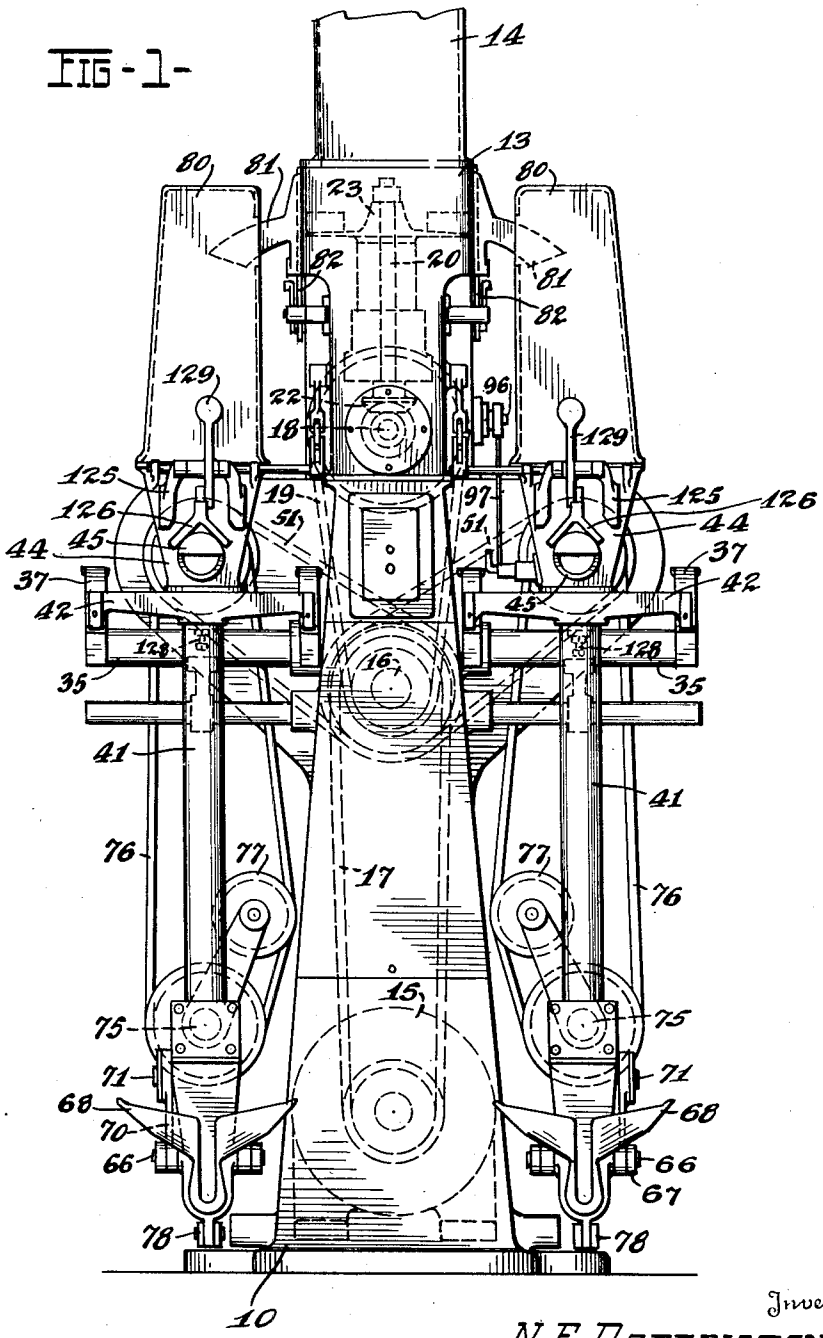
May 10, 1949. N. E. DORRINGTON ET AL 2,469,954

APPARATUS FOR PACKAGING MATERIAL

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FIG-1-



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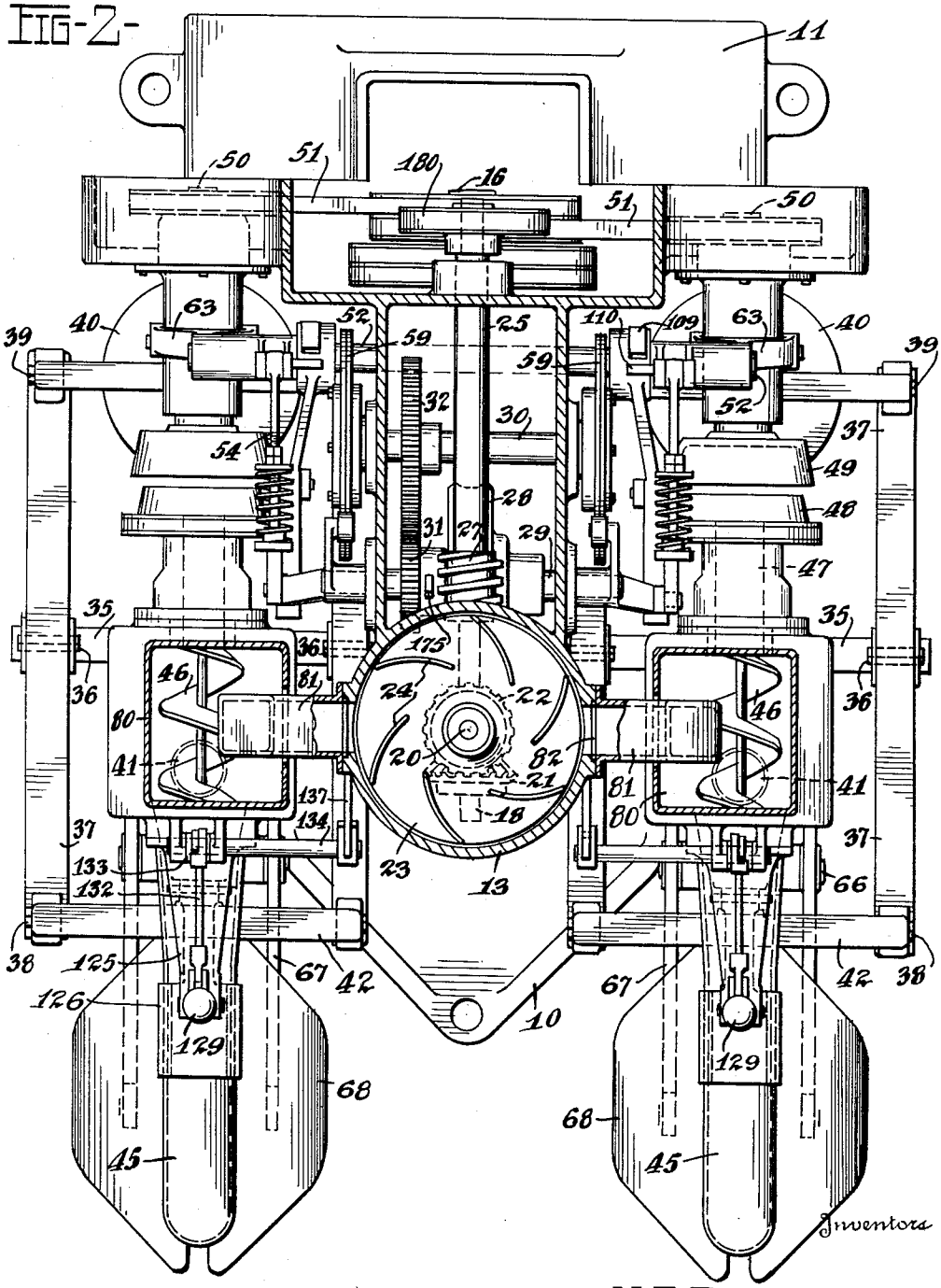
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APPARATUS FOR PACKAGING MATERIAL

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FIG-2-



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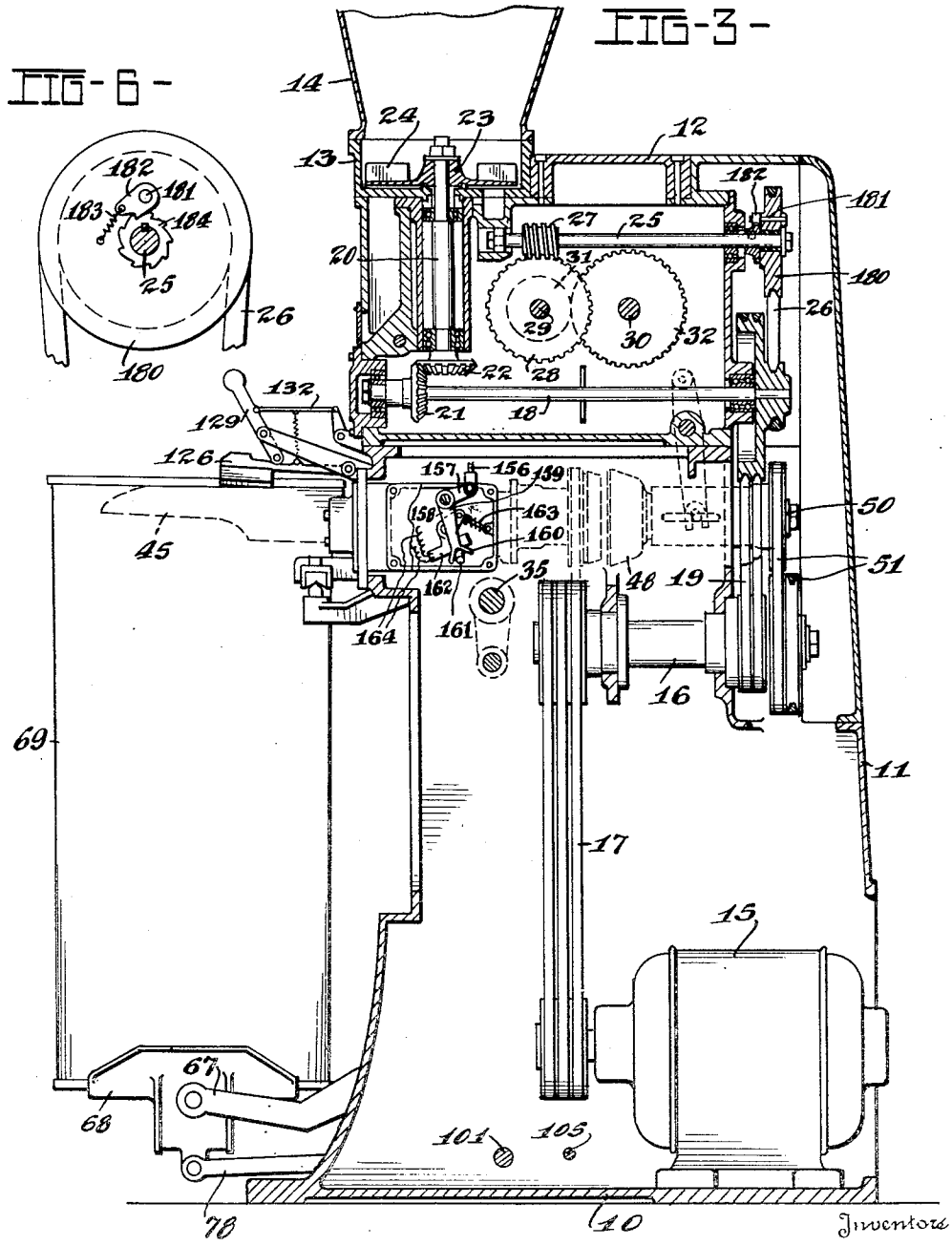
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APPARATUS FOR PACKAGING MATERIAL

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FIG-3-

FIG-6-



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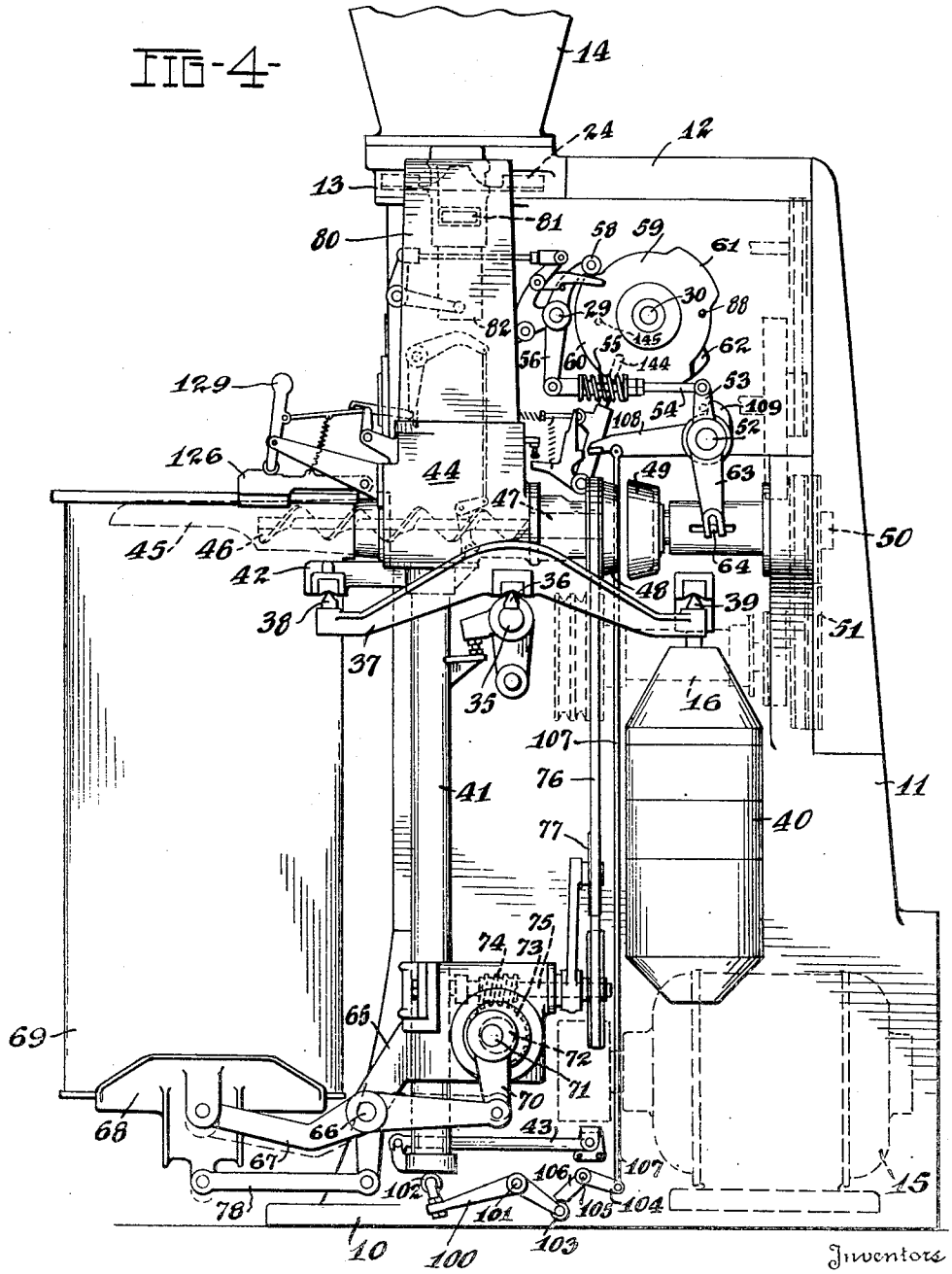
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APPARATUS FOR PACKAGING MATERIAL

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FIG-4-



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APPARATUS FOR PACKAGING MATERIAL

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FIG- 5 -

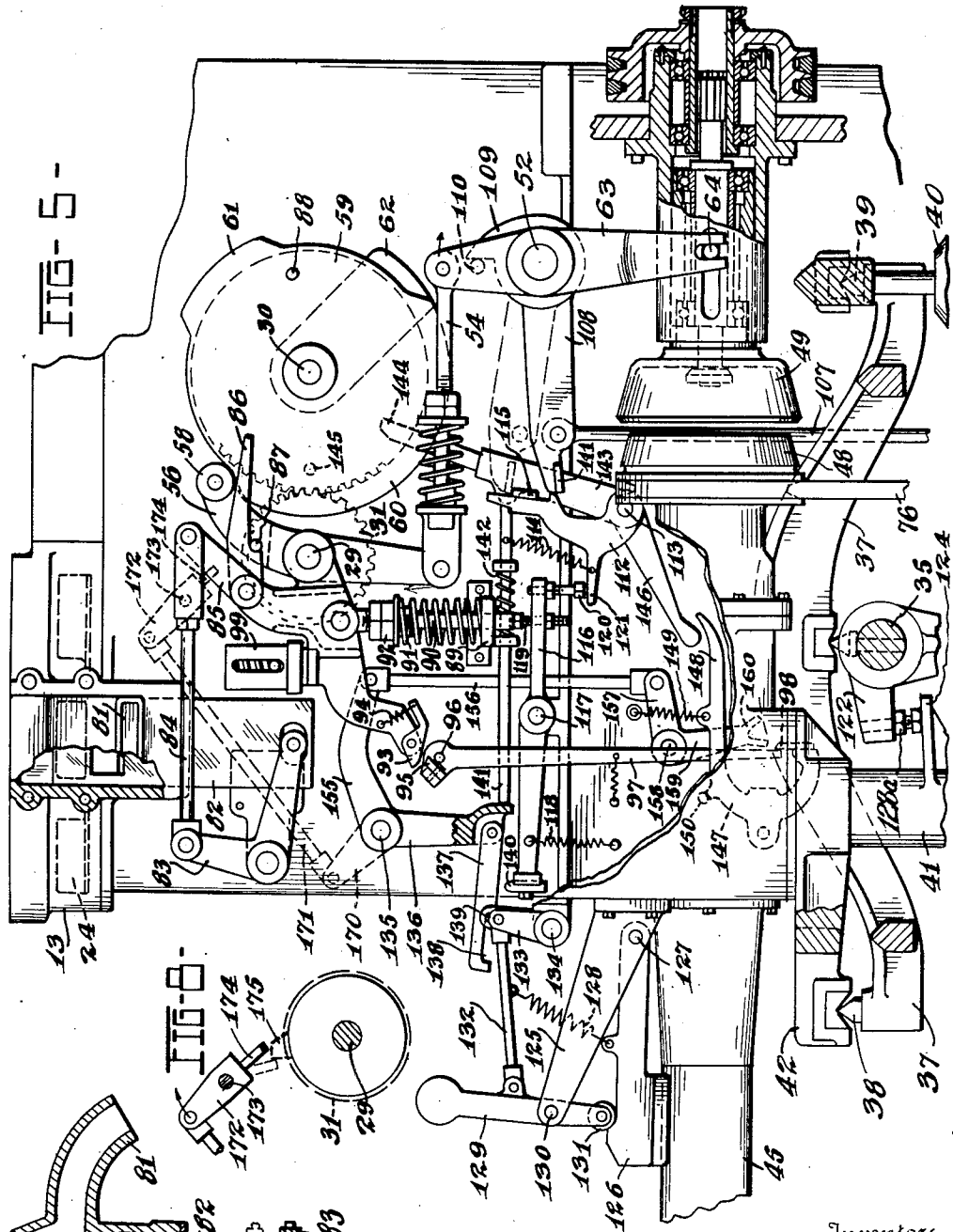
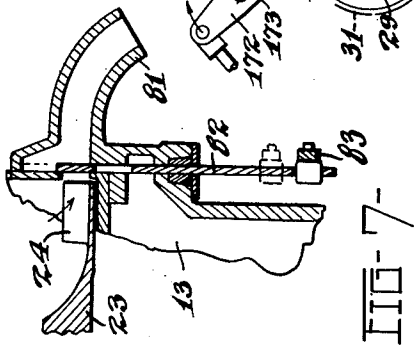


FIG- 6 -

FIG- 7 -



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2,469,954

UNITED STATES PATENT OFFICE

2,469,954

APPARATUS FOR PACKAGING MATERIAL

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Application December 23, 1942, Serial No. 469,890

19 Claims. (Cl. 249—56)

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This invention relates to apparatus for packaging powdered or granular material. More particularly, the invention relates to apparatus for filling valve bags with material of the nature of flour or the like.

An object of the invention is to provide a plurality of feeding units which operate successively to receive a substantially continuous discharge of material from a common hopper.

A further object is to provide a filling unit which is mounted upon a weighing device and weighs the material as soon as it is fed thereto and without waiting for its discharge into the bag to be filled.

Another object of the invention is to provide an apparatus by which the bulk charge of a package is filled thereinto rapidly and while the package is being jigged, and thereafter the charge is completed by a dribble feed into the filling device while jigging is suspended and then, after being weighed, the final dribble feed portion of the charge is discharged into the package during jigging.

Details and further objects of the invention will appear as the description proceeds.

In the accompanying drawings forming a part of this specification

Fig. 1 is a front elevation of one embodiment of the invention;

Fig. 2 is a horizontal section taken through the upper part of the apparatus shown in Fig. 1, some parts being omitted;

Fig. 3 is a vertical longitudinal section of the apparatus, some parts being omitted;

Fig. 4 is a side elevation of the apparatus, some parts being omitted;

Fig. 5 is an enlarged partial side elevation, with some parts broken away and some in section;

Fig. 6 is a detail of a safety drive;

Fig. 7 is a detail section of a discharge spout; and

Fig. 8 is a detail section of a safety stop for the control cam.

In the apparatus shown in the drawings, there is a frame comprising a base 10, a casing 11 and cover 12 which encloses the major part of the operating mechanism. In the upper part of the casing, there is a propeller housing 13 above which there is a hopper 14 for the material which is to be packaged.

Mounted in the base of the machine, as clearly shown in Fig. 3, there is a motor 15. Above the motor, there is a counter-shaft 16 driven from the motor by suitable belts 17. Above counter-shaft

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16, there is an intermediate shaft 18 driven from counter-shaft 16 by means of belts 19. A vertical shaft 20 above one end of shaft 18 is driven by a miter gear 21 on the shaft 18 meshing with a miter gear 22 on shaft 20. On the upper end of shaft 20, there is a propeller 23 having blades 24 within propeller housing 13.

Above intermediate shaft 18, there is a control drive shaft 25 driven by a belt 26 from intermediate shaft 18. On shaft 25, there is a worm 27 which drives a worm wheel 28 on shaft 29. A cam shaft 30 is driven from shaft 29 by means of spur gears 31, 32, spur gear 31 being driven from shaft 29 through a clutch illustrated in Fig. 8. The latter figure will be mentioned below in connection with members 174 and 175.

In the apparatus shown, there are two filling units which are duplicates of each other and, therefore, only one filling unit needs to be described in detail.

From the side of the casing, there extends outward a supporting bracket 35 on which there are bearings 36 (see Fig. 4). Scale beams 37 are fulcrumed on bearings 36, the load end of the scale beams being provided with load bearings 38 and the rear end of the scale beams being provided with bearings 39 from which is suspended the weight 40.

The filling unit mounted upon the scales comprises a vertical post 41 having a bracket 42 extending forward therefrom and mounted on load bearings 38. At the bottom of the post, there is a check rod 43 pivoted to the post and to a stationary pivot on the casing so that the post maintains a vertical position as it moves upward and downward when the scale beam oscillates.

On the upper end of the post, there is mounted a housing 44 carrying a filling spout 45 adapted to enter the valve of a valve bag. A screw 46 projects through the housing and into the spout to feed material from the housing through the spout into a bag suspended from the spout. The screw is driven by a shaft 47 carrying a clutch member 48. A drive clutch member 49 is mounted in slidable but driving relation with a shaft 50 which is driven from counter-shaft 16 by means of a belt 51.

Transversely above shaft 50 there is mounted a rockshaft 52 (see Figs. 4 and 5). An upper arm 53 from rockshaft 52 is connected by a link 54 having a yielding portion 55 to the lower arm 56 of a lever which is mounted upon shaft 29 and the upper arm of which is provided with a cam roller 58 adapted to contact the edge of a cam 59 mounted upon shaft 30. Cam 59 is pro-

vided with two elevated portions 60 and 61. A supplemental cam plate 62 may be adjusted with respect to plate 59 and thus adjust the effective length of cam rise 60. Rockshaft 52 is provided with a downwardly extending forked arm 63 which engages clutch operating pin 64 on the two sides of the clutch shaft and serves to move driving clutch member 49 into and out of engagement with driven clutch member 48.

Vertically adjustable upon the lower portion of post 41, there is a bracket 65. On a forward portion of this bracket, there is a pivotal mounting 66 for a jigging lever 67. A bottom support 68 is pivoted to the forward end of lever 67, the bottom support being in position to support the bottom of a bag 69, the valve of which is threaded upon filling spout 45. The bracket 65 may be adjusted vertically to accommodate lengths of different sized bags, if desired.

The rear end of lever 67 is pivoted to a connection 70 from a crank pin 71 which is operated by a shaft 72 driven by a worm wheel 73 in engagement with a worm 74 on a shaft 75, which in turn is driven by means of a belt 76 from a pulley on clutch member 48. There is provided a tightener 77 which may be adjusted to keep the belt in driving contact with the respective wheels when the bracket is raised or lowered upon the post. A check rod 78 connects the lower part of bottom support 68 with the lower end of bracket 65 and so keeps the bottom support in the desired horizontal position.

Above the housing 44, there is a hopper 80. A discharge spout 81 from housing 13 permits the feeding of material from housing 13 into hopper 80 (see Fig. 2). The spout 81 is controlled by a gate 82 (see Figs. 5 and 7). The gate 82 is opened and closed by means of a bell crank lever 83 connected by a link 84 to the upper arm of a lever 85 pivoted upon shaft 29. The upper arm of lever 85 is provided with a latch member 86 normally engaging a pin 87 on the upper arm of lever 56 so that when the latch is in normal position, movement of lever 56 to the left, as viewed in Fig. 5, imparts an upward movement to the gate 82 which results in opening the outlet from housing 13 through spout 81. A pin 88 upon cam plate 59 engages latch 86 at an appropriate time and raises the latch out of engagement with pin 87.

A bracket 89 secured stationarily to the side of the casing is perforated to allow of the vertical movement therethrough of a rod 90 pivoted to lever 85. A spring 91 surrounds rod 90 and is compressed between bracket 89 and adjustable nuts 92 upon rod 90.

The lower end of lever 85 is provided with a latch 93 normally held in the position shown in the drawings by means of a spring 94. There is provided an engaging abutment 95 which is contacted at times by latch 93, the abutment 95 being upon a member pivoted to the casing at 96 and having a downwardly extending arm 97 engaging an abutment 98 which normally moves upward and downward with post 41. The abutment 95 and the arm 97 thus are pivoted at 96 to a portion of the apparatus which does not undergo a weighing movement. At 99, there is indicated a cushioning stop for the lever 85 when it is swung by spring 91.

The post 41 is held in its raised position at times by the following means which are best shown on Fig. 4. A lever 100 is fulcrumed to the casing at 101 and carries on its forward end a roller 102 in position to contact the bottom

of post 41. The other end of the lever carries a roller 103. Another lever 104 pivoted to the casing at 105 has an arm 106 in position to engage roller 103. A rod 107 connects the other end of lever 104 to an arm 108 rocking upon shaft 52. An arm 109 (see Fig. 5) moving with arm 108 is contacted by a pin 110 on arm 53 and raises arm 108 when the upper end of lever 53 is forced to the right, as viewed in Fig. 5, to close the clutch. Therefore, whenever the clutch is closed, the post 41 is supported by roller 102 so as to position the clutch member 48 carried on the post in alignment with clutch member 49.

The end of member 108 is provided with a wear plate 111. A latch 112 pivoted at 113 is normally urged to latching position by a spring 114 and carries an abutment plate 115 in position to contact wear plate 111 when that plate is in its raised position, as shown in dotted lines on Fig. 5.

A latch-operating lever 116 is pivoted to the casing at 117 and is normally urged to a position in which its rear arm is raised by a spring 118. A stop screw 119 is positioned in the rear arm of lever 116 so as to be in line with rod 90. An adjustable screw 120 at the rear end of lever 116 is in position to contact an arm 121 on latch 112 when the rear end of the lever is lowered.

The supporting member 35 has an arm 122 provided with an adjustable stop screw 123a against which a lug 124 on post 41 is positioned when the post is in its raised position.

Positioned slightly above and adjacent to the filling tube 45, there is a bracket 125. A bag clamp 126 is pivoted to bracket 125 at 127 and is urged upwards by a spring 128. A clamp-operating handle 129 is pivoted to bracket 125 at 130 and carries on its lower end a roller 131 contacting the upper side of clamp 126 and forcing the clamp down into clamping position against the upper end of a bag on spout 45 when handle 129 is in the position in which it is shown in Fig. 5. Handle 129 is connected by a link 132 to an arm 133 of a rockshaft 134.

Another rockshaft 135 projecting from the side of the casing has a downwardly extending arm 136 to which there is pivoted an operating link 137 having in its lower side an elongated notch 138 normally resting upon a pin 139 in an arm projecting upwards from rockshaft 134. On the forward end of lever 116, there is a vertically adjustable plate 140 in position to raise link 137 when the forward end of lever 116 is raised.

The rockshaft 135 which is mounted for angular movement upon the fixed casing of the apparatus is common to both the filling units, and upon the right hand portion thereof the arm 136 is mounted. Upon the left hand portion thereof an analogous arm 136 also is mounted. Thus there are two arms bearing this designation 136.

In line with the lower end of arm 136 there is a push rod 141 normally urged to the rear by a spring 142. A lever 143 mounted on shaft 113 has an upper arm 144 extending into the path of a pin 145 on cam 59, the lever being arranged to push rod 141 forward when the upper arm of the lever is contacted by pin 145.

Lever 143 has a downwardly extending arm 146. A U-shaped lever 147 has an upper arm 148 in the path of arm 146 of lever 143. The arm 148 is normally urged upwards by a spring 149 against a stop 150. Abutment plate 98 is mounted on the lower end of lever 147, and is

moved downward to release member 97 if it has not been released before lever 144 is actuated.

Thus the lever 147 (of each filling unit) is mounted upon the housing 44 and is adapted for undergoing a weighing movement with the housing 44. Spring 149 also is mounted upon housing 44.

An arm 155 extends rearwardly from rockshaft 135. Link 156 is pivoted to the rear end of arm 155 and extends downward to an arm 157 fulcrumed at 158 and operating a downwardly extending arm 159 which terminates in a fork 160 (see Figs. 5 and 3). Fork 160 straddles a pin 161 arranged to operate a mercury switch 162 which is normally swung to the position in which it is shown in Fig. 3 by means of a spring 163. The mercury switch controls the motor 15 through leads 164, but is provided with a restricted orifice for the flow of mercury so that its action is delayed. Ordinarily when the switch is tilted by the lowering of rod 156, shaft 135 is rocked back to its original position before the tilting of the switch is effective, but if this return of rockshaft 135 is too long delayed, the motor is stopped.

As shown in Fig. 5, there is an upwardly and forwardly extending arm 170 on shaft 135. This arm is connected by a link 171 to a stop lever 172 pivoted to the frame at 173 and having a pin 174 extending into the path of an arm 175 controlling a clutch which drives spur gear 31 from shaft 20 (see Fig. 8). Said clutch may be mounted upon the shaft 29 and may be of a conventional design whereby the clutch is closed when the finger 174 is thrust in a counterclockwise direction as shown in Fig. 8, and thus the arm 175 is released for rotation, for example, in a counterclockwise direction, also as shown in said Fig. 8. When the clutch is closed the torque is transmitted to the spur gear 31. The latter is common to both right and left hand filling units as shown in Fig. 2. Torque is thus transmitted to the spur gear 32 which may be keyed to shaft 30. Spur gear 32 also is common to both filling units, there being only one gear 32 and one gear 31. Said clutch may be opened when the arm 175 moves through one revolution and strikes the finger 174, provided that the latter at that time is in the path of motion of the arm 175.

As above mentioned the arms 155 and 170 are mounted for angular movement with the rockshaft 135. These two arms are common to the two filling units, there being but one each of said arms.

As shown in Fig. 6, pulley 180 driven by belt 26 is mounted loosely upon shaft 25 and carries a pin 181 on which there is pivoted a pawl 182 normally urged by a spring 183 into driving engagement with a ratchet wheel 184 splined on shaft 25. This provides for the normal drive of shaft 25 and through it of cams 59, but insures that any backward rotation of pulley 180 will not move cams 59 backward. In normal operation of the apparatus, there is no backward movement of pulley 180, but in adjusting the apparatus, such movement might occur. Pins 88 and 145 would not permit reverse movement of cams 59 without injury to the apparatus.

From the above description it will be apparent that the following shafts and parts (among others) of the apparatus do not undergo a weighing motion and therefore are not mounted upon the scale beams: the shafts 29, 30, 52, bell crank lever 83, shaft 113, shaft 117, shaft 135.

Mounted upon the post 41 and thus adapted for having the weight rest upon the scale beam are the spout 45, the means for clamping a bag to the spout, the U-shaped member 147, the feed screw 46, the driven clutch member 48 together with the bag supporting and jigging means mounted upon the lower portion of said post 41.

The operation of the several parts has been indicated to some extent as the description proceeded, but for convenience, the entire cycle of operations will be reviewed in order.

Presuming that the apparatus is in the position in which it is shown in Fig. 4, except that both bag clamps are opened, a bag is placed upon the right hand filling tube 45, as shown in Fig. 1, which is the tube appearing on Fig. 4. The clamp handle 129 is then shifted to the position in which it is shown in Figs. 4 and 5 and the completion of this movement engages link 137 and so moves arm 136 to the right and rocks shaft 135 to move switch 162 to motor-starting position in Fig. 3 the switch 162 is in a motor-starting position resulting from the closing of the righthand bag clamp (not shown in Fig. 3). However, the lefthand bag clamp as shown in Fig. 3 is open at this point. At the same time, finger 174 is moved out of engagement with the arm 175 and allows the clutch controlled by the arm to close and drive shaft 29 and so start the movement of cam 59 in a clockwise direction as viewed in Fig. 5. Thereupon, roller 58 rides up upon rise 60. The engagement of pin 87 with catch 86 rocks lever 85 and through link 84 also rocks lever 83 and moves gate 82 upward to the open position. This allows discharge of material from hopper 14 through spout 81 into hopper 80. At the same time, the lower end of lever 56 through link 54 rocks shaft 52 and arm 63 moves live clutch member 49 into engagement with clutch member 48, thus driving the discharge screw 46 and discharging material into the bag. At the same time, engagement of pin 110 with tooth 109 raises arm 108 and through link 107 depresses member 106 against the roller 103 and raises roller 102 against the bottom of the post, thus holding the post firmly against the stop 128*a*. With the starting of the clutch member, belt 76 is driven and through the connections previously described, this rocks lever 67 and imparts a jigging action to support 68 for the bottom of the bag.

It will be understood that there is a duplicate filling unit on the other side of the hopper and that this duplicate unit is driven by a cam 59 the same as the one shown in Figs. 4 and 5, except that it is mounted on shaft 30 at 180° from the mounting of the cam shown in Fig. 5. While roller 58 is riding upon rise 60 of the cam of the unit shown in Fig. 5, which will be hereafter referred to as the right hand unit, the pin 145 of the lefthand unit will engage lever 144 of that unit and oscillate through push rod 141 and arm 136 rock shaft 135. However, the initial movement of lever 85 will have lowered rod 90 and so will have tilted lever 116 to raise link 137 out of engagement with pin 139 and consequently the rocking of shaft 135 will not have any effect upon the bag clamp. However, rod 156 will tilt the mercury switch to stopping position. Before the switch has time to act, the operator can place a bag upon the filling spout of the left hand unit and rock the handle of the bag clamp of that unit to return rock shaft 135 to its original position.

It will be seen that the filling and jigging of

the bag will thus continue as long as roller 58 rides upon cam rise 60. It will be seen that the length of this rise may be adjusted by movement of the member 62.

When lever 85 is rocked to open gate 82, latch 93 is moved past catch 95. The parts are so proportioned that the catch 93 is moved an appreciable distance beyond stop 95 so that these two members are not in engagement during the time that roller 58 rides upon cam rise 60. When roller 58 rides off of cam rise 60 or 62, spring 91 returns lever 85 towards its original position until catch 93 engages stop 95. This in turn swings arm 97 against stop 98. The parts are so adjusted that when catch 93 engages stop 95, gate 82 is partially closed. This allows a continued feed of material through spout 81, but at a reduced rate which may be referred to hereafter as a dribble feed. Stops 119 and 120 are so adjusted that when the lever 85 is in dribble feed position, catch 112 is moved to the left so that arm 108 is permitted to move downward when roller 58 runs off of rise 60 or 62. This allows arm 63 to move to the right, as viewed in Fig. 5, and opens the clutch. At the same time, rod 107 is lowered and results in lowering roller 102 and allowing the weight of post 41 and the connected parts to rest upon the scale beam. The dribble feed will in normal operation of the apparatus complete the desired charge before roller 58 is contacted by rise 61. When a sufficient charge has been fed into the hopper 80, the scale beam will swing sufficiently to lower plate 98 out of engagement with arm 97 and so release abutment 95 and allow the complete closure of the gate. Just before roller 58 rides up upon cam rise 61, pin 88 engages latch member 86 and raises it so that it is not engaged by pin 87 when the roller rides up upon the cam rise. Therefore, gate 82 remains closed. However, the movement of lever 56 operates rockshaft 52, closing the clutch and starting the screw feed so that the dribbled portion of the charge is driven out into the bag. At the same time, rod 107 is again raised so as to lock the post in its upward position and the jigging is effected by the movement of clutch member 48 and belt 76.

When gate 82 is completely closed in the manner just described, rod 90 is raised to the position in which it is shown in Fig. 5, and this allows latch 112 to move stop plate 115 beneath plate 111 when arm 108 is raised by the riding of the roller 58 upon cam rise 61. Therefore, when the roller rides off of the end of the cam rise and permits return of rockshaft 52 to the position in which it is shown in Fig. 5, arm 108 is retained in its raised position, indicated by dotted lines in Fig. 5. This keeps the post and filling mechanism locked in the upward position.

Immediately before roller 58 rides off rise 61, pin 145 engages finger 144. At this time, lever 116 will be in the position in which it is shown in Fig. 5, and consequently the movement of push rod 141 will result in link 137 engaging pin 139 and rocking shaft 134 to release the bag clamp and permit the removal of the filled bag. At the same time, the rocking of shaft 135 will result in the tilting of the mercury switch to motor-stopping position and will also rock finger 174 into the position shown in dotted lines in Fig. 8 which will engage arm 175 when it reaches the position in which it is shown in Fig. 8.

In the normal operation of the apparatus, the operator will remove the filled bag and place an empty bag upon the filling tube and return the bag clamp to its closing position and thus rock shaft 135 back to the position in which it is shown in Fig. 5 before the tilting of the mercury switch effects a stopping of the motor and before arm 175 is engaged by finger 174.

In the event that sufficient material is not supplied to the hopper 80 to complete the weighed charge before the rise 61 engages the roller 58, the latch 93 remains in engagement with the catch 95 so that bell crank 85 remains in dribble feed position and the dribble feed continues to flow to the hopper 80 while the rise 61 is in engagement with the roller 58. As previously stated, the scale beam is locked in its upward position when the rise 61 engages the roller 58. When the bell crank 85 is in said dribble feed position, the rod 90 and lever 116 are positioned so that the plate 140 contacts the link 137 and the notch portion 138 is raised out of engagement with the pin 139. Just before the rise 61 passes beyond the roller 58, the pin 145 engages the arm 144 with the result that rockshaft 135 is swung in a clockwise direction, Fig. 5, which, however, does not cause the clamp to open since the notch portion 138 is raised out of engagement with the pin 139. When the clamp remains closed in this manner for an undue length of time, the operator knows that an abnormal weighing operation has taken place. The last described motion of rockshaft 135 also moves the delayed action mercury switch 162 to motor stopping position. Accordingly, the motor stops unless the clamp is manually released by actuation of the clamp-operating handle to allow the package to be removed from the spout 45 and a new package to be clamped thereon before expiration of the time delay period of the switch.

Responsive to the described engagement of the pin 145 with arm 144, the arm 146 engages the arm 148 with the result that the abutment 98 moves away from the arm 97 thus allowing completion of the clockwise movement of bell crank 85, Fig. 5, to thereby completely close the gate 82. The last-described movement of the bell crank 85 raises the rod 90 so that the scale beam is locked in its upward position as the rise 61 passes the roller 58 in the manner previously described. As previously stated, the lever 56 is moved to disengage the clutch and stop the feed screw and the jigging apparatus as the rise 61 passes beyond the roller 58.

As indicated above, in the normal operation of the device the dribble feed is stopped before cam rise 61 becomes effective, and if this does not occur, cam section 62 is adjusted to correct the abnormal operation. In the meantime the dribble feed is continued during the operation of cam rise 61, discharge taking place at the end of that time regardless of whether this additional dribble feed is slightly more or less than that required to furnish the exact charge desired.

As previously indicated, the mercury switch is a delayed action switch and the parts are timed so that clutch arm 175 will not engage finger 174 until an appreciable time after the rocking of shaft 135. Consequently, in case a bag is not placed upon the filling tube and the clamp returned to its closed position, the machine is stopped with roller 58 in about the position shown in Fig. 5. In the apparatus as shown, this is at a time when roller 58 of the left hand unit will be riding on cam extension 62 and so will maintain gate 82 fully opened. However, the stopping of the motor will also stop the rotation of the propeller 23 with its blades 24 so that there is

little real discharge of material even though the gate is fully opened. If cam rise **62** is adjusted so that it does not extend cam rise **60** more than 180°, it will be seen that the gate of the left hand unit will be in the dribble feed position when the apparatus is stopped in the manner just described.

It will be seen from the above that the two units are operated in succession so that the discharge from the common hopper is substantially continuous. This is very desirable particularly in packaging material which might pack or clog or be otherwise injured if the propeller continued to operate while the gates were both closed. It will be seen that normally the bulk charging of each unit approaches one-half of the total time, and in any case, the dribble feed of one unit extends well beyond the beginning of the bulk charge of the other unit.

It will also be seen that the bulk charge is fed into the bag while the weighing device is locked and while the bag is being jigged. The dribble feed is fed into the filling unit, but not into the bag, while the entire filling unit is supported by the scale beam and while both the jigging device and the packing screw are at rest, so that there is no operation of the jigging device or filling screw to interfere with the accuracy of the weighing. After this accurate weighing has been accomplished, the scale is once more locked in position and the completion of the charge takes place during jigging of the package. The scale remains locked while the bag is being discharged and another bag is placed thereon and is not again unlocked until the dribble feed is begun for the next package.

While the apparatus has been disclosed in considerable detail and the various features including the safety devices are advantageous and constitute parts of the invention as a whole, it will be readily understood that part of the objects of the invention may be secured with wide variations in specific apparatus. For example, while the apparatus is primarily intended for the filling of valve bags, it could be easily modified to fill other packages, and while the disclosed connections for operating a screw ejecting device for each packaging unit is preferred, it will be readily understood that other ejecting devices might be employed while incorporating some features of the invention.

It will also be noted that the clutch for operating the discharge device and jigger of each filling unit is closed only when the filling unit is locked in position, and the weighing takes place only when the filling unit is supported on the weighing device without interference from the clutch, discharge device or jigger. This enables accurate weighing of the final portion of the charge, so as to obtain accurate weights, while at the same time the entire charge including the dribble feed may be packed tightly into the package, with screw pressure of material into the package as well as jigging, if desired. From the foregoing, it will be understood that, while the entire combination as disclosed is a desirable combination and the parts work together to produce a final result, some of the results may be obtained with marked variation in construction of the different devices, and that some of the features may be employed without others, so that departures from the exact disclosure may be made within the scope of the appended claims.

What we claim is:

1. In apparatus for filling receptacles, a support for a receptacle, a hopper, a force feeder for feeding material from the hopper to a receptacle on the support, a driven clutch member for said force feeder, a weighing device, means mounting the support, hopper, force feeder and driven clutch member upon said weighing device, a driving member for the clutch mounted upon a stationary support, means for locking the weighing device with the driven clutch member in line with the driving clutch member, means for opening and closing the clutch, and a common operating device for the locking member and the clutch.

2. Apparatus for filling valve bags comprising a hopper, a spout extending from the hopper and adapted to enter the valve of a bag, a force feeder for forcing material from the hopper through the spout into a bag thereon, a support for the bottom of a bag, the valve of which is around said spout, a weighing device, means mounting said spout, hopper, force feeder and support upon said weighing device, a jigger for said support, means to lock the weighing device with the load thereon in upper position, and means for simultaneously operating the force feeder and jigger, said means being operative only when the load on the weigher is locked.

3. Apparatus for filling receptacles comprising a casing, a centrifugal impeller within the casing, a plurality of outlets from the casing, a filling unit in position to receive material from each of said outlets, each of said filling units comprising a weighing device, a support for a receptacle, a hopper and means for forcing material from the hopper into the receptacle, all mounted upon said weighing device, control means for operating the units in succession, and means controlled by the weighing means of the successive filling units for closing in succession the respective outlets from the casing.

4. Apparatus in accordance with claim 3 and comprising means for stopping the operation of the control means a predetermined time after a filled receptacle is discharged, and means including a bag clamping structure for preventing such stoppage operated in placing an empty receptacle in place of the discharge receptacle.

5. Apparatus for filling valve bags comprising a casing, a centrifugal impeller within the casing, outlets on opposite sides of the casing, filling units on opposite sides of the casing, each unit comprising a hopper in position to receive material from one of said outlets, a spout extending from the hopper and adapted to enter the valve of a bag, a manually closable clamp adapted to clamp a bag upon the spout, automatic means for releasing the clamp from a filled bag, control means for operating the filling units alternately, means for stopping the operation of the control means and the entire apparatus a predetermined time after the automatic release of the clamp of either unit, and means operable by the manual operation of the bag clamp thus released to render inoperative the stopping means.

6. Apparatus for filling receptacles comprising a plurality of weighing devices, a support for a receptacle on each device, a common supply for material to fill receptacles on said devices, control means normally directing the feed from the supply to the devices in succession, a common cam shaft, means to rotate the shaft continuously during the operation of the apparatus, a cam on said

shaft for each of said devices, connections from each said cam starting feed to its respective device when the cam shaft reaches a predetermined point in its rotation, means operated by the weighing device in response to a predetermined weight thereon to stop said feed and means operated by the cam to stop said feed when the shaft has turned through a predetermined arc, if the feed is not previously stopped by the weighing device.

7. Apparatus for filling valve bags comprising a weighing device, a hopper mounted on the weighing device, a support for a valve bag mounted on the weighing device and comprising a spout extending from the hopper and adapted to enter the valve of a bag, means for forcing material from the hopper through the spout into a bag on said support, means to supply the main portion of a charge to the hopper rapidly and the final portion more slowly until the charge is complete, and control means operating said forcing means during the rapid feed and after the charge is complete and rendering said forcing means inoperative during the slow feed.

8. Apparatus for filling valve bags comprising a weighing device, a hopper mounted on the weighing device, a support for a valve bag mounted on the weighing device and comprising a spout extending from the hopper and adapted to enter the valve of a bag, means for forcing material from the hopper through the spout into a bag on said support, means to supply the main portion of a charge to the hopper rapidly and the final portion more slowly, means responsive to the weighing device for stopping the slow supply when the charge is complete, and control means operating said forcing means during the rapid feed and after the charge is complete, and rendering said forcing means inoperative during the slow feed.

9. Apparatus for filling valve bags comprising a weighing device, a hopper mounted on the weighing device, a support for a valve bag mounted on the weighing device and comprising a spout extending from the hopper and adapted to enter the valve of a bag, means for forcing material from the hopper through the spout into a bag on said support, means to supply the main portion of a charge to the hopper rapidly and the final portion more slowly, means responsive to the weighing device for stopping the slow supply when the charge is complete, and control means operating said forcing means during the rapid feed and after the charge is complete, and rendering said forcing means inoperative during the slow feed, a lock for said weighing device, and means rendering said lock operative when said forcing means starts and releasing the lock when said forcing means stops.

10. Apparatus for filling valve bags comprising a weighing device, a hopper mounted on the weighing device, a support for a valve bag mounted on the weighing device and comprising a spout extending from the hopper and adapted to enter the valve of a bag, means for forcing material from the hopper through the spout into a bag on said support, means to feed a stream of material into the hopper, a lock for the weighing device, a jigger for a bag on said support, means rendering said forcing means, lock and jigger operative simultaneously and rendering them inoperative a predetermined time thereafter, means operated by the weighing device in response to a predetermined weight thereon to stop said stream, and means to restart said forcing means and render said lock and jigger operative after the stream is stopped.

11. In apparatus for filling valve bags, a scale adapted to be locked in fixed position and releasable for weighing action, a hopper mounted on said scale, a filling spout, a clamp manually movable from open position to closed position to secure a bag to said filling spout, means including a material feeding screw for feeding material from the hopper through the spout into a bag held on said spout, means for supplying material to the hopper, a timing device, means controlled by the timing device to release said scale for weighing action after the greater part of the charge has entered the hopper and to lock the scale after a timed weighing period has elapsed, means controlled by the scale to normally shut off the flow of material to the hopper during the weighing period as soon as the entire weighed charge has entered the hopper, and means actuatable by the timing device and responsive to weighing motion of said scale as produced by a full charge to move said clamp automatically to open position.

12. In apparatus for filling valve bags, a scale adapted to be locked in fixed position and releasable for weighing action, a hopper mounted on said scale, a filling spout, a clamp manually movable from open position to closed position to secure a bag to said filling spout, means including a material feeding screw for feeding material from the hopper through the spout into a bag held on said spout, a timing device, means controlled by the timing device to initiate flow of material to the hopper and to reduce said flow to a dribble feed after a timed feeding period has elapsed, means controlled by the timing device to release said scale for weighing action at the end of said feeding period and to lock the scale after a timed weighing period has elapsed, means controlled by the scale to normally shut off the flow of material to the hopper during the weighing period as soon as the entire weighed charge has entered the hopper, means controlled by said timing device normally operable to automatically move said clamp to open position after the entire weighed charge has entered the bag, and means responsive to said timing device and said scale for preventing the automatic opening of said clamp if an entire weighed charge does not enter the hopper during the weighing period.

13. In apparatus for filling valve bags, a scale adapted to be locked in fixed position and releasable for weighing action, a hopper mounted on said scale, a filling spout, a clamp manually movable from open position to closed position to secure a bag to said filling spout, means including a material feeding screw for feeding material from the hopper through the spout into a bag held on said spout, a timing device, means controlled by the timing device to initiate flow of material to the hopper and to reduce said flow to a dribble feed after a timed feeding period has elapsed, means controlled by the timing device to release said scale for weighing action at the end of said feeding period and to lock the scale after a timed weighing period has elapsed, primary means controlled by the scale to normally shut off the flow of material to the hopper during the weighing period as soon as the entire weighed charge has entered the hopper, means controlled by said timing device normally operable to automatically move said clamp to open position after the entire weighed charge has entered the bag, secondary means operated by the timing device for cutting off the dribble feed

a predetermined length of time after the end of the weighing period, said secondary means being effective only when said primary means have failed to function, and means operative in response to the effective operation of said secondary means to render inoperative said means to move said clamp to the open position.

14. In apparatus for filling a valve bag, a scale adapted to be locked in fixed position and releasable for weighing action, a hopper mounted on said scale, a support for a bag comprising a filling spout, means including a material feeding screw for feeding material to the hopper through the spout into a bag held on said spout, a timing device, means controlled by said timing device to initiate flow of material to the hopper and to reduce said flow to a dribble feed after a timed feeding period has elapsed, means controlled by the timing device to release said scale for weighing action at the end of the feeding period and to lock the scale after a timed weighing period has elapsed, means controlled by the scale to normally shut off the flow of material to the hopper during the weighing period after the entire weighed charge has entered the hopper, means controlled by the timing device for operating said screw during said feeding period, means controlled by said timing device for rendering said screw inoperative during said weighing period, and means controlled by said timing device for operating said screw after the expiration of said weighing period.

15. In apparatus for filling valve bags, a scale adapted to be locked in fixed position and releasable for weighing action, a hopper mounted on said scale, a filling spout, a manually operable clamp for securing a bag to said spout, means including a material feeding screw for feeding material from the hopper through the spout into a bag held on said spout, a timing device, flow control means operatively associated with said timing device whereby a bulk flow of material is maintained to said hopper for a predetermined bulk flow period, means controlled by said timing device for governing said flow control means to maintain a dribble flow after said bulk flow, means controlled by said timing device for releasing said scale for weighing action during a predetermined weighing period commencing at the end of said bulk flow period, means for locking said scale at the end of said weighing period, primary means controlled by the scale normally to shut off the flow of material to the hopper during said weighing period in response to a full charge having entered the hopper, clamp opening means controlled by said timing device and said scale for automatically opening said clamp in response to a full charge entering the hopper, secondary means controlled by said timing device for actuating said flow control means to shut off the flow of material a predetermined length of time after the expiration of said weighing period, said secondary means being effective only when said primary means have failed to shut off said flow, and means for rendering inoperative said clamp opening means in response to a dribble feed position of said flow control means.

16. In apparatus for filling valve bags, a scale adapted to be locked in fixed position and releasable for weighing action, a hopper mounted on said scale, a filling spout, a clamp for securing a bag to said spout, said clamp being manually operable to open and closed positions, means including an impeller for feeding material from the hopper through the spout into a bag held on said spout, a timing device, flow control means, means controlled by said timing device to govern said flow control means to maintain a bulk flow of material to said hopper for a predetermined bulk flow period, means controlled by said timing device for governing said flow control means to maintain a dribble flow of material immediately after said bulk flow period, means controlled by said timing device for releasing said scale for weighing action during a predetermined weighing period commencing at the end of said bulk flow period, means for locking said scale at the end of said weighing period, primary means for actuating said flow control means to shut off the flow of material, said primary means being responsive to weighing movement of said scale during said weighing period, clamp opening means actuatable by said timing device and operative in response to said weighing movement for automatically opening said clamp in response to a full charge entering the hopper, secondary means controlled by said timing device for actuating said flow control means to shut off the flow of material a predetermined length of time after the expiration of said weighing period, said secondary means being effective to shut off said flow when said primary means have failed to shut of said flow, and means for rendering inoperative said clamp opening means in response to a dribble feed position of said flow control means.

17. Apparatus for filling valve bags comprising a plurality of filling units, a common main supply hopper for said units, a like plurality of flow control means for governing flow of material from said common supply hopper to respective of said units, means for controlling said flow control means to deliver streams of material to said units in a predetermined order, each of said filling units comprising a filling hopper and a spout for a valve bag and a bag clamp for said spout and a material feeding impeller for forcing material from the filling hopper through the spout, a like plurality of weighing devices for weighing respective of said units, impeller operating means for actuating respective of said impellers, a delayed action control device for rendering operative and inoperative said impeller operating means, a like plurality of actuating means for said delayed action control device, said actuating means being operatively connected with respective of said bag clamps, each actuating means being adapted for actuating said delayed action control device to render inoperative said impeller operating means in response to a clamp being in the open position, and a like plurality of means operatively connected to respective of said flow control means for rendering inoperative the control device actuating means of those weighing devices undergoing a weighing action.

18. Apparatus for filling valve bags comprising a plurality of filling units, a common main supply hopper for said units, a like plurality of flow control means for governing flow of material from said common supply hopper to respective of said units, means for controlling said flow control means to deliver streams of material to said units in a predetermined order, each of said filling units comprising a filling hopper and a spout for a valve bag and a bag clamp for said spout and a material feeding impeller for forcing material from the filling hopper through the spout, a like plurality of weighing devices for weighing respective of said units, impeller operating means for actuating respective of said impellers, a con-

trol device for said impeller operating means, a like plurality of control device actuating means operatively connected with respective of said bag clamps, each of said actuating means rendering inoperative its respective impeller in response to a clamp in an open position, and a like plurality of means operatively connected to respective of said flow control means for rendering inoperative the control device actuating means of those weighing devices undergoing a weighing action.

19. In apparatus for filling receptacles, a weighing device, a support for a receptacle, a hopper and means to force material from the hopper into a receptacle, said support, hopper and means all being mounted upon the weighing device, means to supply material to the hopper, a cam shaft rotating continuously during the normal operation of the apparatus and having cams thereon, and connections operated by the cams controlling the driving of the means to force material from the hopper, said connections further being operable to initiate the flow of material to said hopper when the filling operation is begun, and means responsive to weighing movement of the weighing device to stop the flow of material to said hopper after a desired weight of material has entered said hopper.

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