May 11, 1943. C. T. WALTER 2,319,193

FILLING AND SCALING DEVICE

Filed Sept. 15, 1939 5 Sheets-Sheet 1

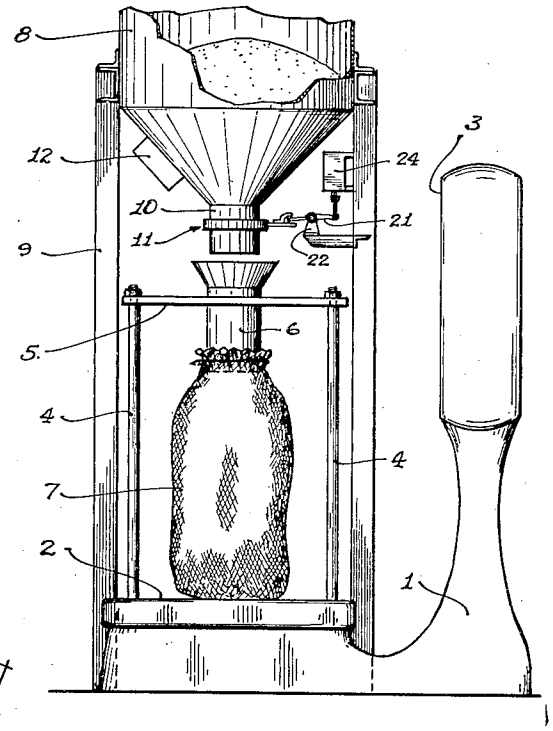


Fig. 1

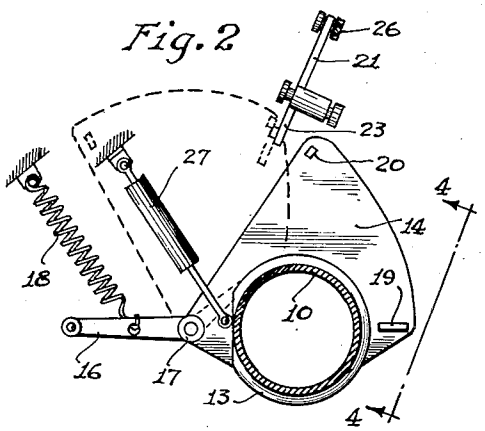


Fig. 2

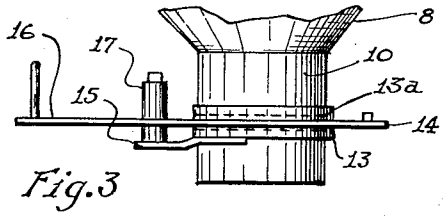


Fig. 3

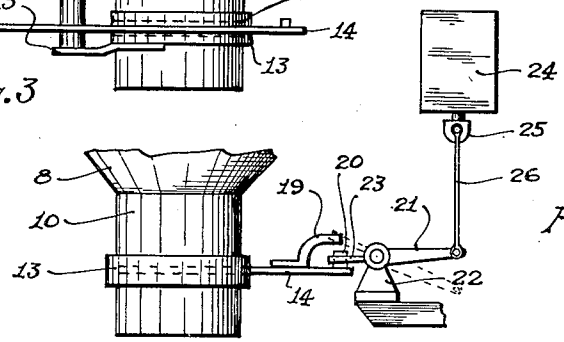


Fig. 4

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May 11, 1943. C. T. WALTER 2,319,193

FILLING AND SCALING DEVICE

Filed Sept. 15, 1939 5 Sheets-Sheet 2

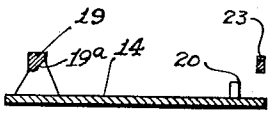


Fig. 5

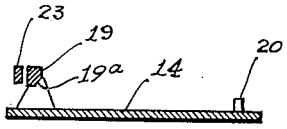


Fig. 6

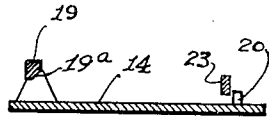


Fig. 7

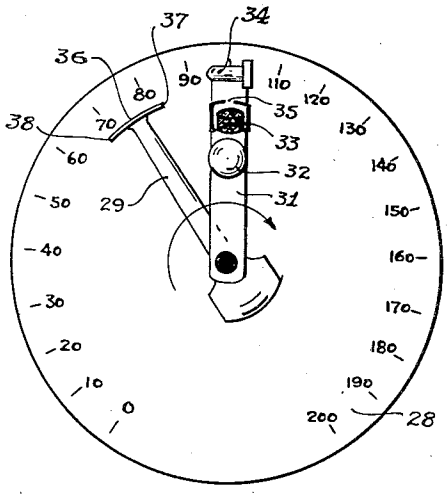


Fig. 8

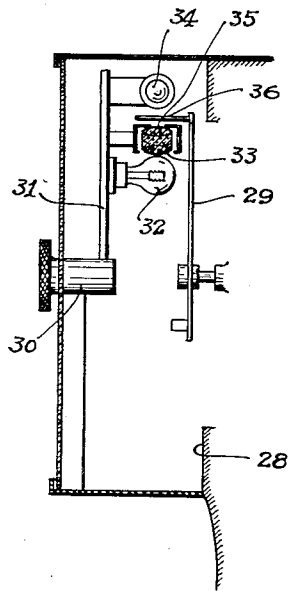


Fig. 9

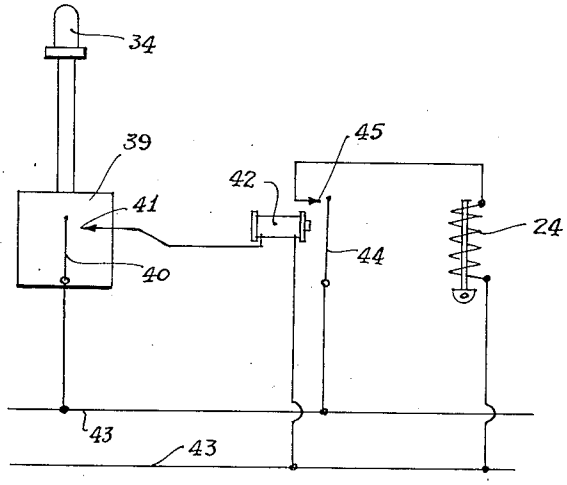


Fig. 10

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May 11, 1943. C. T. WALTER 2,319,193

FILLING AND SCALING DEVICE

Filed Sept. 15, 1939 5 Sheets-Sheet 3

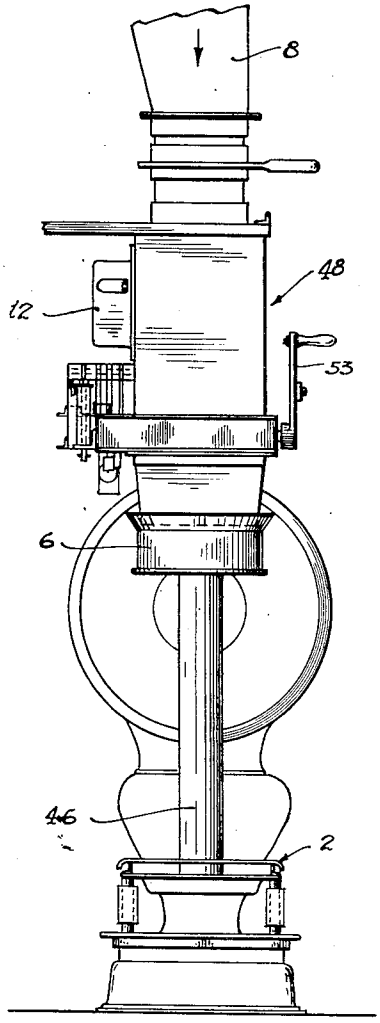


Fig. 11

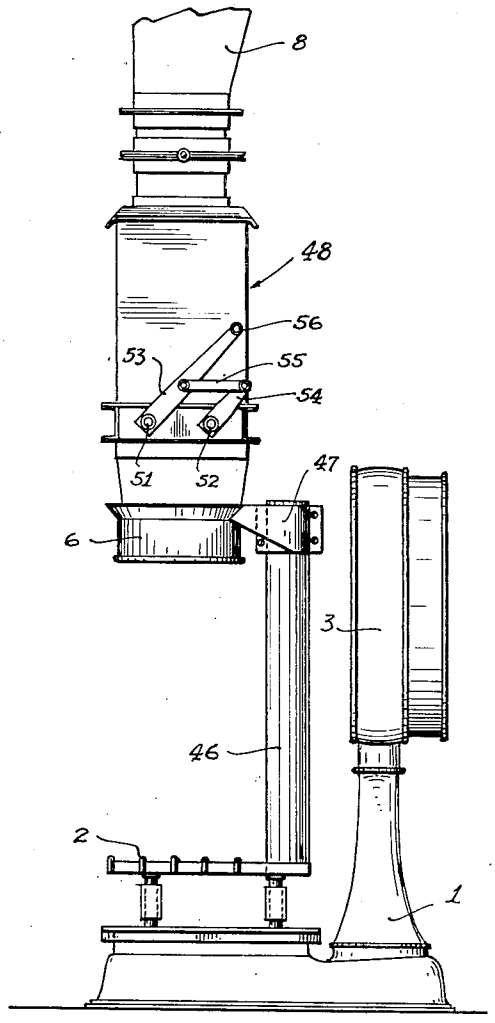


Fig. 12

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FILLING AND SCALING DEVICE

Filed Sept. 15, 1939 5 Sheets-Sheet 4

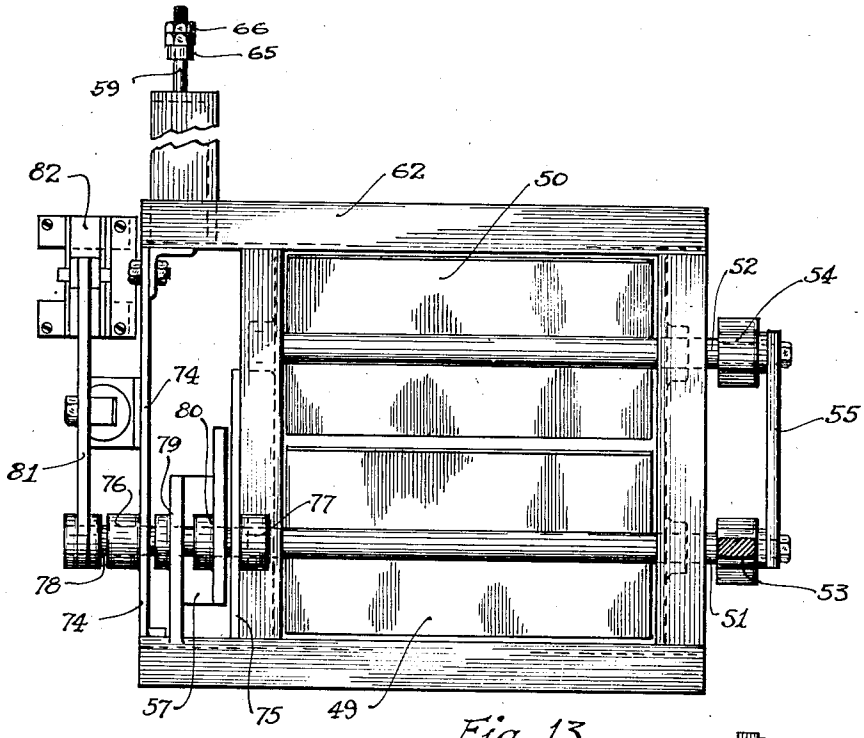


Fig. 13

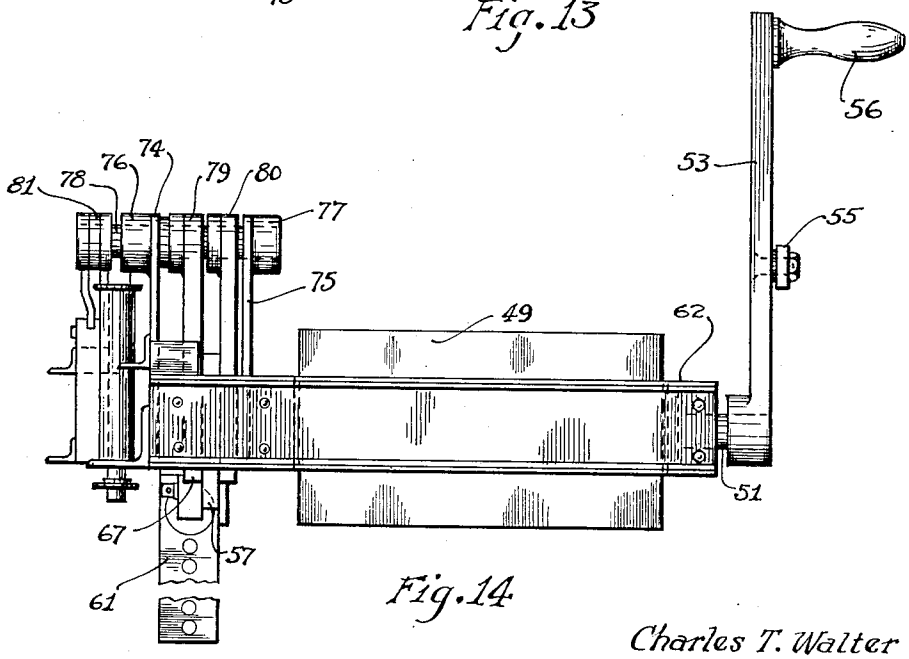


Fig. 14

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FILLING AND SCALING DEVICE

Filed Sept. 15, 1939 5 Sheets-Sheet 5

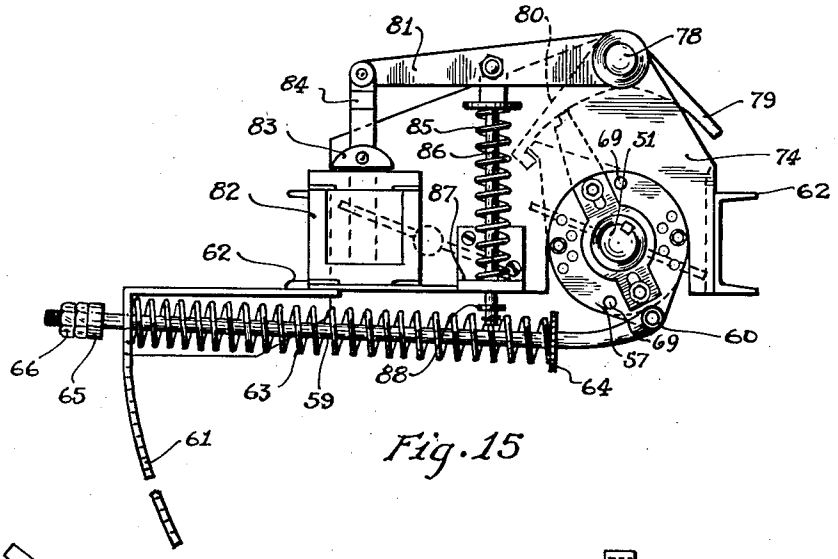


Fig. 15

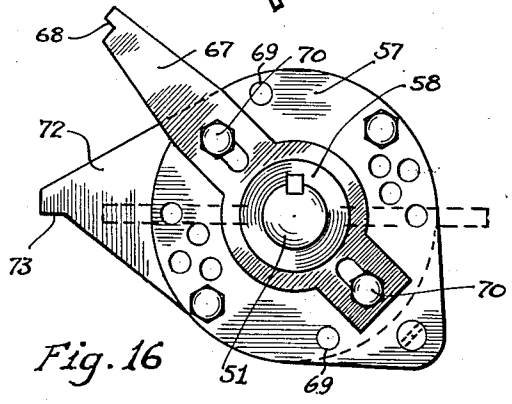


Fig. 16

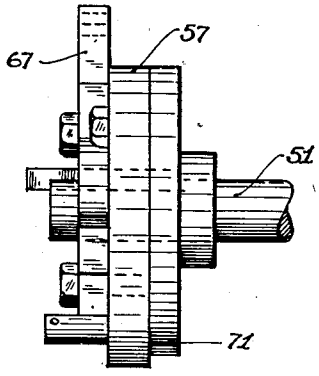


Fig. 17

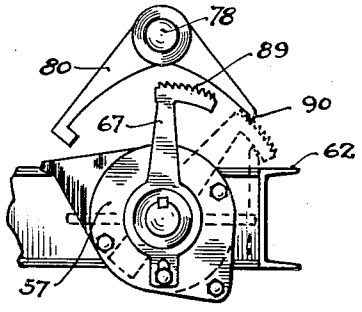


Fig. 18

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Patented May 11, 1943

2,319,193

UNITED STATES PATENT OFFICE

2,319,193

FILLING AND SCALING DEVICE

Charles T. Walter, Chicago, Ill., assignor to Industrial Patents Corporation, Chicago, Ill., a corporation of Delaware

Application September 15, 1939, Serial No. 295,153

12 Claims. (Cl. 249—63)

This invention relates to filling and weighing apparatus.

One of the objects of this invention is to provide means for filling containers such as bags with a desired definite quantity of material.

Another object of this invention is to provide means for automatically stopping the flow of material into bags or containers after a desired definite quantity of material has passed into the container.

Another object of this invention is to provide apparatus which is easily adjustable to regulate the valve opening according to the flow characteristics of the material passing through the apparatus.

Other objects and advantages of this invention will become apparent from the description and claims which follow.

In the drawings, similar reference characters in the several figures are used to indicate similar elements.

Figure 1 is a side view of the bag filling apparatus.

Figure 2 is a plan view of the shut-off valve shown in full lines in closed position and in dotted lines in open position.

Figure 3 is a front view of the filling tube and the shut-off valve,

Figure 4 is a side view of the filling tube and the shut-off valve, taken on line 4—4 of Figure 2,

Figures 5, 6, and 7 are diagrammatic views of the valve positions and the stop members which govern the setting of the valve member.

Figure 8 is a front view of the scale dial together with the scale pointer or indicator and the optical system of the photoelectric means for controlling the closing of the valve.

Figure 9 is a sectional view of the scale face and optical system of the photoelectric control means.

Figure 10 is a diagrammatic illustration of the electrical control system.

Figure 11 is a front view of filling and weighing apparatus embodying a further type of valve member.

Figure 12 is a side view of the apparauts shown in Figure 11.

Figure 13 is a plan view of the valve mechanism of Figures 11 and 12.

Figure 14 is a side view of the mechanism of Figure 13.

Figure 15 is an end view of the mechanism of Figures 13 and 14.

Figure 16 is an enlarged detail view of the valve operating member.

Figure 17 is an enlarged side view of the valve operating member of Figure 16.

Figure 18 is a side view of a valve operating member embodying a modification of the valve holding member.

The filling and weighing apparatus comprises a scale 1 having a scale platform 2 and a scale face housing 3. The scale is mounted on a suitable base. A plurality of uprights 4 are mounted rigidly on scale platform 2 and support a plate or frame member 5. A filling funnel 6 is mounted on frame 5 and extends downwardly from frame 5 a sufficient distance to permit the top portion of a bag 7 to be fastened to the lower portion of funnel 6. A hopper 8 is mounted above plate 5, for example, by means of a frame 9. The discharge tube 10 of the hopper is positioned immediately above funnel 6 and is provided with a valve mechanism 11. The hopper may be provided with any convenient type of shaker mechanism, such as an electromagnetic shaker 12, to keep the material in the hopper in a free flowing condition.

One form of valve mechanism is illustrated in detail in Figures 2 to 7, inclusive. A yoke 13 is mounted on tube 10 of the hopper, both the tube and yoke being provided with a slot 13a in which the valve plate 14 may be moved. The valve plate 14 is mounted pivotally on bracket 15, which is in turn rigidly supported by yoke 13. Arm 16 may be integral with the valve plate and extends to one side of the pivotal mounting 17 to provide a convenient means for manually opening the valve. The valve is normally urged in a closed position by means of tension spring 18. Stop blocks 19 and 20 are rigidly fixed to the surface of valve plate 14, being equally spaced from the axis of the pivotal mounting 17.

A lever 21 is pivotally mounted on a fixed support 22 and is provided with a forwardly extending arm 23 which projects over the marginal portion of the area traversed by the valve plate 14. The lever 21 is adapted to cooperate with stop blocks 19 and 20 to maintain the valve plate in open position and to permit the valve to be closed after the desired amount of material has passed through the filling tube 10. Lever 21 is connected to plunger 25 of solenoid 24 by means of link 26. The solenoid is adapted to be energized and deenergized to maintain the valve in fully open, or a partially opened position, or to release the valve so that it may be closed by the action of spring 18.

The relative positions of valve plate 14, stop blocks 19 and 20, the latch bar 23 are shown

diagrammatically in Figures 5, 6, and 7. The lower portion of stop block 19 is beveled or rounded, as at 19a, as illustrated in the drawings. Figure 5 illustrates the relative positions occupied by the elements in the closed position of valve 14. In this position, latch bar 23 lies above and beyond block 20. In this position, the solenoid is not energized, and plunger 25 extends its maximum travel outside of the windings of the solenoid. Lever 21 and latch bar 23 occupy an angular position as illustrated by the broken lines in Figure 4. In this position, latch bar 23 is above the plane of the top surface of block 20.

As the valve is opened, stop block 19 strikes latch bar 23. The beveled portion 19a of block 19 causes the latch bar 23 to be pivoted in a counterclockwise direction and forces the latch bar beneath stop block 19. The valve is maintained in a fully opened position by latch bar 23, stop block 19 resting against the rearward surface of the latch bar, as shown in Figure 6.

On energization of the solenoid, core 25 is pulled upwardly and rotates lever 21 and latch bar 23 counterclockwise into the position illustrated in Figure 4. In this position, latch bar 23 occupies a position beneath the plane of the lower surface of latch bar 19 and the valve is partially closed by spring 18. Stop block 20 strikes latch bar 23 to prevent a complete closing of the valve. The valve is maintained in a partially opened position as long as solenoid 24 is energized.

Upon deenergization of the solenoid, lever 21 and latch bar 23 are again rotated in a clockwise direction into an angular position, as illustrated by the broken lines in Figure 4. The valve is then completely closed by spring 18. A dashpot 27 may be provided to control the velocity at which the valve is closed and to prevent or minimize the shock on block 20 and latch bar 23 when the solenoid is energized.

The valve control mechanism provides means for fully opening the valve to permit the flow of the larger proportion of the material into the bag or container at a high rate. The valve is then partially closed to permit the material to flow into the container at a lower rate to prevent an overrun of the material.

The solenoid is preferably controlled by photoelectric means. Scale 1 is provided with a scale face 28 which bears the usual weight indicia. A scale pointer 29 is fixed to the scale mechanism. A rotatable hub 30 is provided which is concentric with respect to the pointer shaft. Arm 31 is secured to hub 30 and carries the photoelectric unit. The hub and arm may be rotated and locked in any desired radial position.

The photoelectric unit comprises a light source 32, a condensing lens system 33, and a photoelectric cell 34. If desired, a stop member 35 may be interposed between the condensing lens and the photoelectric tube. The light source, condensing lens, stop mechanism, and photoelectric tube are mounted on bracket 31 in a radial line. A vane 36 is carried at the end of pointer 29 and is adapted to pass between stop 35 or lens 33 and the photoelectric cell 34 to interrupt the beam of light passing from the light source to the photoelectric cell. As pointer 29 rotates in a clockwise direction, the leading edge 37 of vane 36 passes the aperture of stop 35 and interrupts the beam of light passing to the photoelectric cell. The beam of light is interrupted until the trailing edge 38 of vane 36 passes the aperture of stop 35.

Photoelectric cell 34 is connected electrically to relay 39. The relay is provided with a switch arm 40 and contact point 41. The switch arm 40 and contact point 41 are connected in series with a second relay 42 across the power lines 43. Relay 42 is provided with a switch arm 44 and contact point 45. Switch arm 44 and contact point 45 are connected in series with solenoid 24 across power lines 43. While light strikes photoelectric cell 34, switch arm 40 of relay 39 is open. Since the circuit through relay 42 is open, switch arm 44 is also open and solenoid 24 is, therefore, unenergized. When vane 36 interrupts the light beam passing to photoelectric cell 34, the circuit is closed through switch arm 40, contact 41, and relay 42. Energization of relay 42 closes the circuit through switch arm 44, contact 45, and solenoid 24. Solenoid 24 remains energized as long as the vane intercepts the light beam to the photoelectric cell. As the vane passes beyond stop 35, light again strikes the photoelectric cell. The circuit through relay 42 is opened, which results in an opening of the circuit through solenoid 24.

In the operation of the apparatus, an operator attaches bag 7 to funnel 6. The scale is adjusted for the tare weight of the frame 4, plate 5, funnel 6, and bag 7. In adjusting for the tare weight of these elements, trailing edge 38 of vane 36 is used as the reading point or line, and the scale mechanism is so adjusted that trailing edge 38 coincides with the zero point on the scale dial.

For illustrative purposes, it is assumed that 100 pounds of material is to be transferred from the hopper into the bag. If the material is a free flowing material, it is obvious that if the valve is allowed to remain in a fully opened position until sufficient material has passed into the bag to cause the scale pointer to coincide with the 100 pound indicium, considerable overrun will be obtained. To prevent a large overrun the valve is fully opened until a substantial portion of the material has passed into the bag, after which the valve is partially closed to complete the required amount of material and the valve is then fully closed to arrest the flow of material to the bag. In the example illustrated in the drawings, the valve is held in a partially opened position during the flow of the last 15 pounds of material into the bag because of the angular width of vane 36.

After the operator has fastened the bag to funnel 6, arm 31 is rotated to bring the axis of the light source, lens system, and photoelectric cell into line with the 100 pound indicium, and the valve plate 14 is opened manually. Latch bar 23 maintains the valve 14 in open position after it passes stop 19, the relative positions of valve plate 14, stop blocks 19 and 20, and latch bar 23 being illustrated in Figure 6. The material from hopper 8 flows through the valve and into the bag, causing pointer 29 to rotate in a clockwise direction. During this portion of the filling operation light from light source 32 strikes photoelectric cell 34 and maintains switch arm 40 in an open position.

The circuit through relay 42 is open and switch 44 also remains open. The circuit through solenoid 24 is open, and the plunger 25 will remain in its lowermost position, lever 21 and latch bar 23 will remain in a position as indicated by the broken line in Figure 4.

As the material falls into the bag, leading edge 37 of vane 36 will finally interrupt the light beam passing to photoelectric cell 34. Interruption of the light beam causes switch arm 40 to close the circuit through relay 42, which in turn closes switch arm 44 and the circuit through solenoid

24. Energization of solenoid 24 causes plunger 25 to be drawn upwardly, thereby rotating lever 21 and latch bar 23 in a counterclockwise direction into the position illustrated in full lines in Figure 4. As latch bar 23 is disengaged from stop block 19, spring 18 rotates valve plate 14 in a clockwise direction until stop block 20 strikes latch bar 23. The valve plate will then remain partially open. The relative positions of the valve plate 14, stop blocks 19 and 20, and latch bar 23 are illustrated in Figure 7.

Material will flow from the hopper at a reduced rate while the valve remains partially opened. This condition is maintained during the period in which vane 36 interrupts the light beam from light source 32. As the desired amount of material passes into the bag, the trailing edge 38 of vane 36 will pass beyond stop 35 and will permit the light to again strike photoelectric cell 34. As the light strikes photoelectric cell 34, switch arm 40 is opened, thereby causing an opening of switch arm 44 and a deenergization of solenoid 24. Plunger 25 will then drop to its lowermost position and latch bar 23 will rotate in a clockwise direction. As the latch bar rotates in a clockwise direction it will pass beyond stop block 20, and spring 18 will cause a further rotation of valve plate 14 to fully close the valve. The relative positions of valve plate 14, stop blocks 19 and 20, and latch bar 23 are illustrated in Figure 5.

It will be noted that vane 36 is equal to the angular distance of a differential of 15 pounds on the scale dial. With this arrangement, 85 pounds of material will flow through the fully opened valve and the final 15 pounds will be supplied through the valve while it is in a partially opened position. The length of the vane 36 may be varied to suit particular conditions. In the case of a very rapidly flowing material it may be desirable to increase the length of the vane. In the case of very slow flowing materials it may be desirable to decrease the length of the vane.

In Figures 11 to 18, I have illustrated another form of valve mechanism. Column 46 is secured to the scale platform 2. Funnel 6 is supported by a suitable bracket 47, which is mounted adjacent the top of column 46. The hopper 8 and a valve mechanism 48 are mounted above funnel 6. A shaker mechanism 12 is secured to the hopper to maintain the material in a free flowing condition. The valve comprises two pivotally mounted valve plates or gates 49 and 50, which are rigidly secured to shafts 51 and 52, respectively. Lever arms 53 and 54 are secured to the projecting ends of shafts 51 and 52, respectively, and are connected by a link 55. Lever arm 53 is provided with a handle or grip 56.

A disk 57 is firmly attached to the opposite end of shaft 51 and is provided with an integral hub 58. A rod 59 is pivotally attached to disk 57, as by means of pin 60, and extends rearwardly. The rearward end of rod 59 is supported in an aperture in plate 61, which projects downwardly from the valve support frame 62. A coil spring 63 under compression is positioned on rod 59 between plate 61 and washer 64. A stop collar 65 is mounted adjacent the free end of rod 59 and may be locked in any desired position by means of nuts 66, which are threaded onto the free end of the rod. Coil spring 63, which is under compression, constantly urges valve plates or gates 49 and 50 into a closed or substantially horizontal position. Handle 56 on arm 53 permits a manual opening of the gates against the action of spring 63. Means is provided for maintaining the valve in a fully opened position or a partially opened position.

An arm 67 is provided with a protuberance or tooth 68 and is mounted on disk 57. The disk 57 is provided with a plurality of threaded apertures 69 which are adapted to receive bolts 70 to securely fasten the arm 67 in any desired angular position on disk 57. A second disk 71 having a projecting portion 72 is rigidly secured to the opposite face of plate 57. The projecting portion 72 of disk 71 is provided with a protuberance or tooth 73.

A pair of spaced plates 74 and 75 are secured to frame 62 and are provided with bearings 76 and 77, respectively. A shaft 78 is journaled in bearings 76 and 77. A dog 79 is firmly attached to shaft 78 in a position above arm 67. A latch hook 80 is firmly attached to shaft 78 in a position above disk 71. A lever 81 is firmly fixed to shaft 78 and extends rearwardly. Solenoid 82 is mounted rigidly on frame 62, the solenoid plunger 83 being connected to lever 81 by means of link 84. Lever 81 is urged upwardly by means of compression spring 85 which is positioned on a rod 86. The uppermost position of lever 81 is limited by rod 86 which is pivotally supported on lever 81 and extends through bracket 87, which supports coil spring 85. A washer 88 is positioned on rod 86 adjacent its lower end to limit the upward motion of the rod 86 and lever 81.

In the position of the elements shown in Figure 15 the solenoid 82 is actuated, plunger 83 and lever 81 being in their lowermost positions, pulled downwardly against the force of spring 85. Protuberance 73 is held by latch hook 80. In this position the valve gates are shown partly open.

The photoelectric unit and control system and circuit are similar to that shown in Figures 8, 9, and 10.

Assuming that it is desired to place 100 pounds of material from the hopper into the bag, the operator first secures a bag to filling funnel 6. The scale is then adjusted for the tare weight of column 46, filling funnel 6, and the bag. Trailing edge 38 of vane 36 is used as the reading point. Light passes from light source 32 to photoelectric cell 34 and, as was explained above, the circuit through solenoid 82 is open. Plunger 83 and lever 81 are forced into their uppermost positions by means of spring 85.

Valve plates 49 and 50 are opened manually by pulling forwardly on handle 56. As handle 56 is moved in a forwardly direction, arm 67 and disk 71 are rotated in a clockwise direction. Since lever 81 is in its uppermost position, latch hook 80 will be in its uppermost position. Projection 72 and protuberance 73 of disk 71 are free to be moved in a clockwise direction past the latch hook 80. As shaft 51 is rotated, the protuberance 68 of arm 67 will contact the lower surface of dog 79 and will rotate the dog sufficiently to permit the protuberance 68 to pass behind the free edge of dog 79. In this position the valve plates are fully open.

As the material passes from the hopper through the valve and into the bag, the weight will be registered on the scale, and pointer 29 will be rotated in a clockwise direction. When sufficient material has passed into the bag, leading edge 37 of vane 36 will pass stop 35 and interrupt the light passing from the light source into the photoelectric cell. Interruption of the light beam will cause an energization of solenoid 82. Upon

energization of the solenoid, plunger 83 will be pulled downwardly and along with it, lever 81. Dog 79 and latch hook 80 will be rotated in a counterclockwise direction. Dog 79 will, therefore, release protuberance or tooth 69 on arm 67, and coil spring 63 will cause a counterclockwise rotation of shaft 51 to rotate the valve gates toward their closed position. Protuberance or tooth 73 of plate 71 is engaged by latch hook 80 to maintain the valve in a partially open position. The position of the elements at this time is illustrated in Figure 15.

Material will continue to flow into the bag at a greatly reduced rate until pointer 29 has been pivoted sufficiently to move trailing edge 38 of vane 36 beyond stop 35, at which time light again strikes photoelectric cell 34. Light striking the photoelectric cell will open the circuit through the solenoid, and lever 81 will be raised to its uppermost position. At the same time, latch hook 80 will be rotated in a clockwise direction and will release protuberance or tooth 73. Coil spring 63 causes a further rotation of shaft 51 and the valve gates to completely close the valve.

It will be noted that arm 67 may be secured to disk 57 in a number of angular positions. Such adjustment is provided so that the initial or maximum opening of the valve gates may be controlled according to the flow characteristics of the material which is being fed from the hopper. In the case of very free flowing materials the initial opening of the valve gates need not be as great as the opening necessary for very slow flowing material. The initial opening of the valve is governed by the angular rotation of shaft 51 which is required to place tooth 68 in engagement with the end of dog 79. By angular adjustment of arm 67 with respect to the plane of the valve gates, an adjustment of the initial opening may be obtained. Plate 71 may also be adjusted with respect to the plane of the valve gates to adjust the degree of opening during the final filling period.

In Figure 18 I have illustrated arm 67 provided with a series of ratchet teeth 89 which are adapted to cooperate with dog 90. Arm 67 may be securely attached to disk 57, and the operator may control the initial opening of the valve by opening the valve an amount which experience has taught him to be a proper opening for the particular material which is being dealt with at the time. The use of the ratchet teeth permits a ready adustment of the initial opening of the valve gates. The action of this mechanism is similar to that described in which the arm 67 has a single protuberance or tooth 68.

I claim:

1. In a bag filling machine, a hopper, a discharge tube for the hopper, and a valve in the tube comprising a pair of shafts mounted rotatably within the tube, one of the shafts extending outwardly of the tube, a valve plate secured to each of the shafts within the tube, means urging the valve plates into closed position, a disk securely mounted on the outwardly extending shaft exteriorly of the tube, an arm secured to one face of the disk, a second disk secured to the opposite face of the first disk, a tooth on the second disk, a dog operatively associated with the arm, the arm and dog being adapted to maintain the valve plates in open position, a latch hook operatively associated with the second disk, the tooth and latch hook being adapted to maintain the valve plates in partially closed position, means for maintaining the dog in engagement with the arm and solenoid means for maintaining the latch hook in engagement with the tooth.

2. In a bag filling machine, a hopper, a discharge tube for the hopper, and a valve in the tube comprising a pair of shafts mounted rotatably within the tube, one of the shafts extending outwardly of the tube, a valve plate secured to each of the shafts, means urging the valve plates into closed position, a disk securely mounted on the outwardly extending shaft exteriorly of the tube, an arm secured to one face of the disk, a series of ratchet teeth on the outer end of the arm, a second disk secured to the opposite face of the first disk, the second disk having an outwardly projecting portion, a tooth on the projecting portion of the second disk, a dog operatively associated with the series of ratchet teeth, the ratchet teeth and dog being adapted to maintain the valve plates in any selected open position, a latch hook operatively associated with the second disk, the second disk and latch hook being adapted to maintain the valve plates in partially closed position, spring means for maintaining the dog in engagement with the ratchet teeth, and solenoid means for releasing the dog from engagement with the ratchet teeth and for maintaining the latch hook in engagement with the second disk.

3. A filling machine comprising in combination a hopper, a discharge tube for the hopper and a valve in the tube, the valve comprising a pair of shafts mounted rotatably within the tube, one of the shafts extending outwardly of the tube, a valve plate secured to each of the shafts within the tube, means urging the valve plates into closed position, a disk securely mounted on the outwardly extending shaft exteriorly of the tube, an arm secured to one face of the disk, a second disk secured to the opposite face of the first disk, a tooth on the second disk, a dog operatively associated with the arm, the arm and dog being adapted to maintain the valve plates in open position, a latch hook operatively associated with the second disk, the tooth and the latch hook being adapted to maintain the valve plates in partially closed position, means for maintaining the dog in engagement with the arm, and solenoid means for releasing the dog from engagement with the arm and for maintaining the latch hook in engagement with the tooth.

4. In combination with a filling machine for supplying material to a container, a conduit for supplying the filling material, a valve plate mounted rotatably within the conduit, means for urging the valve plate into a closed position transverse the tube, stop means for holding the rotatable valve plate in an open position, stop means for holding the rotatable valve plate in a partially closed position after the means for holding the valve plate in an open position has been released, a solenoid operated means movable between two positions and cooperating with both of said stop means which in one position releases the means for holding the valve plate in an open position after a substantial portion of the desired quantity of the filling material has been filled into a container and in the other position releases the means for holding the valve plate partially closed after the remainder of the desired quantity of filling material has been filled into a container, a solenoid for operating said movable means, and means responsive to the quantity of material

filled into the container for energizing the solenoid.

5. In combination with a filling machine for supplying material to a container, a conduit for supplying the filling material, a pair of shafts mounted rotatably within the conduit perpendicular to a plane that includes the axis of the conduit, a valve plate secured to each of the shafts, each plate parallel to the shaft to which it is secured, means urging the valve plates into a normally closed position, stop means for holding the valve plates in an open position, stop means for holding the valve plates in a partially closed position after the means for holding the valve plates in an open position has been released, solenoid operated means movable between two positions and cooperating with both of said stop means which in one position releases the means for holding the valve plates in an open position after a substantial portion of the desired quantity of the filling material has been filled into a container and in the other position releases the means for holding the valve plates partially closed after the remainder of the desired quantity of the material has been filled into a container, a solenoid for operating said movable means, and means responsive to the quantity of material being filled into the container for energizing the solenoid.

6. In combination with a filling machine for supplying material to a container, a conduit for supplying the filling material, a valve in said conduit comprising a valve plate pivoted on an axis perpendicular to the plane of the plate, means urging the valve plate into a closed position transverse the conduit, stop means for holding the pivoted valve plate in an open position, stop means for holding the pivoted valve plate in a partially closed position after the means for holding the valve plate in an open position has been released, solenoid operated means movable between two positions and cooperating with both of said stop means which in one position releases the means for holding the valve in an open position after a substantial portion of the desired quantity of the filling material has been filled into a container and in the other position releases the means for holding the valve partially closed after the remainder of the desired quantity of filling material has been filled into a container, a solenoid for operating said movable means, and means responsive to the quantity of material filled into the container for energizing the solenoid.

7. In combination with a filling machine for supplying material to a container, a conduit having a transverse slot therein, a valve plate pivotally mounted and adapted to move transversely of the conduit in the slot, means urging the valve plate into a closed position transverse the conduit, a pair of stop blocks secured to the plate, a lever operatively associated with the stop blocks and adapted to engage the stop blocks successively, whereby the valve is first maintained in an open position and then in a partially closed position, and a solenoid means operatively connected to the lever which solenoid means in one position disengages the lever from the first stop block after a substantial portion of the desired quantity of the filling material has been filled into a container, thereby partially closing the valve, and in the other position disengages the lever from the second stop block after the remainder of the desired quantity of filling material has been filled into a container, thereby completely closing the valve, and means responsive to the quantity of material filled into the container to operate said solenoid.

8. In combination with a filling machine for supplying material to a container, a conduit for supplying filling material, a valve in said conduit, means for moving the valve into a closed position, stop means fixed to the valve and moving through a defined path, escapement means cooperating with said stop means for arresting movement of the valve at a plurality of spaced points along its path of movement, and means responsive to the weight of the material supplied to a container including a solenoid having a core for operating said escapement means, said escapement means including a lever operatively connected to said core whereby the escapement means is operated by said core, said stop means being initially engaged by said escapement means to hold the valve in open position until a substantial portion of the quantity of the material to be supplied has passed through the conduit and into the container, said responsive means being effective through the solenoid and core to thereafter release the escapement means from its initial position in engagement with said stop means and drive it into engagement with the stop means in another position, said escapement means functioning with the stop means to initially engage the stop means until said escapement means is in position to engage said stop means at said other position, said escapement engaging said stop means at said other position to hold the valve in a partially closed position until the remainder of the desired quantity of the material has been filled into the container whereupon said responsive means is effective to cause said stop means to be released entirely from said escapement means in order that the valve may be closed.

9. In combination with a filling machine for supplying material to a container, a conduit for supplying the filling material, a valve plate mounted rotatably within the conduit, means for urging the valve plate into a closed position transverse the tube, stop means for holding the rotatable valve plate in an open position, stop means for holding the rotatable valve plate in a partially closed position after the means for holding the valve plate in an open position has been released, a solenoid having a core, said core being movable between two positions and cooperating with both of said stop means which in one position releases the means for holding the valve in an open position and in its other position releases the means for holding the valve in a partially closed position and means including a photoelectric device for effecting operation of the core by changing the electrical characteristics of the solenoid when a substantial portion of the desired quantity of filling material has been filled into a container thereby permitting the valve to close partially, and said photoelectric device again effecting operation of the core by changing the electrical characteristics of the solenoid when the total quantity of filling material has passed through said valve thereby permitting the valve to close completely.

10. In combination with a filling machine for supplying material to a container, a conduit for supplying the filling material, a pair of shafts mounted within the conduit perpendicular to a plane that includes the axis of the conduit, a valve plate secured to each of the shafts, each plate being parallel to the shaft to which it is

secured, means urging the valve plates into a normally closed position, stop means for holding the valve plates in an open position, stop means for holding the valve plates in a partially closed position after the means for holding the valve in an open position has been released, a solenoid having a core, said core being movable between two positions and cooperating with both of said stop means which in one position releases the means for holding the valve plates in an open position and in the other position releases the means for holding the valve plates in a partially closed position, and means including a photoelectric device for effecting operation of the core by changing the electrical characteristics of the solenoid when a substantial portion of the desired quantity of filling material has been filled into a container thereby permitting the valve to close partially, said photoelectric device again effecting operation of the core by changing the electrical characteristics of the solenoid when the total quantity of filling material has been filled into the container thereby permitting the valve to close completely.

11. In combination with a filling machine for supplying material to a container, a conduit for supplying the filling material, a valve plate pivoted on an axis perpendicular to the plane of the plate, means for urging the valve plate into a closed position transverse the conduit, stop means for holding the pivoted valve plate in an open position, stop means for holding the pivoted valve plate in a partially closed position after the means for holding the valve plate in an open position has been released, a solenoid having a core, said core being movable between two positions and cooperating with both of said stop means which in one position releases the means for holding the valve plate in an open position and in the other position releases the means for holding the valve plate in a partially closed position, and means including a photoelectric device for effecting the operation of the core by changing the electrical characteristics of the solenoid when a substantial portion of the desired quantity of filling material has been filled into a container thereby permitting the valve to close partially, and said photoelectric device again effecting operation of the core by changing the electrical characteristics of the solenoid when the total quantity of filling material has been filled into a container thereby permitting the valve to close completely.

12. In combination with a filling machine for supplying a material to a container, a conduit having a transverse slot therein, a valve plate pivotally mounted and adapted to be moved transversely of the conduit in the slot, means urging the valve plate into a closed position transverse of the conduit, a pair of stop blocks secured to the plate, a lever operatively associated with the stop blocks and adapted to engage the stop blocks successively whereby the valve is first maintained in an open position and then in a partially closed position, a solenoid having a core, said core being operatively connected to the lever, which core in one position disengages the lever from the first stop block while moving it into position to engage the second stop block and in said other position disengages the lever from the second stop block, and means including a photoelectric device for effecting the operation of the core by changing the electrical characteristics of the solenoid when a substantial portion of the desired quantity of the filling material has been filled into a container thereby permitting the valve to partially close, and said photoelectric device again effecting operation of the core by changing the electrical characteristics of the solenoid when the total quantity of filling material has been filled into a container thereby permitting the valve to close completely.

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