 and lever e and permits the gate b to be closed by the action of the spring b^2 . A spring g^2 returns the arm g to position of rest against stop g^3 . The movement of the gate to shut off the flow effects the release of the filling spout in the manner already described and the cycle of operations is repeated. It will be understood that when the hand lever f is pulled down the wear plate f^2 on the other end contacts with the arm e^1 and swings it to the full line position as above described. The arm e^2 is also swung to full line position and the yielding part e^3 slips over the latch g^1 so that the arm e^2 is then held by the latch g^1 until it is again released by movement of the weight rod as above described.

It will be understood that various changes in details of construction and arrangements can be made to suit different conditions of use and that, except as pointed out in the accompanying claims, the invention is not restricted to the particular construction shown and described herein.

I claim as my invention:

1. In a bag filling machine, the combination of a filling spout adapted to support a bag to be filled, a balanced lever, a weight rod hung from one end of said balanced lever, a suspension rod hung from the other end of said balanced lever, a supporting lever for the filling spout mounted on the suspension rod, a detent mounted independently of the last named lever, a detent on the last named lever engaged by the first detent to prevent movement of said supporting lever, and means the operation of which is initiated by the movement of the balanced lever to move the detent and permit the angle of inclination of the spout to be changed with the movement of said lever.
2. In a bag filling machine, the combination of a bin having an outlet, and a pivotally supported filling spout, a pivoted detent to prevent movement of the spout, an arm carried by the detent, a gate to control the discharge of the material through the outlet, a balanced lever, means to support from one end of said balanced lever a bag to be filled, a weight rod hung from the other end of the balanced lever, means tending

normally to close the gate, means operated by the closing of the gate to engage the detent arm to release the detent and filling spout, a lever operatively connected to the gate and having a detent arm, a detent to engage said arm and prevent movement of the last named lever, and means the operation of which is actuated by the movement of the weight rod to move the detent to release the arm and lever and permit the gate to close.

Signed at London, England this 6th day of December, A. D. 1929.

KRISTIAN MIDDELBOE.