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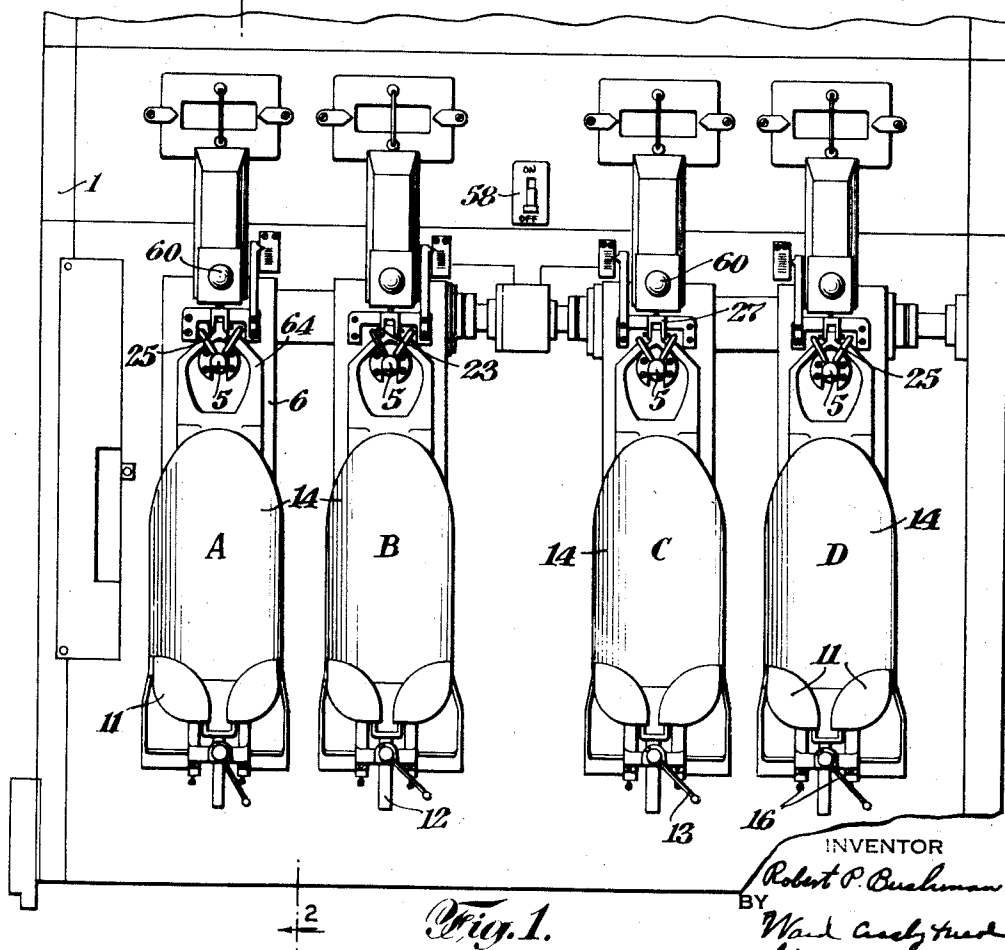
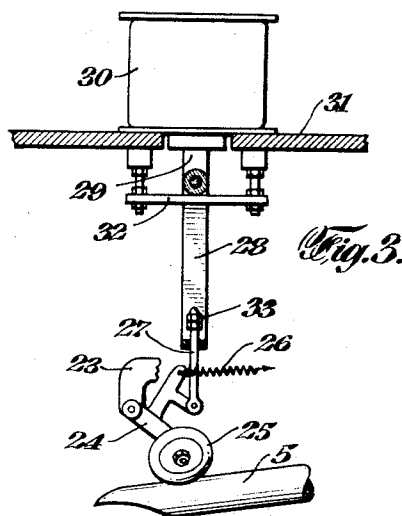
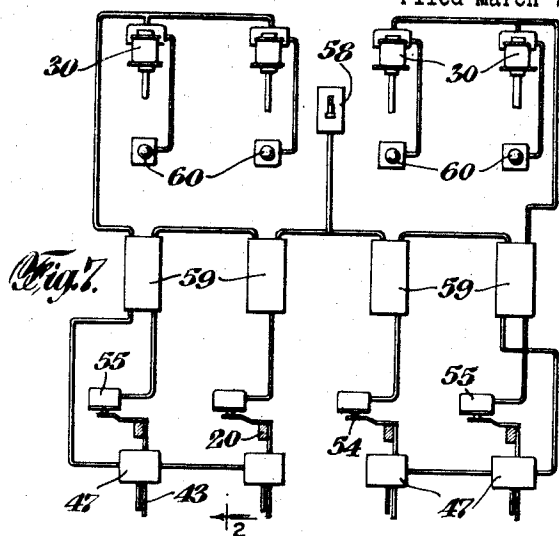
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BAG FILLING AND WEIGHING MACHINE

Filed March 7, 1940

2 Sheets-Sheet 1



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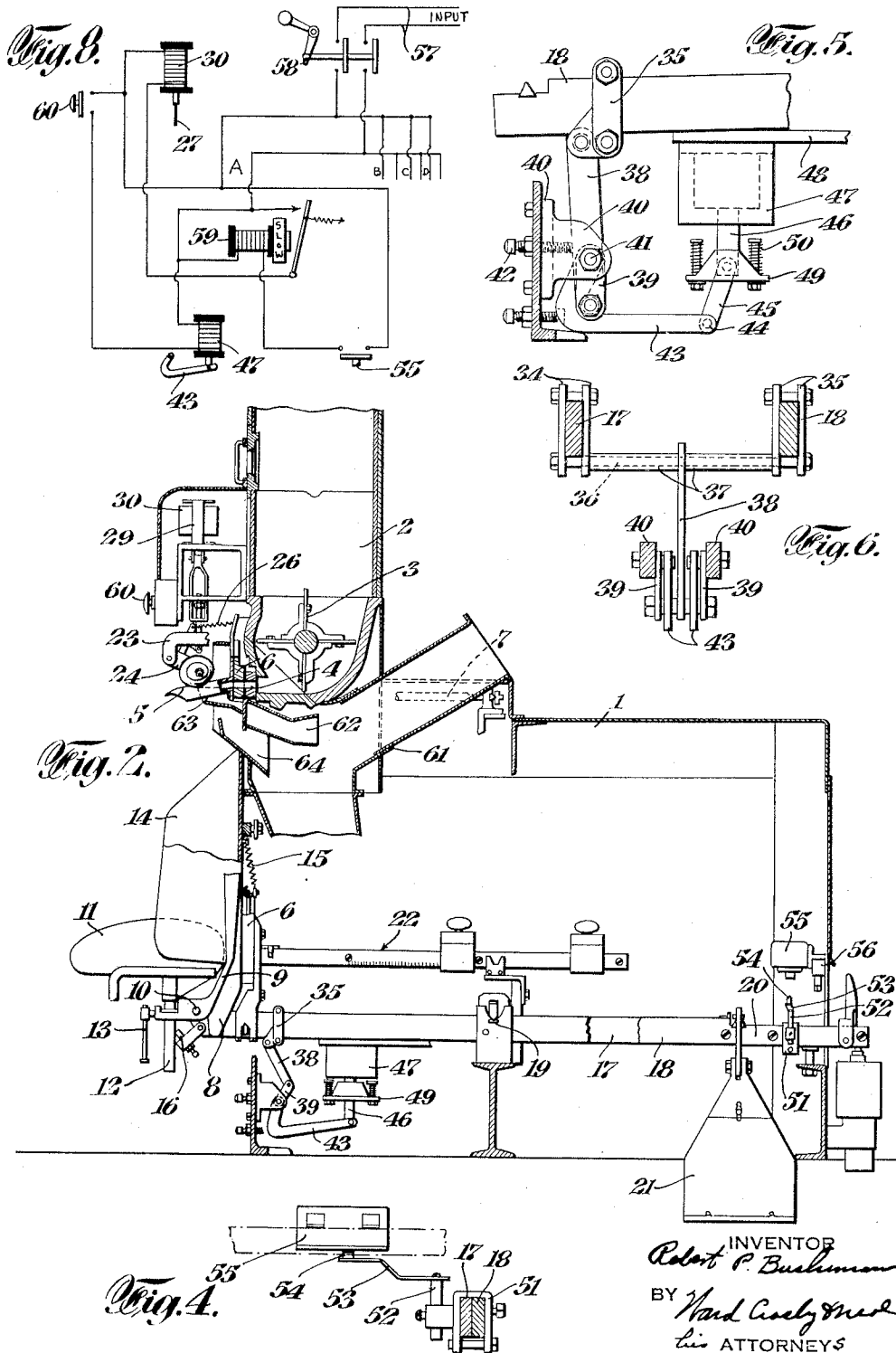
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2 Sheets-Sheet 2



UNITED STATES PATENT OFFICE

2,232,437

BAG FILLING AND WEIGHING MACHINE

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15 Claims. (Cl. 249—60)

This invention relates to valve bag filling and weighing machines and more particularly to machines which are adapted to feed a predetermined weight of material into bags to be filled. The invention is especially useful in connection with the filling of valve bags with finely divided material such as cement, high early cement, hydrated lime, gypsum, basic slag, potash, salts or the like.

An object of the invention is to provide a machine capable of accurately and uniformly weighing and packaging material, and at the same time maintaining a high hourly output of such packages.

Another object of the invention is to provide a machine capable of producing clean packages, substantially free from material on the exterior thereof.

The invention consists in the novel features, arrangements, and combination of parts embodied by way of example in the apparatus hereinafter described as illustrating the preferred form of the invention, and the invention will be more particularly pointed out in the appended claims.

Further objects and advantages of the invention will more fully appear from the following description taken in connection with the accompanying drawings which show, by way of example, the present preferred embodiment of the invention.

In machines of this character, the escape of material in finely powdered form, such as cement or the like material, has always been considered highly detrimental to the operator; and additionally it has been increasingly important to keep the packages as clean as possible. The trade has been increasingly insistent upon such clean packages, and in addition material spilled upon and adhering to the exterior of the packages is wasted, with resultant loss. In an effort to overcome this, suction means have been lately employed in an effort to remove excess material from polluting the air, spilling on the exterior of the bags, or becoming otherwise wasted. Such suction systems have not effectively accomplished their intended purpose, due largely to ever-increasing desire and need for increased production and the resultant endeavor to discharge the filled bags from the machine immediately after they have been weighed. This increased speed of operation of the machines has included forceful and positive discharge of the filled bags, but such discharge has always been kept in step with

the speed of filling and weighing, with the detrimental results above indicated.

Likewise, in machines of this type the material is forced under high pressure and along with it entrained air enters into the bag, so that when the bag is filled with the proper weight of material it also contains an appreciable amount of air under pressure. This is one of the chief causes for blowing out powdered material when the bag is immediately discharged. By the present invention these various objections have been overcome and at the same time a machine has been provided which is simple, dependable, does not require undue servicing, and operates in an efficient and economical manner.

Referring to the drawings, in which the same reference characters indicate the same parts in the various views:

Fig. 1 is a front elevation of a four-unit machine in filling position, with certain parts broken away;

Fig. 2 is a vertical sectional view taken at 2—2 of Fig. 1 showing in side elevation one of the units of the machine;

Figs. 3 and 4 show further details of Figs. 1 and 2;

Fig. 5 is a somewhat enlarged side elevation of the scale beam latch, shown in Fig. 2, but in locked position;

Fig. 6 is a front elevation of the details shown in Fig. 5;

Fig. 7 is a somewhat diagrammatic view of the electrical system; and

Fig. 8 is a similar view showing further circuit details of the system illustrated in Fig. 7.

A general outline description of the machine will first be given to facilitate an understanding of the details to be described following. The present embodiment comprises four units (designated hereinafter as A, B, C and D) and each unit comprises a weighing mechanism, which carries a filling tube movable therewith into and out of register with the corresponding feed throat, and a saddle for supporting the bottom of the bag and also movable with the weighing mechanism. The filling tube has a fixed forward and downward angle of inclination such as to induce a filled bag to slide downwardly thereon when free for such movement; and the saddle is pivoted slightly to the rear of its center of gravity with the filled bag resting thereon. Clamping means is provided for holding the bag on the tube during the filling operation; and after the bag is filled, due to the locking force of the clamp against the tube, induced by the tendency of the

bag to move downwardly along the tube, the clamp may not be readily unlocked until its predetermined time of release. Means is also provided for locking the weighing means in down position and for unlocking the same when the next filling cycle is to take place. As the weighing means moves downwardly under the influence of the filled bag, it initiates a control for the bag clamp releasing means, which control is so timed that the release of the bag clamp is delayed for a predetermined interval of a few seconds after the bag has been filled and the weighing means locked in down position. This permits the entrained air in the bag to escape before the bag may be removed or discharged from the machine, and prevents the filling material from being blown out of the bag by the entrained air. A vacuum system is employed for removing the material spilled adjacent the valve and for carrying away the material which escapes from the valve with the entrained air immediately after the filling is completed. After the said period of delay and upon the releasing of the bag clamp, the bag is automatically discharged. After the bag has been thus discharged, the scale remains locked in its down position permitting the operator to insert an empty bag on the filling tube and restore the mechanism to filling position by releasing the scale latch, whereupon the filling cycle again commences.

Referring to the drawings and more particularly to Figs. 1 and 2: the general framework of the machine is designated as 1 and is provided with a common bin 2, in the bottom of which is disposed a suitable power driven impeller 3 for feeding the material to the respective filling units which are designated A, B, C and D. Each filling unit is supplied with material through a fixed feed throat 4 (Fig. 2) which is in register during the filling operation with a filling tube 5 rigidly attached to the upper end of the vertical frame 6, which extends upwardly from and is carried by the weighing beam mechanism to be described following, and the upper end of which is held in parallel alignment with said weighing beam assembly by suitable fulcrum connectors such as 7 in the usual manner. The filling tube 5 has a forward and downward inclination, which preferably should be of the order of 4° to 8°; and in the present embodiment is about 6°. The saddle bracket 8 is integrally attached to the lower end of the frame 6 and a saddle support 9 is pivotally attached thereto at the pivot point 10. The saddle 11 is mounted on the shaft 12 which is slidably positioned within the support 9 and is secured in the desired vertical position therein by means of the screw 13, to provide for the vertical adjustment of said saddle. The saddle support 9 extends upwardly and carries rigidly attached thereto a back shield or plate 14. The pivot point 10 is positioned slightly to the rear of the center of gravity of the saddle with the filled bag resting thereon, so that there is a tendency for the saddle to rotate in an anti-clockwise direction (Fig. 2) when free to do so. A helical coil spring 15 is attached at its upper end to the saddle support 9 and at its lower end to the frame 6; the spring being of such strength as to urge the saddle to its normal position as indicated in the drawings when it is not occupied with a bag, but permitting the saddle to rotate about its pivot point 10 when occupied with a filled bag and when the bag is permitted such movement. A pair of suitable adjustable stops 16 are fixed to the lower forward portion of the saddle bracket

8 to limit the rotational movement of the saddle 11; which preferably is permitted a downward inclination greater than that of tube 5. The downward inclination of the saddle 11 should be at least as great as that of tube 5 so as to prevent binding of the filled bag between the tube, along which the top of the bag gravitates downwardly, and the saddle, along which the bag also gravitates downwardly as it is being discharged; and a slightly greater inclination of the saddle with respect to the tube has been found preferable.

The weighing scale in the present embodiment comprises main scale beams 17—18 spaced apart at the fulcrum point 19 and forwardly thereof and bent together and attached to form a single trunk at the rear portion marked 20 (see also Fig. 4). The main beam weight 21 is suitably supported from the portion 20 of the main beam. Supported upon and positioned above the main beam assembly is an auxiliary beam assembly designated in its entirety as 22 for finer weight adjustment, as well known in the art.

Bag clamp means and release

Immediately above the filling tube 5 is a clamp bracket 23 rigidly attached to a relatively stationary part of the machine and pivotally attached at the lower end thereof is a clamp arm 24 (see also Fig. 3) provided with two inwardly extending branches to which are attached clamp discs such as 25 (see Fig. 1); the discs being preferably formed of firm rubber and being mounted on lock bolts so as to provide rotational adjustment to permit fresh peripheral portions to be brought into use when the discs become worn. The clamp arm 24 is provided with an upwardly extending portion to which is attached the forward end of a helical tension spring 26, whose opposite end is attached to a relatively stationary part of the machine so as to normally urge the clamp discs 25 against the filling tube 5. Another branch of the arm 24 is attached to the lower end of a releasing rod 27, whose upper end is slidably engaged in a lower cross member of a stirrup 28, whose upper end is pivotally attached to the armature 29 of the solenoid 30 which is supported on a suitable bracket 31 rigidly attached to the machine frame. A stop bar 32 passes through the upper portion of the stirrup 28 and serves to limit the down movement thereof. The upper end of the rod 27 is provided with stop nuts 33 between which and the lower cross member of the stirrup 28 a sufficient space is provided to permit the clamp discs 25 to maintain clamping engagement with respect to the tube 5 during the downward travel of said tube; said nuts serving as a means of engagement with the stirrup 28 when the solenoid 30 is energized to thereby raise the clamp discs against the action of the spring 26.

Scale locking means

Referring more particularly to Figs. 5 and 6: the main scale beams 17 and 18 carry rigidly secured thereto adjacent their forward ends clamp links 34—35 serving to support the link bar 36 carrying spacer bushings 37 serving to hold in centered position a link 38 whose upper end is pivotally supported on the bar 36 and whose lower end is pivotally supported between the lower ends of two lock links 39, whose upper ends are pivotally supported from the U-shaped bracket 40, as at the pivot point 41. The construction of the parts is such that upon the movement of the forward end of the weighing scale to the weighed or down position, the link 38 is moved

downwardly and its lower end is guided by and moves with the lock links 39 in a clockwise direction about the pivot point 41 until the link 38 rests against an adjustable stop screw 42, in which position the scale is securely locked in the down position.

The following means is provided for unlocking the above mechanism so as to permit the scale to return upwardly to its normal weighing position after the filled bag has been discharged. The arm 43 is formed of two laterally spaced sides suitably secured together, and has its shorter arm pivoted to the bracket 40 at the axis 41, with the respective sides disposed on opposite sides of the link 38 and between the lock links 39. Its longer arm is pivotally connected as by the pin 44 to the lower end of a solenoid link 45, whose upper end is pivotally attached to an armature 46 of the solenoid 47, which is rigidly supported from the frame of the machine as by a bracket 48. Secured to the lower end of the armature 47 is a cushioner frame 49 carrying suitable helical compression springs 50 held in position by vertical studs passing freely through the frame 49.

The solenoid unlocking mechanism functions as follows. Upon energization of the relay 47, the armature 46 is urged upwardly and by moving the arm 43 about the axis 41 and the arm in turn engages the cross pin between the lock links 39 to move the same in an anti-clockwise direction and thereby moving the lower end of the link 38 in a similar direction so as to free the scale from locked position and permit it to return to weighing position under the influence of the main counterbalance weight 21 (Fig. 2). In order to provide for definitely and positively unlocking the scale, substantial force must be exerted by the solenoid 47, and to prevent damaging the mechanism the above-described cushioner has been provided.

Control switch for bag clamp release

As has been previously pointed out, upon energization of the solenoid 30 the armature 29 thereof is lifted to effect the release of the bag clamp (Fig. 3). Means for controlling the actuation of said releasing means will now be described with reference to Figs. 2 and 4. On the rear portion 20 of the main scale beam is rigidly attached a clamp bracket 51 to which is attached a vertically adjustable post 52 carrying a resilient arm 53 provided at its outer end with a button 54 positioned in vertical alignment with the movable element of an electrical switch 55 which is rigidly attached to a relatively stationary part of the machine; so that when the scale beam moves downwardly toward its weighed position the corresponding upward movement of the rear portion 20 of the scale beam causes the button 54 to close the switch 55 at or slightly prior to the down position of the scale. An adjustable limit stop 56 is rigidly attached to a relatively stationary part of the machine adjacent the switch 55 to definitely limit the down position of the scale. The effect of the closing of the switch 55 will be described more particularly following with respect to the electrical control circuit and the actuation thereof.

Electrical control circuit

Referring more particularly to Fig. 8: the input electrical power line 57 supplies electrical energy from a suitable source (not shown) and is provided with a suitable switch 58 to connect the power line to the machine circuit which supplies

electrical energy to the respective units A, B, C and D. Since the respective units are identical, only the complete circuit diagram pertaining to unit A is shown, it being understood that the same circuit is likewise present in units B, C and D. The bag clamp release solenoid 30 is connected directly to one side of the power line 57, and the other line connection to the solenoid is connected to the other side of the power line through a delayed action relay switch 59 which is in circuit with the releasing switch 55. The delayed action relay switch 59 is adjustable for a predetermined time interval so that after the closing of the switch 55, as previously described, there is a time interval before the clamp release relay 30 is actuated to lift the rod 27 to raise the bag clamp from clamping position as previously described. It has been found that a time interval of the order of two seconds has given satisfactory results for the purposes desired, said time interval being measured from the time when the scale reaches its down position. The scale lock releasing relay 47 is connected to the power line through the manually operable push switch 60, which is mounted adjacent to and immediately over the filling tube and in a readily accessible position to be actuated by the operator.

In Fig. 7 the cable circuit diagram is illustrated, showing in somewhat diagrammatic form the arrangement of the electric circuits to the various units of the machine.

Suction venting system

A suitable source of suction and filtering means well known to the art are attached to the housing 61 (Fig. 2) which has an inlet conduit 62, whose inner end is in communication with the housing 61 and whose outer end has an inlet opening adjacent the feed throat 4 and filling tube 5, and the said intake opening is in register with the vent shield 63 carried by filling tube 5 and is positioned to be brought into register with the tube 5 as the tube moves downwardly. Another inlet conduit or housing shield 64 is rigidly mounted on the machine and surrounds the filling tube 5, being provided with an opening of sufficient size to permit the vertical movement of said tube, and being so positioned as to catch spilled or excess material adjacent to or emanating from the bag valve.

Operation

When the machine is to be operated, the operator closes the switch 58 (Figs. 1 and 7) to energize the control circuit of the machine. The empty bags are then placed on the respective filling tubes 5 and the source of power is connected to operate the impeller 3 (Fig. 2) to thereby discharge material into the respective bags. Each filling unit then goes through the following cycle of operation. As the bag is filled, the scale moves to its down position where it is locked by the jack knife mechanism previously described in connection with Figs. 5 and 6, and the switch 55 (Figs. 2 and 8) is closed to initiate the control of the clamp releasing means. At this time and during the interval which it takes the delayed relay switch 59 to complete its cycle of operation, the releasing relay 30 is deenergized and the clamp means is in effective clamping position to retain the filled bag in position on the machine; and as previously described, due to the tendency of the bag to slide downwardly on the inclined tube 5, it is impractical for the operator to release the clamping means and discharge the bag.

During this time interval, the entrained air within the bag is allowed to escape and the surplus spilled material, as well as the material escaping with the entrained air, is effectively removed by the suction means previously described. Likewise, the escape of the entrained air has somewhat elongated the bag and reduced the amount of weight imposed on the filling tube while increasing the weight exerted on the saddle 11. After the predetermined time interval has elapsed, the relay 30 is automatically energized, thereby releasing the bag clamp mechanism, and immediately upon such release the top of the bag slides forwardly and downwardly along the tube 5 under the force of gravity, and simultaneously the force of gravity likewise tips the saddle 11 together with the back plate or shield 14 forwardly and downwardly to an angle which is preferably greater than the angle of inclination of the tube 5, and the bag is thereby discharged laterally and downwardly from the machine to be received by a suitable conveying mechanism such as a conveyor belt (not shown) which is positioned in the usual manner in front of and travels in a direction parallel to the front of the machine. The pivotal movement of the saddle is limited by the stop 16; and after the bag has been discharged, the saddle is returned to its normal position by means of the spring 15. At this time the scale remains locked down and the flow of material from the discharge throat 4 has been shut off, in the present embodiment by the downward movement of the tube 5 into a position out of register with the feed throat 4, which is then closed by a plate portion carried on frame 3 above the tube 5 (in a manner well known in the art); and at this time the relay 30 is still energized to hold the bag clamp in raised position. The operator then places an empty bag on the tube 5 by sliding it over the tube and beneath the clamping means. While holding the bag in this position with one hand, the operator with the other hand pushes the switch 60 to closed position, thereby energizing the lock release relay 47 which actuates the release 43 to unlock the jack knife lock and permit the scale to return to its weighing position under the influence of the scale weight 21. As the scale returns to its weighing position, its rear end is lowered with the result that the button 54 is moved downwardly to thereby open the switch 55 which deenergizes the relay 30 and permits the clamping means to return to clamping position. The filling cycle is now ready to again commence as previously described.

As will be understood from the foregoing, the degree of inclination of the tube 5 is a critical one as respects this phase of the invention. On the one hand it should not be so great as to tear the bag due to its tendency to slide off the tube while at the same time forcefully locking the clamp in position to hold it against discharge; while on the other hand it should be sufficiently great to cause the bag to be gravitationally forcefully discharged when the clamp is released.

From the foregoing it will be seen that the actual filling and weighing operations may be performed at a much greater speed than heretofore possible without having the spilled and escaping material deposited on the exterior of the bag, in addition to the detrimental result to the operator by having such material escape as the bag is discharged. The delayed action in the discharge permits sufficient time for the escaped and spilled material to be extracted and carried

away by the venting suction means, which heretofore has been partially ineffective where the bags were discharged immediately upon being filled. The net result of the foregoing is that with the present invention the hourly output capacity is greatly increased, and additionally the detrimental escape of material is prevented, thereby minimizing danger to the operator and producing cleaner packages. It has been found that the present invention permits the use of four packing units in a single machine which is capable of being handled by one operator, with increased productive capacity per machine and per operator.

Having thus described my invention with particularity with reference to the preferred embodiment of the same, it will be obvious to those skilled in the art, after understanding my invention, that changes and modifications may be made therein without departing from the spirit and scope of the invention, and I aim in the appended claims to cover such changes and modifications as are within the scope of the invention.

What I claim is:

1. In a valve bag filling and weighing machine, the combination of means for weighing a filled bag and provided with means for supporting said bag while being filled, said supporting means comprising a filling tube, means for clamping the bag on said tube, means operable upon the downward movement of said weighing means for locking the same in weighed position after the bag has been filled, means actuated by the downward movement of said weighing means and comprising time delay means for controlling the release of said clamping means at a predetermined time interval after the bag has been filled and said weighing means has been locked, and means for automatically discharging said bag upon the release of said clamping means.

2. In a valve bag filling machine, the combination of a valve bag filling tube for receiving a bag to be filled, force-feed impeller means for forcefully feeding material through said tube and into said bag, weighing means carrying said filling tube and movable downwardly under the weight of material in said bag, bag clamp means for locking the bag on said tube, means comprising time delay means for releasing said clamp means after a predetermined time interval following the complete filling of said bag, and a pivoted bottom support on which said bag is seated when filled, said tube and said pivoted support being so constructed and arranged that upon the release of said clamp the weight of the filled bag effects its discharge from the machine.

3. In a valve bag filling and weighing machine, the combination of a filling tube having a fixed forward and downward inclination for receiving a bag to be filled and for partially supporting said bag when filled, bag clamp means for locking the bag on said tube, said tube and clamp means being so constructed and arranged that the bag is held on said tube against removal by the operative, means comprising time delay means for releasing said clamp means after a predetermined time interval following the complete filling of said bag, a bottom support pivotally mounted rearwardly of its center of gravity with a filled bag thereon and on which said bag is seated and partially supported when filled, weighing means on which said tube and support are carried for movement therewith, and means for locking said weighing means in weighed position prior to the

release of said clamp means, said tube and said pivoted support being so constructed and arranged that upon the release of said clamp the weight of the filled bag effects its discharge from the machine.

4. In a valve bag filling and weighing machine, the combination of a filling tube having a fixed inclination forwardly and downwardly for receiving a bag to be filled, bag clamp means for locking the bag on said tube, a bottom support pivotally mounted rearwardly of its center of gravity with a filled bag thereon and on which said bag is seated when filled, weighing means on which said tube and said pivoted support are carried for movement therewith, means for locking said weighing means in weighed position, means for releasing said clamp means subsequent to the locking of weighing means and after a predetermined time interval following the complete filling of said bag, said tube and said pivoted support being so constructed and arranged that upon the release of said clamp the weight of the filled bag causes its upper end to slide down said tube and said support to rotate forwardly and downwardly to thereby laterally discharge the filled bag from the machine.

5. In a valve bag filling and weighing machine, the combination of a filling tube for receiving a bag to be filled, a saddle for supporting a filled bag, weighing means carrying said tube and saddle and being so constructed and arranged that said tube and saddle are at rest immediately the bag has been filled and said weighing means has moved to weighed position, said tube and saddle being so constructed and arranged that a filled bag is automatically discharged therefrom, clamp means for securing a bag to said tube and thereby preventing said discharge, and clamp release means controlled by the downward movement of the weighing means, said release means comprising time delay means and having its operation initiated upon the downward movement of the weighing means and being so timed that the actual release of said clamp is delayed for a predetermined time interval after the weighed position has been reached and said tube and saddle are brought to rest, whereby said filled bag is maintained on said machine for a predetermined time to permit entrained air and dust carried thereby to escape and thereafter said filled bag is automatically discharged.

6. In a valve bag filling and weighing machine, the combination of a filling tube for receiving a bag to be filled, a saddle for supporting a filled bag, weighing means carrying said tube and saddle and being so constructed and arranged that said tube and saddle are at rest immediately the bag has been filled and said weighing means has moved to weighed position, said tube and saddle being so constructed and arranged that a filled bag is automatically discharged therefrom, clamp means for securing a bag to said tube and thereby preventing said discharge, clamp release means controlled by the downward movement of the weighing means, said release means comprising time delay means and having its operation initiated upon the downward movement of the weighing means and being so timed that the actual release of the said clamp is delayed for a predetermined time interval after the weighed position has been reached and said tube and saddle are brought to rest to permit the entrained air and material carried thereby to escape from the bag, and suction means having an intake adjacent said filling tube for receiving said material

passing outwardly of the valve opening in said bag and material spilled adjacent thereto, whereby said filled bag is maintained on said machine for a predetermined time to permit entrained air and dust carried thereby and material spilled adjacent said valve to be removed and thereafter said filled bag is automatically discharged.

7. In a valve bag filling and weighing machine, the combination of a filling tube for receiving a bag to be filled, weight responsive means for weighing a filled bag, means for holding the bag on said tube, means for releasing said holding means, and means for controlling said releasing means, said controlling means comprising time delay means and being so constructed and arranged that the control cycle is initiated upon actuation of said weight responsive means and the release of said holding means is delayed a predetermined time interval after the bag has been filled.

8. In a valve bag filling and weighing machine, the combination of weight responsive means for weighing a filled bag and comprising a filling tube, bag clamp means for holding the bag on said tube, electromotive means for releasing said clamp means, and electrically actuated control means for said electromotive means, said control means comprising an electrical circuit with means for closing the same upon actuation of said weight responsive means and a delayed action means actuated upon the closing of said electrical circuit and in turn serving to close the circuit to said electromotive means.

9. In a valve bag filling and weighing machine, the combination of means for weighing a filled bag and provided with means for supporting said bag while being filled, said supporting means comprising a filling tube and means for clamping a bag thereon, means operable upon the downward movement of said weighing means for locking the same in weighed position after the bag has been filled, said locking means comprising a jack knife lock, means actuated by the downward movement of the weighing means for controlling the release of said clamping means at a predetermined time interval after the bag has been filled and said weighing means has been locked, and means for releasing said locking means comprising a member operatively engaging said locking means and actuated by electromotive means and manual control means therefor.

10. In a valve bag filling and weighing machine, the combination of a filling tube having a fixed forward and downward inclination for receiving a bag to be filled and for partially supporting said bag when filled, bag clamp means for locking the bag on said tube, means for releasing said clamp means after a predetermined time interval following the complete filling of said bag to permit escape of entrained air from said bag prior to its discharge, a bottom support pivotally mounted rearwardly of its center of gravity with a filled bag thereon and on which said bag is seated and partially supported when filled, weighing means on which said tube and support are carried for movement therewith, and means for locking said weight means in weighed position prior to the release of said clamp means, said tube and said pivoted support being so constructed and arranged that upon the said escape of entrained air the resultant elongation of said bag causes a substantial part of the weight of the bag to be shifted from said tube to said pivotal support and upon the release of said

clamp the weight of the filled bag effects its discharge from the machine.

11. In a valve bag filling and weighing machine, the combination of means for weighing a filled bag and provided with means for supporting said bag while being filled, said supporting means comprising a filling tube, means for holding the bag on said tube and for inhibiting the premature release thereof, means operable upon the downward movement of said weighing means for shutting off the flow of filling material through said tube; and means actuated by the downward movement of said weighing means and comprising time delay means for controlling the release of said holding means at a predetermined time interval after the bag has been filled and the flow of filling material has been shut off.

12. In a valve bag filling and weighing machine, the combination of means for weighing a filled bag and provided with means for supporting said bag while being filled, said supporting means comprising a filling tube, force-feed impeller means for forcefully feeding material through said tube and into said bag, said supporting means being constructed and arranged to discharge a filled bag therefrom, means for preventing the discharge of said filled bag, means for releasing said discharge-preventing means, control means for said releasing means comprising time delay means, said controlling means being so constructed and arranged that its cycle of operation is initiated during the filling and weighing cycle and is so timed that said bag is not released for discharge until a definite predetermined time interval after the bag has been filled, whereby said filled bag is maintained on said tube for a predetermined time to permit entrained air and dust carried thereby to escape and thereafter said filled bag to be discharged.

13. In a valve bag filling and weighing machine, the combination of a filling tube for receiving a bag to be filled, force-feed impeller means for forcefully feeding filling material through said tube and into said bag together with admixed air resulting from said forceful feeding, weight responsive means for weighing a filled bag, means for shutting off the flow of material and admixed air into said bag, means for holding the bag on said tube during and after the filling period, means for releasing said bag holding means, and time delay means for controlling said releasing means, said controlling means being so constructed and arranged that the control cycle is initiated by the actuation of said weight responsive means and the release of said holding means is delayed a predetermined time interval after the bag has been filled, said time interval being sufficient to permit the escape from the bag of air under pressure therein due to said forceful feeding of material into said bag.

14. In a valve bag filling machine, the combination of an elongated stationary bin for supplying material to the bags to be filled and having a plurality of outlet feed throats disposed in a substantially horizontal series lengthwise of said bin, a force-feed impeller disposed adjacent said feed throats and mounted within said bin for rotation about a substantially horizontal axis, a plurality of rigid filling tubes inclined forwardly and downwardly associated with respective of said feed throats for receiving material forced therethrough by said impeller, a plurality of downwardly and upwardly movable weighing means respectively carrying said filling tubes, a plurality of supports associated with respective of said filling tubes and carried therewith by respective of said weighing means, said supports each being positioned to support the bottom of a bag and being pivoted rearwardly or its center of gravity with a filled bag thereon and being movable forwardly and downwardly about its pivot to an angle at least as great as that of its corresponding tube, said weighing means serving to position filled bags at respective discharge stations upon the downward movement of said weighing means, a plurality of means for holding valve bags on said respective tubes during and after filling, and a plurality of means each comprising time delay means associated with respective of said bag holding means and so constructed and arranged as to individually release respective of said bag holding means a predetermined time interval after the respective completely filled bags have been positioned at said respective discharge stations.

15. In a valve bag filling machine, the combination of an elongated stationary bin for supplying material to the bags to be filled and having a plurality of outlet feed throats disposed in a substantially horizontal series lengthwise of said bin, a force-feed impeller disposed adjacent said feed throats and mounted within said bin for rotation about a substantially horizontal axis, a plurality of filling tubes associated with respective of said feed throats for receiving material forced therethrough by said impeller, a plurality of downwardly and upwardly movable weighing means respectively carrying said filling tubes, said weighing means serving to position filled bags at respective discharge stations upon the downward movement of said weighing means, a plurality of means for holding valve bags on said respective tubes during and after filling, and a plurality of means each comprising time delay means associated with respective of said bag holding means and so constructed and arranged as to individually release respective of said bag holding means a predetermined time interval after the respective completely filled bags have been positioned at said respective discharge stations.

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