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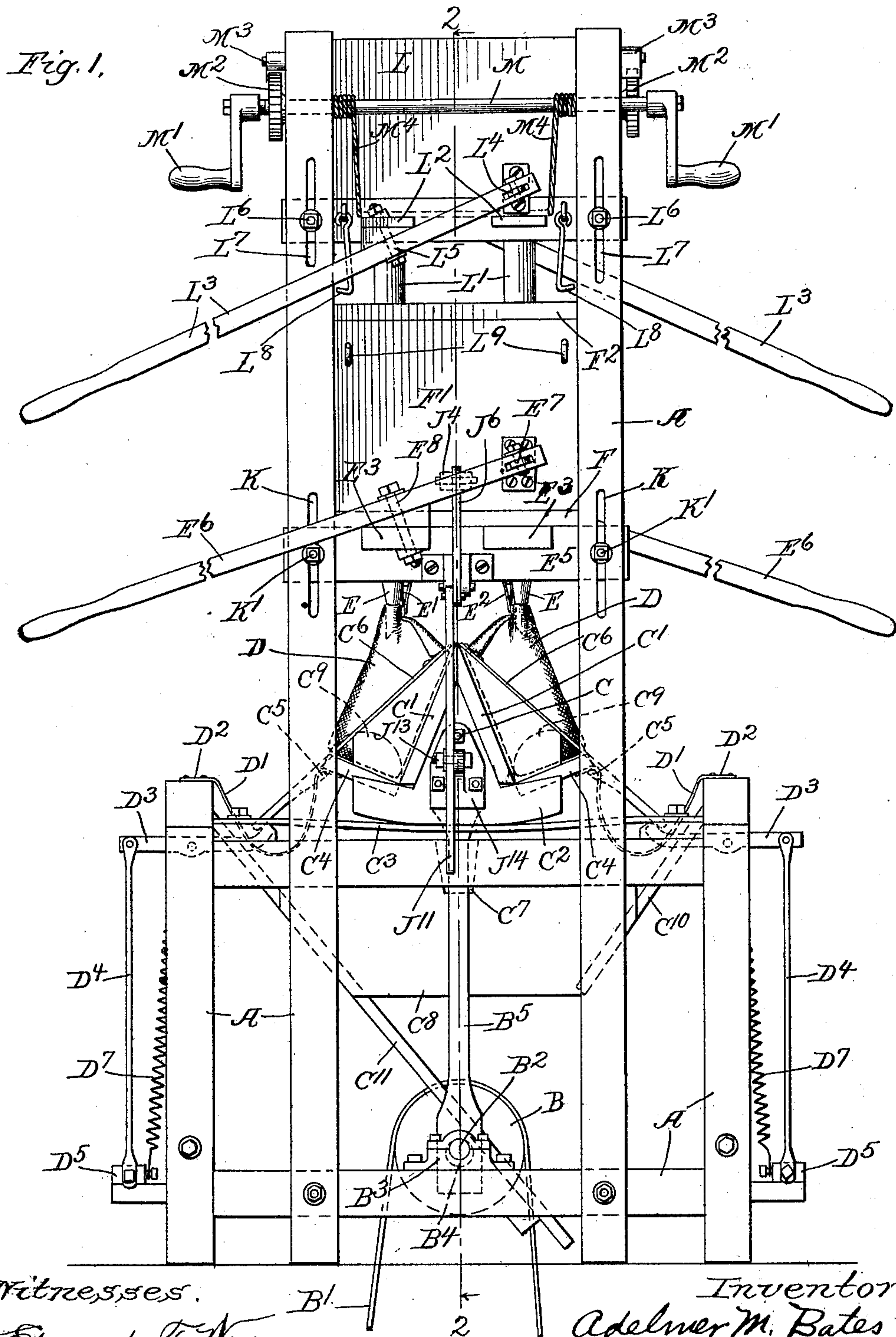
Patented Aug. 26, 1902.

A. M. BATES.
MACHINE FOR FILLING BAGS.

(Application filed Jan. 25, 1901.)

(No Model.)

4 Sheets—Sheet 1.



Witnesses.

Edward T. Wray.
Homer L. Trough

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by Parker & Carter
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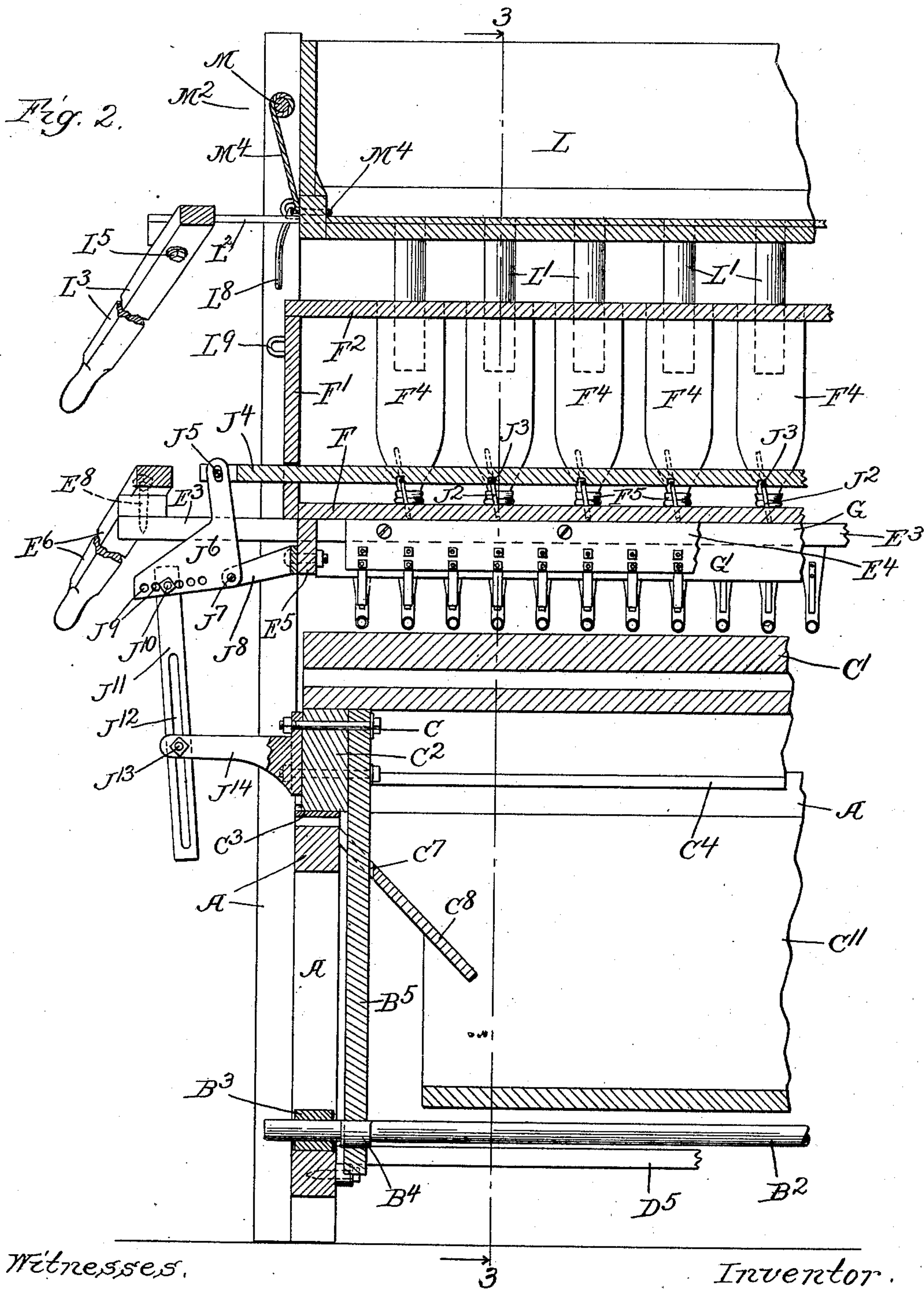
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4 Sheets—Sheet 2.



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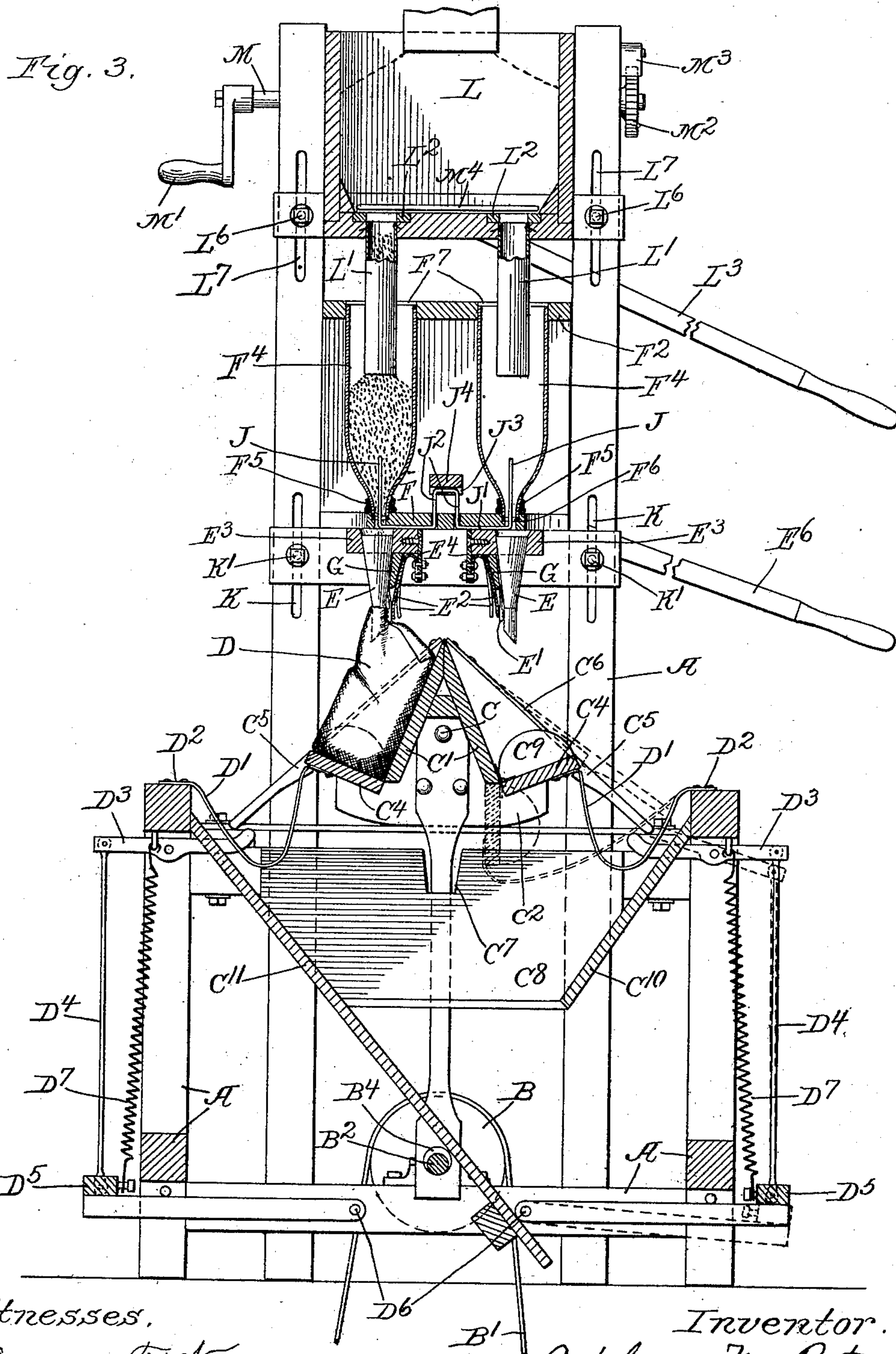
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4 Sheets—Sheet 3.



Witnesses.

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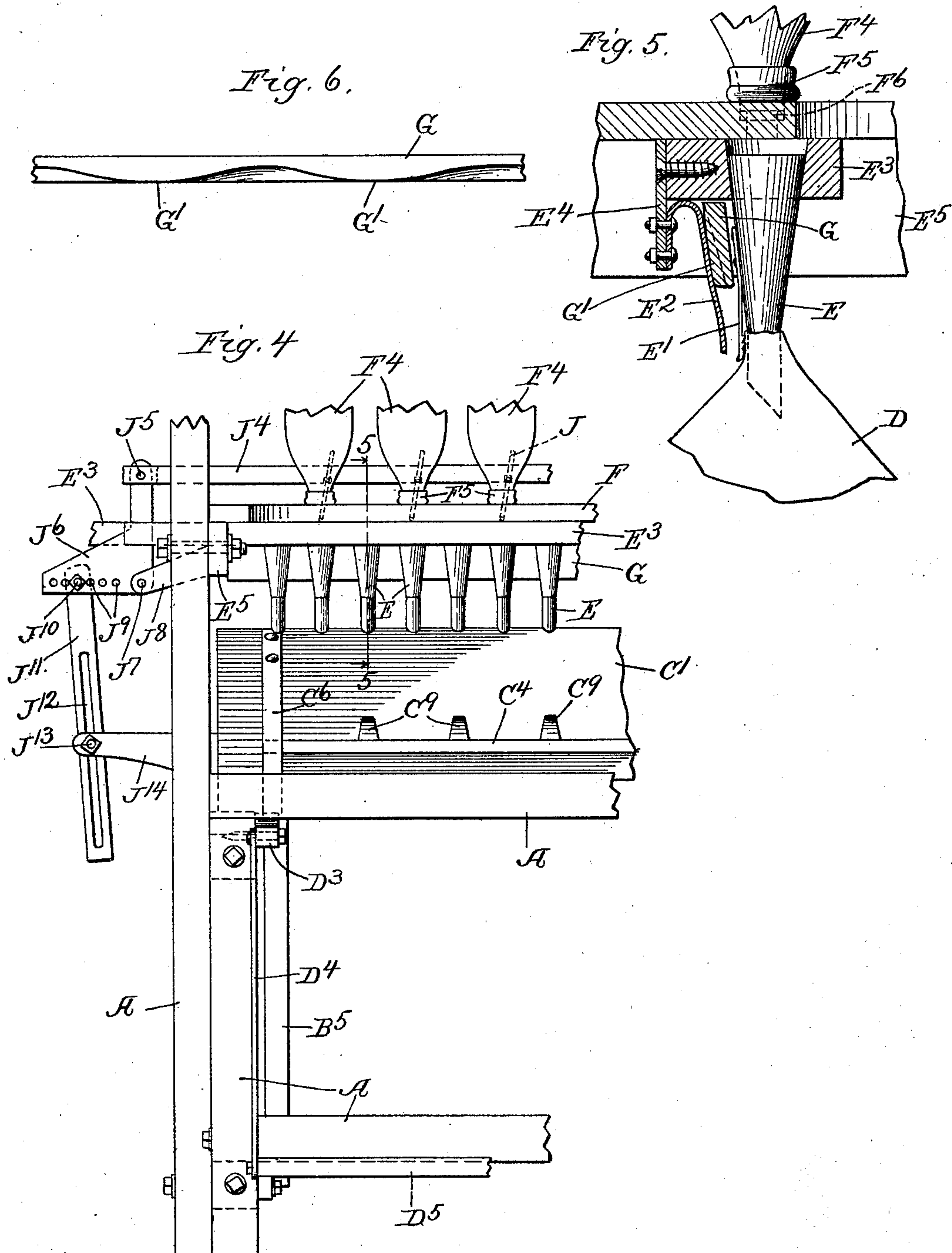
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(No Model.)

4 Sheets—Sheet 4.



Witnesses,

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UNITED STATES PATENT OFFICE.

ADELMER M. BATES, OF CHICAGO, ILLINOIS.

MACHINE FOR FILLING BAGS.

SPECIFICATION forming part of Letters Patent No. 707,544, dated August 26, 1902.

Application filed January 25, 1901. Serial No. 44,681. (No model.)

To all whom it may concern:

Be it known that I, ADELMER M. BATES, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, 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 bagging materials, and particularly to machines for filling valve-bags.

It is illustrated in the accompanying drawings, wherein—

Figure 1 is an end elevation. Fig. 2 is a longitudinal section on line 2 2, Fig. 1. Fig. 3 is a cross-section on line 3 3, Fig. 2. Fig. 4 is a side elevation of a portion of the machine. Fig. 5 is a detail cross-section of the discharge mechanism on line 5 5, Fig. 4. Fig. 6 is an edge view of the cam-board.

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

A A are the timbers of the frame, consisting of suitable standards, uprights, and cross-bars.

B is a pulley driven from the belt B', adapted to rotate the shaft B², which is journaled in the bearing B³ and is connected by an eccentric B⁴ with the spring-pitman B⁵, which is secured at C to the saddle-like portion, consisting of the inclined boards C' C' and the lower rocker-like piece C², resting upon the cross-spring C³ and preferably attached thereto.

C⁴ C⁴ are the hinged bottom supports for the bag, and each is held in position by the latch C⁵ on the spring C⁶, which is secured to the upper part of the board C'. The pitman B⁵ finds a guide in the aperture C⁷, formed by the side C⁸ of the receiving hopper or chute. It is obvious that any other form of guide might be used and also that the pitman could be pivoted to the saddle-like piece. If not pivoted, it imparts a certain swinging or laterally vibratory motion. If pivoted and the parts suitably guided, the motion might be made wholly vertical. It is of course substantially so in the form shown.

C⁹ C⁹ are the sides on the bottom support C⁴. The inclined board C', bottom support C⁴, and sides C⁹ form a suitable pocket or supporting part for the bag D. Obviously the rotation of the shaft B² will impart a rapid vibratory motion to the bottom support, to the bags, and

to the contents of the bags. The bottom support C⁴ may be and preferably is a continuous board across the machine and serves to hold a series of bags, and thus to form a series of bag-supports. In such case the latch and spring C⁵ C⁶ are supplied only at each end of the machine. To each bottom support is secured a strap D', fastened at D² to the frame. It serves to keep such bottom support from swinging too far inwardly when the latch is released and also serves as a means for restoring it to the position indicated in Fig. 1. The end of each latch is placed in the line of the excursion of the short lever D³, which has at its outer end a rod D⁴, which is secured at its lower end to the treadle D⁵. The treadle is pivoted at D⁶, and a spring D⁷ is associated therewith to restore the treadle to its normal position. On the right-hand side of Fig. 3 the parts are shown in dotted lines in the position which they assume when the treadle is operated and the bottom support permitted to fall down to discharge the bag into the hopper beneath. The bag strikes the hopper side C¹⁰ and falls thence onto the side C¹¹ and drops free from the bagging-machine. In full lines the parts are shown in the position they assume when by manipulating the strap D' the bottom support is lifted up, so as to be engaged by the latch. On the opposite side of Fig. 3 the parts are shown in the position they assume while the bag is being filled. The bottom support is preferably, as in the illustrations, in a fixed relation with reference to the driving-shaft; but of course it could be made adjustable along the pitman, the other parts being correspondingly adjustable.

E E are filling tubes or funnels, supplied each with a clamp E', which serves as a top-bag support and which is preferably of spring material and tends to gently rest against the end of the tube or funnel, so as to hold the empty bag D in position.

E² is a reinforcing-spring attached to the slide E³ by the metal slat E⁴. The slide E³ projects through the side piece E⁵ and is attached to the lever E⁶, which is pivoted at E⁷. The attachment is made by means of the bolt E⁸. The parts E³, E⁵, E⁶, E⁷, and E⁸ are of course duplicated at each end of the machine, and the side pieces E⁵ E⁵ furnish the support

for the upper bottle-case, which has the bottom F, ends F' F', top F². The bottle-case contains a series of bottle-like or funnel-like feeding and measuring devices F⁴ F⁴. The lower end or mouth of each bottle is preferably surrounded by an adjustable rubber ring F⁵, and the mouth projects down into a socket in the bottom F, where it may rest against the washer F⁶. By adjusting the ring F⁵ or by varying the thickness of the washer F⁶ an individual adjustment of the bottle may be obtained, and thus the lack of uniformity in the interior cross-section or the cubic contents of the bottles can be reduced to a minimum. The bottle is open at the top, as indicated at F⁷, where it passes through the top of the bottle-case F². By means of the lever E⁶ the filling funnels or tubes E, with the slide E³, can be moved with reference to the bottles F⁴. In their normal position they are in line with each other, so that the contents of the bottle F⁴ passes through the tube E into the bag D; but when the slide E³ is moved a short distance they are thrown out of line with each other, and the slide E³ serves as a valve to prevent the escape of the material from the bottles F⁴. During this operation, however, the parts move along the fixed cam-board G, which has a series of indentations or cut-away parts G' G'. These cut-away parts are set in line each with one of the bottles F⁴ and are held rigidly in this position. When, therefore, the bags are in position on the filling tubes or funnels E E and such filling tubes or funnels are in line with their associated bottles F⁴, the reinforcing-spring E² is opposite one of the cam-surfaces G', and therefore is free to engage the light spring E' and cause it to firmly grip and hold the bag against the tube or funnel E. It is quite obvious that this portion of the device could be easily altered without greatly departing from the spirit of my invention.

The particular detail which I have here sought to illustrate is that in which the bag is first lightly held by its upper support and is then subsequently firmly attached in position. In reversing the action the firm attachment is first released and then the bag when filled can pull away from the light support by reason of its weight. The slides E³, it will be observed by referring to Fig. 2, are so supplied with these funnel-like parts as to provide twice as many such parts as there are bottles. In other words, while one half of the funnels are in line with their respective filling-bottles the other half are disassociated with the filling-bottles. In this position, by reason of the action of the cam-board as described, the bags which are being filled are tightly held by the upper support, whereas the funnels not in use are in a position where the attendant can easily attach the bags to their respective funnels by means of the light attachment or support. When the bags have been filled, the lever E⁶ is operated so as to carry the funnels to one side, cutting off the

connection between each funnel and the bottle, and the further operation of the machine brings the unfilled funnels and unfilled bags into position under their respective filling-bottles after the filled bags have been discharged and the bottom-support restored to its normal position. I have spoken of the devices F⁴ as "bottles." They are preferably of glass and in the form of inverted bottles with the bottoms removed; but they may of course be made of different material and of different shapes from those shown.

Some difficulty sometimes occurs on account of the tendency of the material being bagged to pack in the supply-ways. This is true even where long funnels are used or where the tubes are made comparatively the same in cross-section for a long distance. To obviate the tendency to pack, I have provided a series of agitators or stirrers, one for each bottle, for in the form of device here shown it is at the mouth of the bottle where the greatest tendency for the material to pack is found. The particular agitator which I have shown is a piece of wire J, which stands upright in the mouth of the bottle, projecting up into the bottle. It is then bent at J', running across through a groove in the bottom piece F, is then turned up at J², and at J³ is attached to a slide-bar J⁴ between the two rows of bottles. This bar is supported in the end plates F' F' and pivoted at J⁵ to the elbow-crank lever J⁶, which is pivoted at J⁷ to the arm J⁸, which projects from the cross-piece E⁵. The elbow-crank lever is provided with a series of adjustment-holes J⁹, whereby it is pivoted at J¹⁰ to the rod J¹¹, which is slotted at J¹² to permit of the adjustable attachment by the bolt J¹³ to the arm J¹⁴ on the saddle-like part when attached to the pitman. Obviously the action of the pitman, while it is operating the vibrator or series of devices intended to impart a vibratory motion to the bags, will at the same time, through the mechanism which is described, operate the agitators or stirrers within the bottles to keep the material from packing. The adjustment at J¹³ is necessary to disengage the rod J¹¹ and the arm J¹⁴ when the funnels and their associated bottles are to be vertically adjusted.

The frame-standards A A are slotted at K K at each end of the machine, and bolts K' K' pass through said slots, whereby the cross-pieces E⁵ E⁵ may be secured at any position along the slots, and with them the funnels, bottles, and bottle-case. This entire collection of parts is intended to be adjustable vertically, the means for moving these parts being associated with the hopper mechanism about to be described.

L is a hopper of any desired form or shape, but in this instance shown rectangular in cross-section and having downwardly projecting from it a series of tubes L' L', smaller in cross-section than the bottles and adapted to project into the same.

L² L² are cut-off slides provided with a se-

ries of apertures and adapted each to be moved back and forth in the hopper by means of the lever L^3 , which is pivoted at L^4 and attached by the bolt L^5 to such cut-off slide L^2 . This slide of course operates as a valve for the several tubes leading out of the hopper. There is one such slide and series of tubes for each series of bottles, with of course in each case and at each end a similar operating mechanism. The hopper is provided with bolts L^6 L^6 , which are associated with the vertical slots L^7 L^7 , so that the hopper and its associated parts can be secured adjustably at varying distances along the vertical line. At each end of the hopper are latches L^8 , adapted to engage the eyes L^9 L^9 on the end pieces of the bottle-case.

M is a shaft, there being one at each end of the machine, having each a windlass M^1 and a metal wheel M^2 , associated with the locking-dog M^3 . On the shaft is coiled the cable M^4 , which is secured to the bottom of the hopper. Thus by winding the shaft the hopper may be lowered, if the bolts L^6 are loosened, until the latches L^8 can be put in engagement with the eyes L^9 . If now the bolts K^1 K^1 are loosened, the whole upper portion of the machine may be lowered along its standards until the funnels are brought to the proper distance from the relatively fixed receptacles or bag-supports. The bolts K^1 K^1 will now be set so as to fix the funnels and bottles in position. The latches L^8 are now freed from their respective eyes, and by reversing the motion of the shafts M the hopper can be raised. This motion will continue until the material contained in the bottle F^4 and the tube L^1 up to its valve is exactly the amount required to fill the receptacle. It is obvious that by raising or lowering the hopper and tubes more or less this amount of material may be varied, or, in other words, there is here an easily-operated measuring device. When the proper point has been reached, the bolts L^6 are set and the parts are then in position to operate so long as the same material is being used and the same receptacles are being filled. There is commonly an operator on each side of the machine to operate one set of filling devices. A bag is then attached, being held by the light spring to each alternate funnel, the hopper-slides L^2 are moved, and the material flows in and fills the bottle and tube. Then the slides are restored to their normal position and the supply is cut off. The funnels are moved with the slide E^3 into position, so that those holding the bags are underneath the filled bottles, and the heavy spring then forces the lighter spring toward the filling tube or funnel and firmly holds the bag by its upper support. While the bags are being filled, a series of bags are being put on the intermediate funnels. The slides containing the funnels are then moved in the opposite direction, thus throwing the filled bags and their filling-funnels out of line with the filling-bottles,

cutting off the lower ends of the filling-bottles, and freeing the heavy springs of the upper support. By operating the treadle D^5 the lower support or the hinged portion of the lower or bottom support is freed and the weight of the bag forces the same down. The bag falls out and in falling its contents are sharply forced toward the valve end, thus seating or closing the valve. This is very desirable where valve-bags are used, though many features of my invention and many of its several functions or operations would be equally applicable to bags other than valve-bags or, indeed, to receptacles other than bags. This dropping of the bag, however, is particularly important in the case of valve-bags.

It will be readily understood that the mechanism which I have shown and described can be greatly varied in many important respects and in numerous details without departing from the spirit of my invention, and I wish, therefore, to describe said mechanism and the functions and operation of its several parts in somewhat general terms. The feeding mechanism may be, broadly considered, the entire mechanism from the supply, wherever it may be, whether in the hopper or elsewhere, to the bag or receptacle. The measuring device is in a sense a portion of such feeding mechanism. The valve arrangement for the admission of the material into the upper measuring-tube and also for retaining the material in the lower measuring tube or part may be arranged in any desired manner. I have shown an arrangement which is quite satisfactorily applicable in the case of a machine of the general construction shown. This measuring apparatus is of course entirely applicable to the measurement of any such materials as those referred to and without regard to the character of the receptacles in which the materials are to be received.

The agitator, which frees the material in the feed mechanism or stirs it at the points in the passage-ways where it would be inclined to pack, may be of any desired form, as, for instance, that of a screw; but I prefer the oscillating wire.

I have spoken of a tube in various places, meaning sometimes thereby to include also the funnel or the funnel-shaped receiving portion of the measuring device. These several parts can of course be shaped in the various ways; but I prefer those parts which are round in cross-section and at certain places funnel-shaped, as indicated.

The upper support and the lower support of the bag are arranged with means for releasing them, and these means may be simultaneously or separately operated.

I have spoken throughout the specification of "valve-bags," by which I mean to indicate bags where the space through which the material is admitted is relatively small—that is, bags where the material is not introduced through an opening as large as the cross-section.

tion of the bag—and by speaking of introducing the material in a relatively small stream I have reference to the same idea.

Obviously my invention is applicable to numerous bags where the apertures for the introduction of the material are of various sizes.

Many portions of my invention are applicable to "bags" whether or not the valve be actually present, and by the use of this term in specification and claims I do not mean to limit myself to that particular form of bag, but have used this term as a convenient term to designate the class of bags which are filled through a comparatively small aperture. On the other hand, many features of my invention are applicable to receptacles other than bags.

The vibration or vibratory action given to the bag or receptacle or its support, as the case may be, or intended to be given to the contents of the bag or receptacle is such a vibration as will produce the result of breaking down the pyramid of material which tends to form within the bag and of filling out the material into the corners or the outer portions of the bag and to fill the upper portion of the bag and freeing the discharge end of the filling-tube from the material. It may be a lateral or vertical vibration or a combination of the two. In the machine shown the direct vibration is vertical; but there is an incidental lateral vibration and the bag in a certain sense dances about on its lower support.

Preferably the vibration is so rapid that the bag is frequently free from its support or, in other words, is tossed in the air. The platform descends more rapidly than the bag, for its descent is positive, while the bag responds only to the action of gravity and is in a certain degree retarded by its upper support. It therefore is free from its bottom-support, and the bottom-support quickly rising strikes the bag and tosses it upward. The excursions of the bag and its support are of course not very extended, but the action is substantially as described.

When the bags are all full, they can be simultaneously or successively freed at bottom and top, whereupon they fall down and the material within them is given a sharp thrust toward the valve to close it. Of course when receptacles other than valve-bags are under treatment this latter action would have to be dispensed with. The arrangement is such that the lower supports are immediately restored to their normal positions. The upper support of the bag, if placed near the discharge end of the supply-tube and if placed where in the process of filling the matter within the bag approaches the lower end of such supporting attachment, it will force the material of the bag down into the material and by reason of the rapid vibration of the nearly-filled bag will speedily punch a hole through the material and ruin the bag. It is to avoid this difficulty that I have placed the bag preferably

with one corner up and with the upper support above the lower end of the discharge-tube, so that this punching action against the material within the bag never takes place. A very small portion of the bag just below the upper support is left unfilled. This is only necessary where the material of the bag is very flimsy. This small portion of the bag about and below the upper support is left unfilled for two reasons: First, because if it is allowed to fill up the upward and downward motion of the upper support and funnel will destroy the fabric of the bag about the valve. This is true because the bag is made of thin weak material heavily starched, and if there is any downward punching against the mass of material within the bag the starch is broken and the fabric weakened, so that there is danger of leakage about the valve. Second, because if this space is left slightly unfilled there is room for the material within the bag to move *en masse* toward the valve end, and thus better seat the valve. For these reasons the excursion of the vibrator is so related to the distance from the end of the feeding-tube to the point where the bag is clamped that when the bag is thus nearly full this unfilled portion will be a small portion about the valve and funnel, and it will have a collapsible or accordion-like movement, so that none of the goods will ever be stretched across a surface of compact salt or material within the bag.

The measuring device is intended to make it easy to determine by measurement, the correct amount of material to supply to fill these bags. It is also desirable to adjust the parts to suit different sizes of bags. For example, if a bag of three pounds is to be filled the distance between the lower support and the upper support should be, say, ten inches. With a bag of five pounds it should, perhaps, be twelve or thirteen inches. To secure a sufficient amount of material to fill a three-pound bag, the upper of the two telescopic tubes will be left well down in the lower, while to fill a five-pound bag it would be raised considerably. The parts are set so that the cubic contents of the upper telescopic tube and the lower telescopic tube up to the point to which it will fill will be just sufficient to contain three or five pounds, as the case may be, of material in question.

It will be understood that the filling tubes or funnels are arranged, as it were, in two groups, each group consisting of the alternate funnels or tubes. They could of course be arranged in groups of each third or fourth funnel if under any conditions such arrangement became important. The funnel or tube is a portion of the supply-passage, and the part immediately above it is of course another portion. For convenience I have referred to this latter part as being a "supply-section," so as to describe and claim its operation in connection with the funnels beneath it. The top support I call a "duplex" support or

group, for it is composed of two parts, one of which has a light grip or clamp action, and the other a strong or heavy grip or clamping action.

5 The wavy cam, as explained, presents a series of waves, and the lengths from one swell to the other is in this case twice the distance from one filling tube or funnel to the next, so that when one of the heavy clamping
10 devices is opposed to or in operation with the swell of the cam the other is in the interval between such swells, and thus one set of heavy supporting devices is operated while the other set is thrown out of operation.
15 This result can be accomplished by the motion of the cam or the motion of the funnels.

The devices for tripping the bag-supporting parts, so as to throw the bags out when they are filled at the will of the operator, I
20 would describe under the general term of "trip mechanism operable at will."

What I claim, and desire to secure by Letters Patent, is—

1. In a machine for filling bags or receptacles with a powdery or granular substance, the combination of a feed mechanism whereby the material is introduced into the bag in a relatively small stream, with an upper support whereby the bag is secured at its upper end
25 while open, a bottom-support whereby the bag is supported at its lower end, and means for positively moving and thus releasing both supports to free the bag.

2. In a machine for filling bags or receptacles with a powdery or granular substance, the combination of a feed mechanism whereby the material is introduced into the bag in a relatively small stream, with an upper support whereby the bag is secured at its upper end
35 while open, a bottom-support whereby the bag is supported at its lower end, a vibrator of which the bottom-support forms part, and means for moving and thus releasing both supports to free the bag.

3. In a machine for filling bags or receptacles with a powdery or granular substance, the combination of a feed mechanism whereby the material is introduced into the bag in a relatively small stream, with an upper support
45 whereby the bag is secured at its upper end, a bottom-support whereby the bag is supported at its lower end, and means for simultaneously or successively moving and thus releasing the supports to free the bag.

4. In a machine for filling bags or receptacles with a powdery or granular substance, the combination of a feed mechanism whereby the material is introduced into the bag in a relatively small stream, with a duplex upper
55 support whereby the bag is secured at its upper end with a variable grip, a bottom-support whereby the bag is supported at its lower end, and means for positively moving and thus releasing the heavy grip of the upper
60 support and the lower support to free the bag.

5. In a machine for filling bags or recepta-

cles with a powdery or granular substance, the combination of a feed mechanism whereby the material is introduced into the bag in a rela- 70 tively small stream, with a duplex upper support whereby the bag is secured at its upper end with a variable grip, a bottom-support whereby the bag is supported at its lower end, and means for positively moving and 75 thus releasing the supports to free the bag and for successively releasing the two parts of the duplex upper support.

6. In a machine for filling bags or receptacles with a powdery or granular substance, the combination of a feeding mechanism whereby the substance to be treated is fed into the bag in a relatively small stream, with bag-sup- 80 ports separated so as to leave the sides of the bag loose, the upper support adapted to hold 85 the bag near one corner, the lower support adapted to receive one side and the bottom of the bag, mechanism for tilting the bottom-support to discharge the bag when it is full, and mechanism for vibrating such tilting bot- 90 tom-support.

7. In a machine for filling bags or receptacles with a powdery or granular substance, the combination of a feeding mechanism whereby the substance to be treated is fed into the bag 95 in a relatively small stream, with bag-supports, the upper support adapted to hold the bag near one corner, the lower support adapted to receive one side and the bottom of the bag, and a mechanism for vibrating the bag 100 and its lower support by a positive downward and upward motion in a line through the lower corner of the bag and at an angle to its length.

8. In a machine for filling bags or receptacles with a powdery or granular substance, the combination of a feeding mechanism whereby the substance to be treated is fed into the bag in a relatively small stream, with bag-sup- 105 ports, the upper support adapted to hold the bag near one corner, the lower support adapted to receive one side and the bottom of the bag, mechanism for vibrating the bag and its lower support by a positive upward and down- 115 ward motion in a line through the lower corner of the bag and at an angle to its length, the upper support comprising a clamping device which clamps the exterior of the bag to the filling-tube near the upper corner of the bag and above the discharge end of the filling- 120 tube within the bag.

9. In a machine for filling bags or receptacles with a powdery or granular substance, the combination of a feeding mechanism adapted to introduce the material in a relatively small 125 stream into the bag, with a bottom-support for the bag, and a trip mechanism for such support whereby it may be removed to permit the bag to fall, an upper support whereby the upper part of the bag is retained in proper 130 relation to its filling-tube, and a positive release mechanism to release the bag from its tube, said release mechanism being independent of the trip mechanism, so that the bag

may be released at the top and its support removed from the bottom simultaneously or otherwise.

10. In a machine for filling bags or receptacles with a powdery or granular substance, the combination of a bag-support with a feed mechanism comprising a relatively small tube-like part which leads from the supply to the bag, and an agitator within the passage from the supply to the bag, said agitator consisting of a long, thin, flexible wire, and means external to the tube for rapidly oscillating said wire so that by such oscillation and the flexibility of the wire it is kept in violent agitation and the contracted feeding-passage thus kept free.

11. In a machine for filling bags or receptacles with a powdery or granular substance, the combination of a bag-support with a feed mechanism comprising a relatively small tube-like part which leads from the supply to the bag, and an agitator within the passage from the supply to the bag, said agitator consisting of a long, thin, flexible wire, means external to the tube for rapidly oscillating said wire so that by such oscillation and the flexibility of the wire it is kept in violent agitation and the contracted feeding-passage thus kept free, said passage-way from the feed-supply to the bag being practically continuous, and the agitator projecting through the wall of said passage-way.

12. In a machine for filling bags or receptacles, the combination of a bag-support for holding the bag while it is being filled, a vibrating pitman to which it is secured and whereby it is supported directly above the pivot of such pitman, and a spring-support for the bag-support working outwardly in the direction of the length of the pitman, to keep the bag-support from being displaced.

13. In a machine for filling bags or receptacles with a powdery or granular substance, the combination of a filling-tube which introduces the substance into the bag, with an agitator therein, and means for rapidly moving said agitator within the tube to prevent the material from packing, said agitator consisting of a wire adapted to be rapidly oscillated, and a vibrator for the bag, and means connected with said wire and vibrator to keep both in operation simultaneously.

14. In a machine for filling receptacles, the combination of a supporting-frame with a supply-hopper-discharge portion vertically adjustable on the frame, a bag-supporting device on the frame, a series of devices for receiving the material from the hopper-discharging portion and conveying it to the bag, said series of devices vertically adjustable along the supporting-frame and containing parts which, with the discharge portion, form a measuring device adapted to be varied by the adjustment of the hopper-discharge portion with reference to the devices which receive the material from the hopper-discharge and convey it to the bag, and a windlass on

the frame connected with the hopper-discharge portions so as to raise or lower the same.

15. In a machine for filling receptacles, the combination of a supporting-frame with a supply-hopper-discharging portion vertically adjustable on the frame, a bag-supporting device on the frame, a series of devices for receiving the material from the hopper-discharging portion and conveying it to the bag, said series of devices vertically adjustable along the supporting-frame and containing parts which, with the discharge portion, form a measuring device adapted to be varied by the adjustment of the hopper-discharge portion with reference to the devices which receive the material from the hopper-discharge and convey it to the bag, a windlass on the frame connected with the hopper-discharge portions so as to raise or lower the same, and means for attaching the devices which receive the material from the hopper-discharge portion and convey it to the bag to the hopper-discharge portion so that both can be moved simultaneously with the action of such windlass.

16. In a machine for filling receptacles, the combination of a receptacle-support with a receptacle-supplying passage-way, an agitator in the said passage-way to keep the material from packing, a driving mechanism, and connections from the receptacle-support and agitator to the driving mechanism, whereby the receptacle-support is rapidly vibrated and the agitator rapidly operated to keep the passage free and fill the receptacle.

17. In a machine for filling receptacles, the combination of a receptacle-support, having a hinged bottom, with a driving mechanism and a connection from the same to the support, whereby the latter is rapidly vibrated, a spring-support for the receptacle-support, and trip mechanism whereby the hinged bottom is operated to discharge the filled receptacle.

18. In a machine for filling receptacles, the combination of a series of filling tubes or funnels with a series of supply-sections associated therewith, there being twice as many filling tubes or funnels as supply-sections, and means for moving the supply-sections and funnels with reference to each other so that each supply-section is alternately placed in connection with one and then another of the filling tubes or funnels.

19. In a machine for filling receptacles, the combination of a series of filling tubes or funnels with a series of supply-sections associated therewith, there being twice as many filling tubes or funnels as supply-sections, and means for moving the supply-sections and funnels with reference to each other so that each supply-section is alternately placed in connection with one and then another of the filling tubes or funnels, the parts arranged so that the supply-section is closed at the bottom during the period intervening be-

tween its connection with one tube or funnel and the next.

20. In a machine for filling receptacles, the combination of a series of filling tubes or funnels with a series of supply-sections associated therewith, there being twice as many filling tubes or funnels as supply-sections, and means for moving the supply-sections and funnels with reference to each other so that each supply-section is alternately placed in connection with one and then another of the filling tubes or funnels, the parts arranged so that the supply-section is closed at the bottom during the period intervening between its connection with one tube or funnel and the next, and means for filling such supply-section when so closed.

21. In a machine for filling bags, the combination of a series of filling tubes or funnels, with a series of clamps adapted to clamp the bag against the side of such tube or funnel, and a cam device adapted to simultaneously release a series of such clamps.

22. In a machine for filling bags, the combination of a series of filling tubes or funnels, with a series of clamps adapted to clamp the bag against the side of such tube or funnel, and a cam device adapted to simultaneously release a series of such clamps, said tubes or funnels arranged in series, each series consisting of each alternate funnel, and said cam device adapted to release the clamps associated with each of said series alternately.

23. In a machine for filling bags, the combination of a series of filling tubes or funnels, with a series of weak clamps, one for each tube or funnel, and a series of strong clamps, one for each funnel, and a controlling device whereby the strong clamps are alternately thrown in and out of action in groups.

24. In a machine for filling bags, the combination of a series of filling tubes or funnels, with a series of clamps, and a longitudinal wavy cam device associated with said clamps, each successive swell of the cam being opposed to the second filling tube or funnel, and means for moving the filling tubes or funnels and cam device with reference one to the other, so that the clamps are operated to release or secure the bag in alternately-acting groups.

25. In a machine for filling valve bags or receptacles with a powdery or granular substance, the combination of a feed mechanism, comprising a feeding-tube, whereby the material is introduced into the bag, with an upper support for said bag forming part of the feeding-tube and comprising a part which bears against the inside of the bag near the top, and an outer part opposed thereto which bears against the outside of the bag near the top, said outer part adapted to clamp the material of the bag against the part within the bag and above the lower end of the feed-tube within the bag, a support for the bottom of the bag, a vibrator adapted to give the bag an up-and-down motion, the excursion of

such vibrator related to the distance from the end of the feeding-tube to the point where the bag is clamped so that when the bag is nearly full the upper part of the bag about the feeding-tube will be free to have an accordion-like movement to prevent injury to the material of the bag.

26. In a machine for filling valve bags or receptacles with a powdery or granular substance, the combination of a feed mechanism comprising a feed-tube whereby the material is introduced into the bag, with an upper support for said bag forming part of the feeding-tube and comprising a part which bears against the inside of the bag near the top, and an outer part opposed thereto which bears against the outside of the bag near the top, said outer part adapted to clamp the material of the bag against the part within the bag and above the lower end of the feed-tube within the bag, a support for the bottom of the bag, a vibrator adapted to give the bag a laterally-vibratory motion, the excursion of such vibrator related to the distance from the end of the feeding-tube to the point where the bag is clamped so that when the bag is nearly full the upper part of the bag about the feeding-tube will be free to have an accordion-like movement to prevent injury to the material of the bag.

27. In a machine for filling valve bags or receptacles with a powdery or granular substance, the combination of a feed mechanism, comprising a feed-tube, whereby the material is introduced into the bag, with an upper support for said bag forming part of the feeding-tube and comprising a part which bears against the inside of the bag near the top, and an outer part opposed thereto which bears against the outside of the bag near the top, said outer part adapted to clamp the material of the bag against the part within the bag and above the lower end of the feed-tube within the bag, a support for the bottom of the bag, a vibrator adapted to give the bag an up-and-down and a laterally-vibratory motion, the excursion of such vibrator related to the distance from the end of the feeding-tube to the point where the bag is clamped so that when the bag is nearly full the upper part of the bag about the feeding-tube will be free to have an accordion-like movement to prevent injury to the material of the bag.

28. In a machine for filling bags or receptacles with a powdery or granular substance, the combination of a feeding mechanism whereby the substance to be treated is fed into the bag in a relatively small stream, with bag-supports adapted to support the bag so as to leave its sides relatively loose, and a vibrator comprising the bottom support, a rod therefrom, and an eccentric whereby a rapid vibratory motion is imparted to the bag and contents, the rod being pivoted below on such eccentric and attached above to the bottom support, and a spring device acting outwardly and in the line of the pitman away from its

pivot and so as to hold the pitman in position.

29. In a machine for filling bags or receptacles with a powdery or granular substance, the combination of a feeding mechanism whereby the substance is fed into the bag in a relatively small stream, with bag-supports adapted to support the bag so as to leave its sides relatively loose, and a vibrator which contains a spring member and which imparts a rapid laterally-vibratory motion to the bag and contents and thus breaks down the pyramid or column of material within the bag.

30. In a machine for filling bags or receptacles with a powdery or granular substance, the combination of a feeding mechanism whereby the substance is fed into the bag in a stream much smaller than the cross-section of the bag, with bag-supports adapted to support the bag so as to leave its sides relatively loose during the process of filling, and a vibrator which contains a spring member and which imparts a rapid vertical motion to the bag and contents and thus breaks down the pyramid or column of material in the bag.

31. In a machine for filling bags or receptacles with a powdery or granular substance, the combination of a feeding mechanism whereby the substance is fed into the bag in a relatively small stream, with bag-supports adapted to support the bag so as to leave its sides relatively loose, and a vibrator which contains a reciprocating and a spring member and which imparts a rapid combined vertical and lateral vibratory motion to the bag and contents and thus breaks down the pyramid or column within the bag.

32. In a machine for filling bags or receptacles with a powdery or granular substance, the combination of a feeding mechanism whereby the substance is fed into the bag in a stream much smaller than the cross-section of the bag, with bag-supports adapted to support the bag so as to leave the sides relatively loose during the process of filling, and a vibrator which includes the bottom support for the bag and a spring member, and which is adapted to impart a rapid motion to the bag and contents so as to break down the pyramid or column of material within the bag.

33. In a machine for filling bags or receptacles with a powdery or granular substance, the combination of a feed mechanism whereby the substance is fed into the bag in a stream much smaller than the cross-section of the bag, such mechanism containing a funnel or tube which projects down into the bag, with bag-supports to support the bag so as to leave its sides relatively loose during the process of filling, and a vibrator which contains a spring member and which has a rapid positive upward-and-downward motion aided by said spring member so as to impart a rapid motion to the bag and contents.

34. In a machine for filling bags or receptacles with a powdery or granular substance,

the combination of a feed mechanism adapted to introduce the material into the bag in a relatively small stream, with a bottom support for the bag and a top support for the bag, the two separated from each other so as to leave the sides of the bag loose, and non-automatic trip mechanism for the bottom support whereby the latter may be removed at the will of the operator to permit the bag to fall when the operator so desires.

35. In a machine for filling bags or receptacles with a powdery or granular substance, the combination of a feed mechanism adapted to introduce the material into the bag in a relatively small stream, with a bottom support for the bag, a vibrator of which the bottom support forms part, and a trip mechanism for such vibrator-support whereby the latter may be removed to permit the bag to fall.

36. In a machine for filling bags or receptacles, the combination of a bag-filling device with means for supporting the top of the bag and a bag-support for the bottom of the bag and a spring-support on which the bag-support rests while the bag is being filled, and a vibrator to give such bottom support a rapid vibratory motion while the bag is being filled.

37. In a machine for filling bags or receptacles, the combination of a bag-filling device with means for supporting the top of the bag and a bag-support for the bottom of the bag and a spring-support on which the bag-support rests while the bag is being filled, and a vibrator to give such bottom support a rapid vibratory motion while the bag is being filled, said vibrator consisting of a pitman secured to the lower bag-support and moving in one direction in opposition to the spring-support.

38. In a machine for filling bags or receptacles, the combination of a bag-filling device with means for supporting the top of the bag and a bottom support for the bag, spring-bars upon which bottom-support rests, and a vibrator which tends to move the bag-support up and down while the bag is being filled.

39. In a machine for filling bags or receptacles, the combination of a bag-filling device with means for supporting the top of the bag and a bottom support for the bag, spring-bars upon which bottom support rests, and a vibrator which tends to move the bag-support up and down while the bag is being filled, said vibrator consisting of a pitman secured to the bag-support and working substantially at right angles to the length of the spring-bars.

40. In a machine for filling bags or receptacles, the combination of means for filling the bags with an upper bag-support for holding the bag while it is being filled, a lower bag-support for holding the bag while it is being filled, a pitman rigidly attached to the lower bag-support at one end and driven by an eccentric at the other end so as to give the bag-support a combined vertical and lateral motion, and a spring-support which operates

upon the bottom bag-support in the direction outwardly along the line of the pitman while the bag is being filled.

41. In a machine for filling receptacles, the
 5 combination of a supporting-frame with a supply-hopper-discharging portion vertically adjustable on the frame, a bag-supporting device on the frame, a series of devices for receiving the material from the hopper-discharging portion and conveying it to the bag,
 10 said series of devices vertically adjustable along the supporting-frame and containing parts which, with the discharge portion, form a measuring device adapted to be varied by
 15 the adjustment of the hopper-discharge portion with reference to the devices which receive the material from the hopper-discharge and convey it to the bag, and means for connecting such series of devices with the hopper-discharging portion so that the two can
 20 be vertically adjusted together on the frame.

42. In a machine for filling receptacles, the combination of a suitable support for the receptacle, with a discharge part to discharge
 25 the material into the receptacle, a supply part to contain the supply of material, a measuring device interposed between the discharge and the supply, and consisting of two telescopic portions, a means for adjusting the
 30 two telescopic portions with reference to each other, means for varying the distance be-

tween the support and the discharge, and means for adjusting the supply part and the discharge part simultaneously with reference to the support for the receptacle.

43. In a machine for filling receptacles, the combination of a receptacle-support with a discharge device adapted to discharge the material into the receptacle, and a supply device adapted to hold the supply, a measuring device comprising two telescopic parts,
 40 one associated with the discharge device, and the other with the supply device, and means for adjusting the supply part and the discharge part simultaneously with reference to
 45 the support for the receptacle.

44. In a machine for filling bags or receptacles with powdery or granular substance, the combination of a feed mechanism adapted to introduce the material into the bag in a
 50 relatively small stream, with a bottom support for the bag and a top support for the bag and trip mechanism operable at will for the bottom support whereby the latter may
 55 be removed at the will of the operator to permit the bag to fall when the operator so desires.

ADELMER M. BATES.

Witnesses:

ARTHUR BROWNING,
 FRANCIS W. PARKER.