

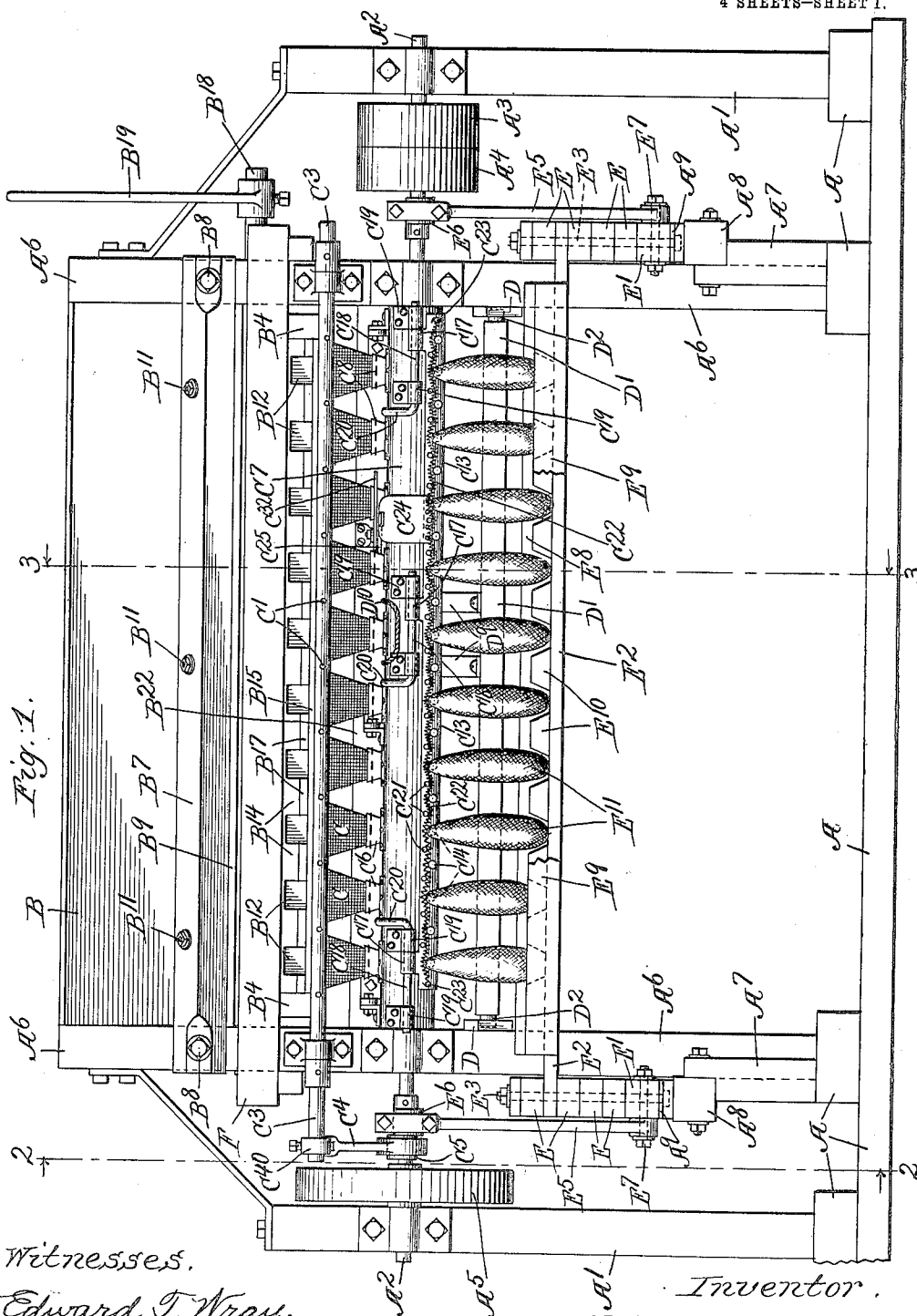
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A. M. BATES.
MACHINE FOR FILLING BAGS.
APPLICATION FILED AUG. 14, 1902.

1,070,388.

Patented Aug. 19, 1913.

4 SHEETS—SHEET 1.



Witnesses.

Edward T. Wray.
Weston B. Lazard.

Inventor.

Adelmer M. Bates.

by Parker Norton

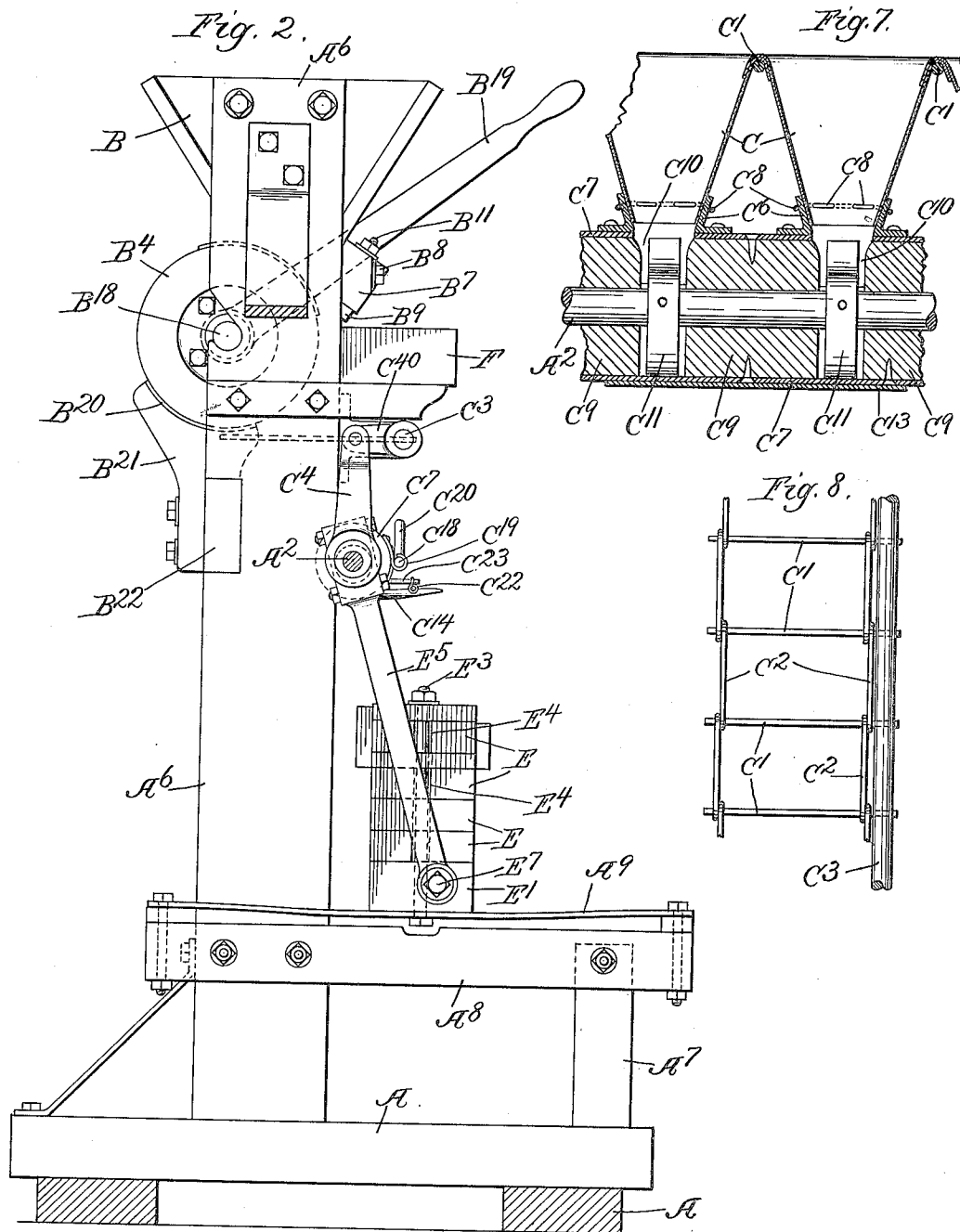
Atty's.

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4 SHEETS—SHEET 2.



Witnesses.

Edward T. Wray.
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4 SHEETS—SHEET 3

1,070,388.

Fig. 9.

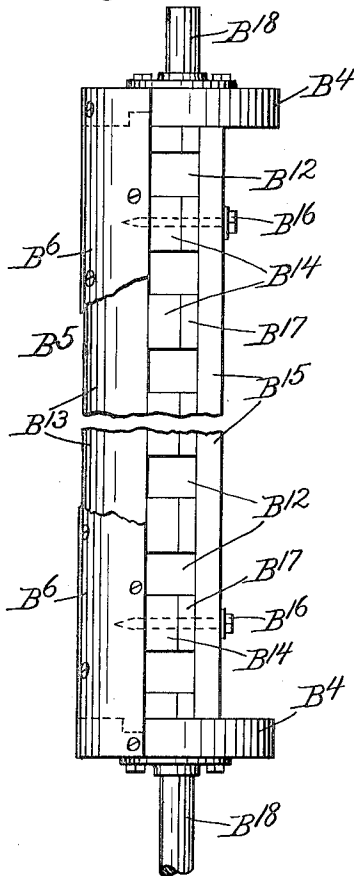


Fig. 3.

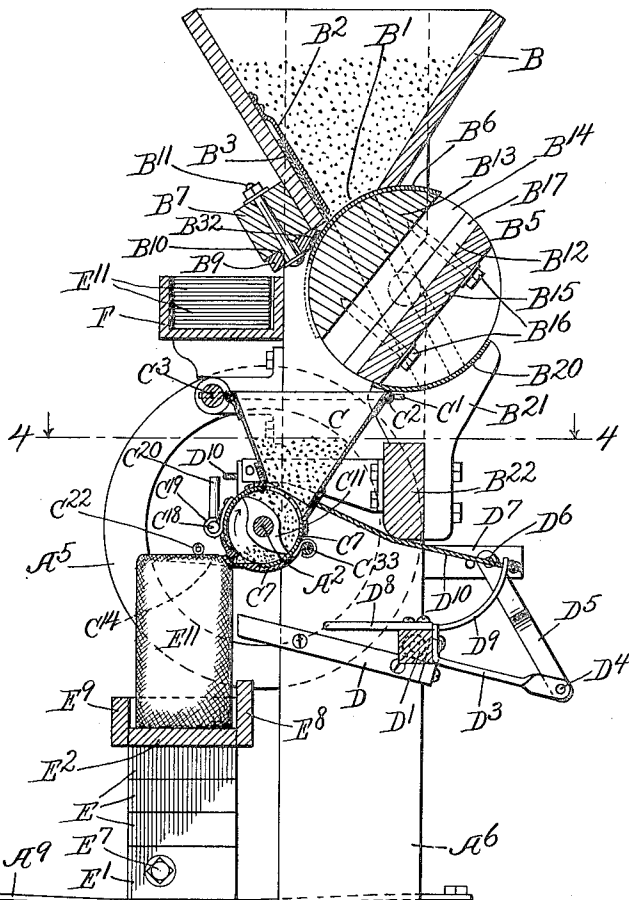
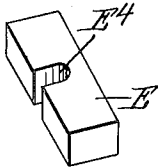
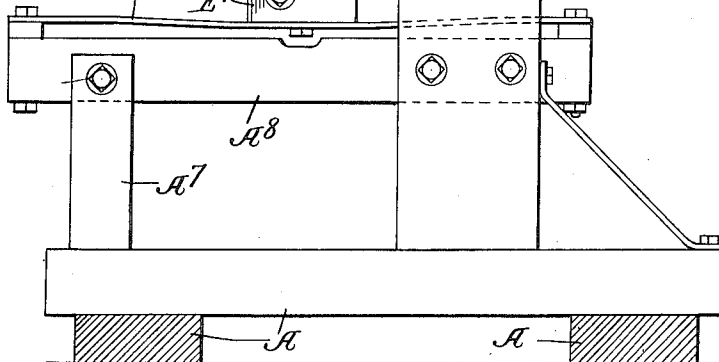


Fig. 10.



Witnesses.

Edward T. Wray
Winton B. Lazar.

Inventor.

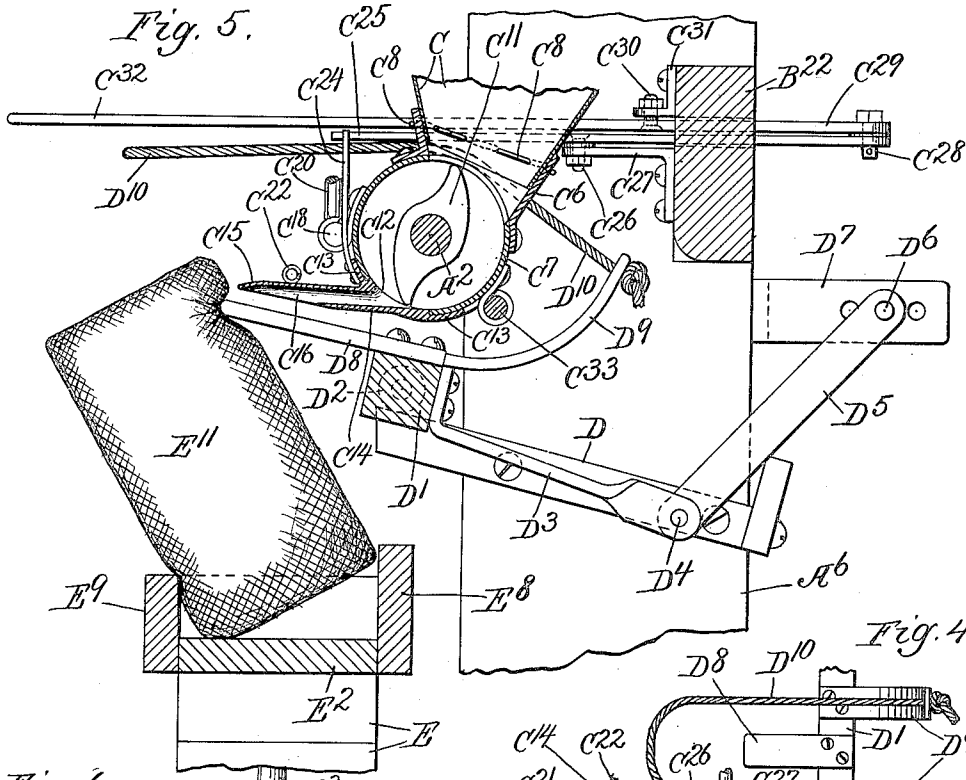
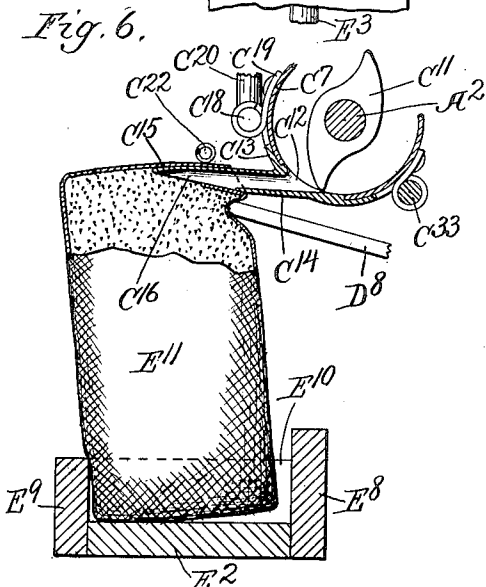
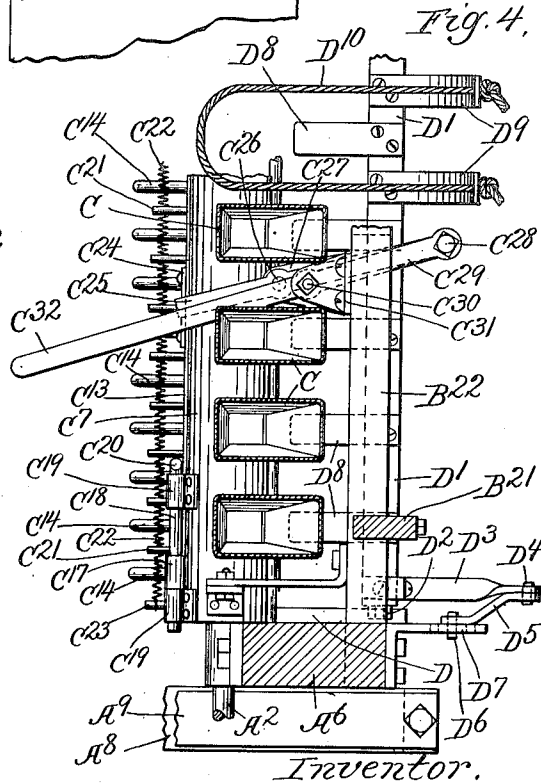
Adelmer M. Bates.
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1,070,388.

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4 SHEETS—SHEET 4.



Witnesses.
Edward T. Wray.
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UNITED STATES PATENT OFFICE.

ADELMER M. BATES, OF CLEVELAND, OHIO, ASSIGNOR TO BATES VALVE BAG COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF WEST VIRGINIA.

MACHINE FOR FILLING BAGS.

1,070,388.

Specification of Letters Patent.

Patented Aug. 19, 1913.

Application filed August 14, 1902. Serial No. 119,586.

To all whom it may concern:

Be it known that I, ADELMER M. BATES, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Machines for Filling Bags, of which the following is a specification.

My invention relates to machines for filling bags.

It has for its object to provide certain new and useful improvements which can be employed for the purpose of filling bags. I have particularly shown these improvements in connection with the filling of bags which are intended to be filled with powdery or granular substances.

My invention has been shown as applied to machines for filling a number of bags at once. I have also illustrated my invention in connection with the filling of what is known in the art of bag filling, as "valve bags."

My invention is illustrated in the accompanying drawings, wherein—

Figure 1 is a front elevation of my machine. Fig. 2 is a side elevation. Fig. 3 is a vertical section on line 3—3 of Fig. 1. Fig. 4 is a horizontal section on the line 4—4 of Fig. 3. Fig. 5 is a detail cross section showing one bag in position. Fig. 6 is a detail of a portion of the part shown in Fig. 5, with the bag broken away. Figs. 7 to 10 are details.

In the various drawings the parts are shown as broken away where necessary, and details are exhibited in separate drawings where this seems necessary, and parts are sometimes omitted where their presence seems unnecessary. The drawings are to be taken in a certain sense as diagrammatic, in that they are intended to illustrate the invention in a particular way as well as its mere application to the particular form shown.

Like parts are indicated by the same letter in all the figures.

A is a base made in any desired form and adapted to hold the superstructure. From this base rise the standards A^1 A^1 in which is journaled the shaft A^2 . Associated with this shaft are the driving pulleys A^3 and A^4

and the fly wheel A^5 . Two other standards A^6 A^6 also rise from this base, and the shaft A^2 is journaled in them as indicated. Rising from the base are two short standards A^7 A^7 and connecting the standards A^6 and A^7 are the cross pieces A^8 A^8 , which cross pieces carry the spring bars A^9 A^9 . This constitutes the upper part of what might be called the framing or support of the working parts.

I will now describe the storage and measuring device of my machine. B is a hopper or storage box, supported, for example, on the standards A^6 A^6 . It is open below at B^1 and is provided with a downwardly depending lip B^2 in which lies a second lip B^3 . These parts are intended to close more effectually the discharge opening B^1 at its forward edge, for there would be a tendency at this point for the material in the hopper to pass in between the lower edge of the hopper and the moving closing plate hereinafter described. B^4 B^4 are the ends of what, in general terms, may be called a cylinder B^5 . This cylinder is provided with a closing plate B^6 , which, when beneath the aperture B^1 , serves to close the hopper. As previously suggested, the slide or lip B^3 bears against this plate to more effectually close this opening, but in the case of powdery substances there is a tendency of the material to escape, and I have provided an additional closing device. B^7 is a beam secured to the lower edge of the hopper by the bolts B^8 and carrying at its lower extremity a board B^9 which is slotted at B^{10} and held adjustably by the bolts B^{11} . The inner edge of this board B^{10} is provided with a piece of felt or the like B^{12} , which bears upon the closing plate B^6 to more effectually prevent the escape of the powdery substance. The cylinder B^5 is formed in any desired manner, but is intended to contain certain measuring compartments B^{12} B^{12} which are preferably formed by a cross piece B^{13} , provided with blocks or strips B^{14} to form a portion of such measuring compartments B^{12} B^{12} . A corresponding board B^{15} is secured within such cylinder, preferably by the bolts B^{16} B^{16} and is also provided with blocks B^{17} B^{17} to form the remainder of such measuring compartments. Obviously, the size of these com-

partments can be varied by varying the size of the blocks on these boards, and this can be done conveniently within reasonable limits by having a series of boards B¹⁵, each with a varying arrangement of blocks. This measuring cylinder is supported on the shaft B¹⁸, which is operated by the handle B¹⁹, and the openings of the measuring compartments are closed at the time when they are being filled from the hopper by means of the lower closing plate B²⁰, supported on the cross pieces B²¹ B²¹, which are themselves supported on the cross bar B²², which is supported on the standards A⁶. This constitutes the measuring device or cylinder and its associated parts, and obviously, as it is rocked back and forth by means of the handle B¹⁹, the compartments are successively filled from the hopper and their contents discharged. They are filled when in the position indicated by dotted lines in Fig. 3, and discharged when in the position indicated by full lines in Fig. 3.

I will now describe the feeding devices for receiving the material thus measured out in quantities and conveying it to the bag. The first element in these feeding devices are the flexible funnels C C, which are in this case shown as rectangular, a cross section and pyramidal in general form, with the apex of the pyramid below. These funnels are supported each on the rods or wires C¹ and C². The rods C¹ project from the rock shaft C³, which is journaled on the standards A⁶ A⁶ and connected at one of its extremities by means of a pitman C⁴, and with the shaft A² by means of an eccentric C⁵. The pitman C⁴ is connected with the rock shaft C³ by the short arm C⁴⁰. Thus the rock shaft C³ is rocked back and forth through a comparatively small arc. The material of the flexible funnels C C is preferably of cloth, and is preferably folded over at the top around the bars C¹ and C², and they are secured in any desired manner. The lower ends of these funnels are secured to outwardly projecting parts C⁶ C⁶ over the cylinder C⁷, by means, for example, of the lacings C⁸ C⁸. Of course, they could be secured in any desired manner. The cylinder C⁷ is concentric with the shaft A² and is fixed in position. The cylinder C⁷ is hollow and contains a series of blocks C⁹ C⁹, which thus divide it into a series of feeding compartments C¹⁰ C¹⁰ each of which is associated with one of the outwardly projecting parts C⁶, and thus with one of the flexible funnels C. In each of these compartments, and secured upon the shaft A², is a rotating centrifugal feeder C¹¹, and the cylinder is provided in connection with each of these feeding compartments with an opening C¹² on the opposite side of the cylinder from the opening which connects with the part C⁶. C¹³ is a slide, forming a part of the cylinder

and provided with a series of forwardly projecting discharge tubes C¹⁴, each of which has preferably a forwardly projecting upper lip C¹⁵ and a long, downwardly opening discharge mouth C¹⁶. This slide C¹³ is provided with a series of upwardly projecting eyes C¹⁷, which receive the long pins C¹⁸, which are secured to the cylinder C⁷ by the supports C¹⁹ C¹⁹. Each of these pins is provided with an end C²⁰ whereby it may be pulled out if the slide is to be entirely detached from the cylinder. On the slide are a number of pins C²¹ which are properly disposed with reference to the discharge tubes C¹⁴ so as to make between the tubes and the pins a space for the coiled spiral spring C²², which, in position, assumes a zigzag path, bearing downwardly but resting flexibly upon the discharge tubes. This flexible spiral spring is secured to the slide by the end pins C²³. Upwardly projecting from the slide is the notched piece C²⁴, in the notch of which lies the outer end of a lever C²⁵, which is pivoted at C²⁶ to a projection C²⁷ from the cross piece B²². The other end of this lever is pivoted at C²⁸ to the end of a long lever C²⁹, which is pivoted at C³⁰ to another projection C³¹ on the cross piece B²². This lever terminates in the hand portion C³². By moving this hand portion the compound lever will operate to move the slide back and forth. There are twice as many of the discharge tubes C¹⁴ as of the feeding compartments C¹⁰ and they are arranged so that when the lever C³² is at one limit of its excursion, one set of these discharge tubes registers with the openings in the feeding compartments, while when the lever is at the other limit of its excursion, the other set of discharge tubes is brought into such relation,—that is, one set, consisting of each alternate tube, is in receiving position while the other set, consisting of the other alternate tubes, is inactive. C³³ is a long rod which passes through eyes on the slide and on the cylinder. Thus it will be seen that the slide can slide back and forth, while, when the rod C³³ is removed, it will swing open, being supported on hinges formed by the pins C¹⁸ and their associated parts.

I will now describe the bag discharging device. D D are inclined ways supported on the frame. D¹ is a cross piece provided with rollers D², which roll on said ways. The cross piece is provided with backwardly projecting arms D³ pivoted at D⁴ to the links D⁵, which are in turn pivoted at D⁶ to a rearwardly projecting portion D⁷ on the frame. Secured on the cross piece D¹ are a series of pushers D⁸, there being one such pusher for each flexible funnel. Secured on the cross piece D¹ are two upwardly curved parts D⁹, to each of which is secured an end of the rope D¹⁰, the middle portion of which pro-

ceeds out beyond the funnels into position where it is within reach of the operator, and where it may be suspended by any convenient means, though no holding device is here shown. Obviously, when the operator pulls forward on this rope D¹⁰, the cross piece D¹ with its associated parts, will be moved forward and such bags as lie within the line of excursion of the pushers D⁸ will be encountered thereby, as indicated in Figs. 5 and 6. The direction of action of the pusher D⁸ will be changed by the action of the arm D³ and the link D⁵ as indicated in Fig. 5, as the motion progresses, and the result will be that the bag will be first indented as shown in Fig. 6, just below the feed tube C¹⁴, and as the motion continues this pressure will be applied in a direction as indicated in Fig. 5, so as to simultaneously withdraw the feed tube C¹⁴, or push the bag away from it, compress the bag just below the filling corner and tip the bag over as indicated in Fig. 5. When the rope D¹⁰ is released, the cross piece D¹ with its associated parts will by gravity travel back to its normal position of rest shown in Fig. 3.

I will now describe the bag supporting device. Mounted on each of the spring bars A⁹ is a series of blocks E E and also a block E¹ and a transverse board E², and these several parts are held together and secured to the spring bar A⁹ by means of the bolt E³. The board E² is the board which supports the bags and its position may thus be varied by changing the relative position of the blocks. The blocks are preferably cut away at E⁴ to permit them to be easily changed as to their position on the rod E³. The lower block E¹ is connected with the pitman E⁵ which is connected by means of the eccentric E⁶ with the shaft A². This connection is made at the point E⁷ which is beyond the central vertical axes of the blocks and board E². The board E² is provided with a rear ledge E⁸, a front ledge E⁹, and spacing blocks E¹⁰ to produce pockets or recesses in which the lower ends of the bags E¹¹ E¹¹ are received. By the rotation of the shaft A² the set of blocks and the board on which the bags rest, are moved up and down through a short excursion at a relatively high rate of speed, and this motion is accelerated, and the vibrating effect increased by the presence of the spring bar A⁹ in the system. The position of the connection between the pitman and the lower block is such as to tend to give such a motion to the board E² as will hold the bags E¹¹ E¹¹ in position and not tend to discharge them or throw them outwardly, away from the machine. The bag which I have illustrated in connection with my machine is provided with a valve at one of its upper corners, and this valve is composed of parts which normally engage each other on a plane approximately

parallel with the upper edge or top of the bag, so that when the feed tube C¹⁴ is introduced into the valve, the valve lips or folds are left in normal condition. The tube, when the bag is in proper place, occupies the position indicated in Fig. 6, and discharges well within the bag, and beyond the lips of the valve, and toward the opposite side or edge of the bag. The pushers D⁸ engage the bag just below the lower valve lip as they come forward, as previously suggested, they push the bags away from the filling tubes and compress the lips of the valve together, and then tip the bag off of its board, causing it to fall over the outer ledge E⁹ and to drop down below with the valve end of the bag. If the effect of the pusher has not been to sufficiently close the lips of the valve, this action will be further carried out or completed by the shock received when the bag falls upon its valve end.

I have not attempted to show the valve in the bag, because the drawings are too minute to permit the same and because any kind of a valve can be employed, or at least any form which is properly positioned and any of the several forms of valve shown in my various valve bag patents, for example Re-issue Patent No. 12,062 of December 16, 1902, will be suitable for this purpose.

Of course, it will be understood that my invention can be used for filling other than valve bags, and bags having different filling apertures from that illustrated. The upper edge of the bag is supported by the filling tube, while the lower edge or end of the bag is supported by the board on which it rests.

F is a receptacle along the front of the machine just below the hopper, which can be used for holding empty bags.

It will be understood, of course, that, as previously suggested, these devices are to be taken as diagrammatic or illustrative of the general features of my invention, rather than as limiting me to the specific forms and structure shown. Many of these devices may be changed or some of them dispensed with and others substituted for those shown, without departing wholly from the spirit of my invention. I do not wish to be limited to the particular forms of construction shown. In many instances equivalent devices could be substituted for those which I have shown. I have shown my valve bag, but the features of my invention can be used for filling other than valve bags. I have shown the valve bag as sitting upright in the process of being filled, but obviously, it could occupy some other position.

The use and operation of my invention as illustrated, are as follows: Assume now, that the device is to be used for the purpose of filling valve bags with salt. A suitable supply of salt is placed in the hopper, where it

may be stirred or agitated, or kept in suitable condition for feeding by any desired means, though in most cases nothing of this kind will be needed. The operator will bring the measuring cylinder into position where the upper end of the measuring compartments B¹² will be in the position indicated in dotted lines in Fig. 3, whereupon these compartments will obviously be filled.

If, now, the operator turns this cylinder so as to bring the parts into the position indicated in full lines in Fig. 3, it is clear that the flow of material from the hopper will be cut off and that the several compartments will be in position to discharge each its contents into its associated flexible funnel. The material is prevented from escaping from the hopper by the slide D⁸ and the felt piece B³². After this operation has been completed there will be found in each of the flexible funnels C, approximately the same amount of material, or the amount thrown into such hopper by such measuring compartment. The flexible funnel is the first element, so to speak, of the feeding device, and since it is suspended upon the bars or pins C¹ C¹, and since these are in effect arms from the rock shaft, which is constantly rocked at a high rate of speed, it is obvious that the sides of such flexible funnels will be constantly collapsed and then stretched, which will produce a downwardly feeding effect and cause the material in the funnel to be fed downwardly into the feeding compartment below. This motion of the flexible funnels is relatively continuous and high speed. The feeding compartments in the cylinder, containing as they do, each a centrifugal feeder, constitute in effect, the second element of the feeding devices. The centrifugal feeder forces the material around and as it travels at a relatively high rate of speed, it in effect, throws it at a blow, outwardly through the feeding tube. These feeding tubes constitute the third element in the feeding device. As previously suggested, they discharge far into the bag and serve also as a means of holding the bag up from within. There need not be any exterior support, though for the empty bags it may be well to have some slight protectional support to keep them in position on the feeding tubes, and hence I have provided the spiral spring C²². Of course, the measuring compartments will be adjusted to suit the particular size of bags being filled, and hence when the action is completed, each bag will have received its appropriate charge of material, being the amount first deposited in the measuring compartment, then in the collapsible funnel, then in the feeding compartment, and then passed through the feeding tube. Since the valve is formed in the bag as indicated, the feed tube passes through said valve without disturbing or displacing the lips thereof, except so far as they are separated by such feed tube. The bag is hung, as it were, by its upper end on such feed tube, being lightly held in position with a special spring. The bags are threaded on to the inactive feeding tubes, being each alternate feeding tube, while the process of filling the other bags is being carried out. When this process is completed, the operator will seize the cord D¹⁰ and draw forward the pushers D⁸, whereupon the action suggested in Figs. 5 and 6 will take place. The pushers will engage the bags just below the valves and the feed tubes and will simultaneously push the bags off and force the valve lips to close around the retreating tube, and when the tube is entirely withdrawn the valve lips will be found closely pressed together and the material within the bag will hold them in this position. As this action in many instances might not be complete, and particularly as it might not be complete with certain materials, I have designed the machine so that the further motion of the pushers will cause the bags to be tipped over and inverted, the valve end striking the bottom of the receiving chamber first. This effectually closes the imperfectly closed valves, if there be any. It will be understood that during the time when these bags are thus being filled, the board on which they are resting will be violently agitated or moved up and down by a quick, sharp movement. This movement will partake of three characteristics: first, the jerky action incident to the action of the spring; second the reciprocating action, caused by the pitman, and third the inwardly vibrating action, incident to the fact that the pitman is connected outside of or beyond the central vertical axes of such bag supporting parts. The tendency of this is to cause the bag to remain in proper relation to the filling tube and to cause the material within the bag to vibrate or to be jarred in such a way as to cause the bag to be evenly and uniformly filled. The filling tube, it will be observed, extends far into the bag to furnish a proper support, while its discharge opening is long like the opening of a quill, the end of which has been diagonally cut to form a pen. When the set of filled bags has been discharged the operator will have arranged another set of empty bags on the alternate filling tubes. The slide will now be moved by means of the lever C³², whereupon such set of filling tubes supplied with the empty bags, will be brought into proper position each to connect with one of the feeding compartments, the measuring apparatus will now be operated and new charges of material supplied and the filling process will proceed while the operator is threading bags on the now idle feeding

tubes. The process previously described is now duplicated.

I have not, of course, minutely described the various steps and processes in the use and operation of my invention, as the same will become more apparent to one who undertakes to erect a machine in accordance with my description.

I have used the term funnel to describe the part indicated by the letter C, but I wish this term to be understood in its broadest significance as being a passageway diminishing in cross-section toward the discharging point. I have called it a funnel because that conveniently describes the particular form which I have employed, and the form which my apparatus assumes is, I think its best, but the funnel might be greatly changed in size and shape.

The collapsing and stretching action obviously will cause the material to feed forward and will even break up lumps and cause the material which is wet to feed instead of choking.

I claim:

1. In a machine for filling bags, a feeding element consisting of a flexible funnel, supports above and below, and means for moving one of such supports for alternately collapsing and stretching the sides of said funnel to vary its cross-sectional area.

2. In a machine for filling bags, a feeding element consisting of a flexible funnel, supports for the same above and below, means for moving one of said supports and vibrating it laterally to alternately collapse and stretch the sides of the bag to vary its cross-sectional area.

3. In a machine for filling bags, a feeding element consisting of a flexible funnel, supports for the same above and below, means for moving the upper support and vibrating it laterally to alternately collapse and stretch the sides of the bag to vary its cross-sectional area.

4. In a machine for filling bags a feeding element consisting of a funnel with flexible sides and top and bottom supports, a rock shaft and arms therefrom which support the upper walls of the funnel.

5. In a machine for filling bags, a feeding element consisting of a receiving portion secured at its upper and lower ends and formed with flexible sides, and provided with means to vary its cross-sectional area, said means positively alternately collapsing and stretching said sides so as to cause the material to feed therethrough.

6. In a machine for filling bags, a feeding element comprising a substantially horizontal feeding tube adapted to extend far within the bag and support it by engagement with the inside of the top of the bag, having its extremity under-cut diagonally so as to form a relatively wide opening adapted

to discharge the material into the bag substantially at right angles to such tube.

7. In a machine for filling valve bags, a combined feed and bag support consisting of a tube-like portion mounted in a substantially horizontal position and adapted to enter and engage the inner part of the upper fabric of the bag, and provided with a discharge opening on its under side, in combination with a support on which the bottom of the bag rests.

8. In a machine for filling valve bags closed at both ends, a bag holding device comprising two substantially parallel and substantially horizontal bag supports, one adapted to extend across the top entirely within the bag and engage the inner surface of the upper portion of the bag, the other the outer surface of the lower portion of the bag.

9. In a machine for filling bags closed at both ends, the combination of a holder to support the bag from beneath with a horizontally disposed holding device extending within and across the bag at its upper end, upon which the bag is adapted to hang loosely while being filled.

10. In a machine for filling valve bags closed at both ends, the combination of a filling and bag supporting tube arranged in a substantially horizontal position and adapted to enter the bag, with a valve closing device adapted to engage the exterior of the bag near such tube.

11. In a machine for filling valve bags closed at both ends, the combination of a device for supporting the bottom of the bag with a bag filling device adapted to enter the bag at the top of the bag, and a bag discharging device adapted to engage the bag at its upper end and tip it over said discharging device independent of the feeding device and manually operated.

12. In a machine for filling bags, the combination of a vertically reciprocable bag support with a spring support for same and a pitman to reciprocate such support in substantial opposition to the spring support, the mean line of action of the pitman being inclined to make an acute angle with the line of direction of movement of the bag support.

13. In a machine for filling bags, the combination of a vertically reciprocable bag support with a spring support for same and a pitman to reciprocate such support in substantial opposition to the spring support, the mean line of action of the pitman being inclined to make an acute angle with the line of direction of movement of the bag support, and crossing the central longitudinal vertical plane of such bag support.

14. In a machine for filling bags, the combination of a bag support with a spring support for same and a pitman shaft and ec-

centrics to reciprocate such support in substantial opposition to the spring support, the mean line of action of the pitman being inclined to the vertical, and crossing the
5 central longitudinal vertical plane of such bag support, the lower attachment between the pitman and the support being on the

opposite side of the bag from the side from which the bag is fed.

ADELMER M. BATES.

Witnesses:

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H. S. BAHNEY.