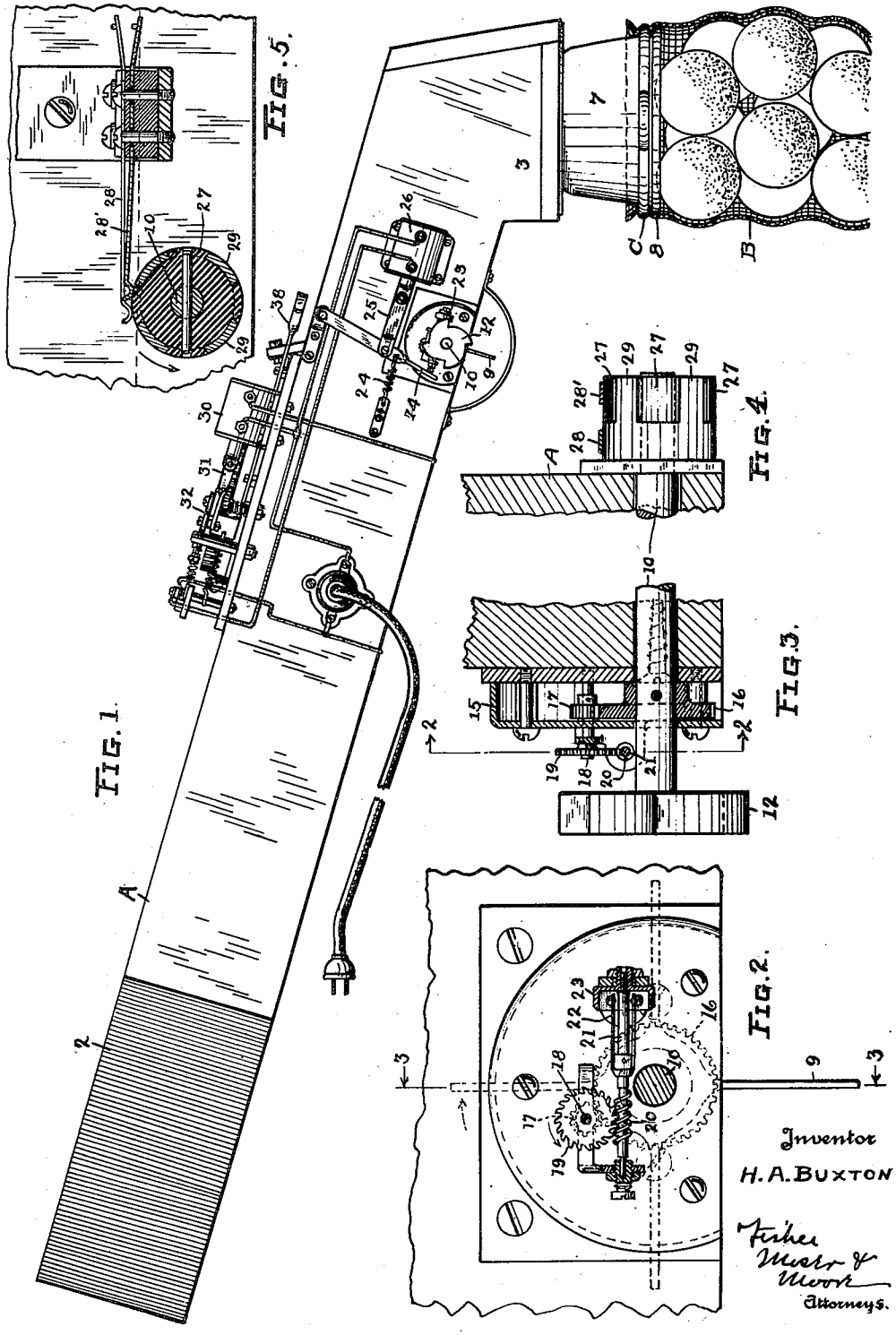
March 14, 1933. H. A. BUXTON 1,900,907

BAG FILLING APPARATUS

Filed Dec. 5, 1929 4 Sheets-Sheet 1



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BAG FILLING APPARATUS

Filed Dec. 5, 1929 4 Sheets-Sheet 2

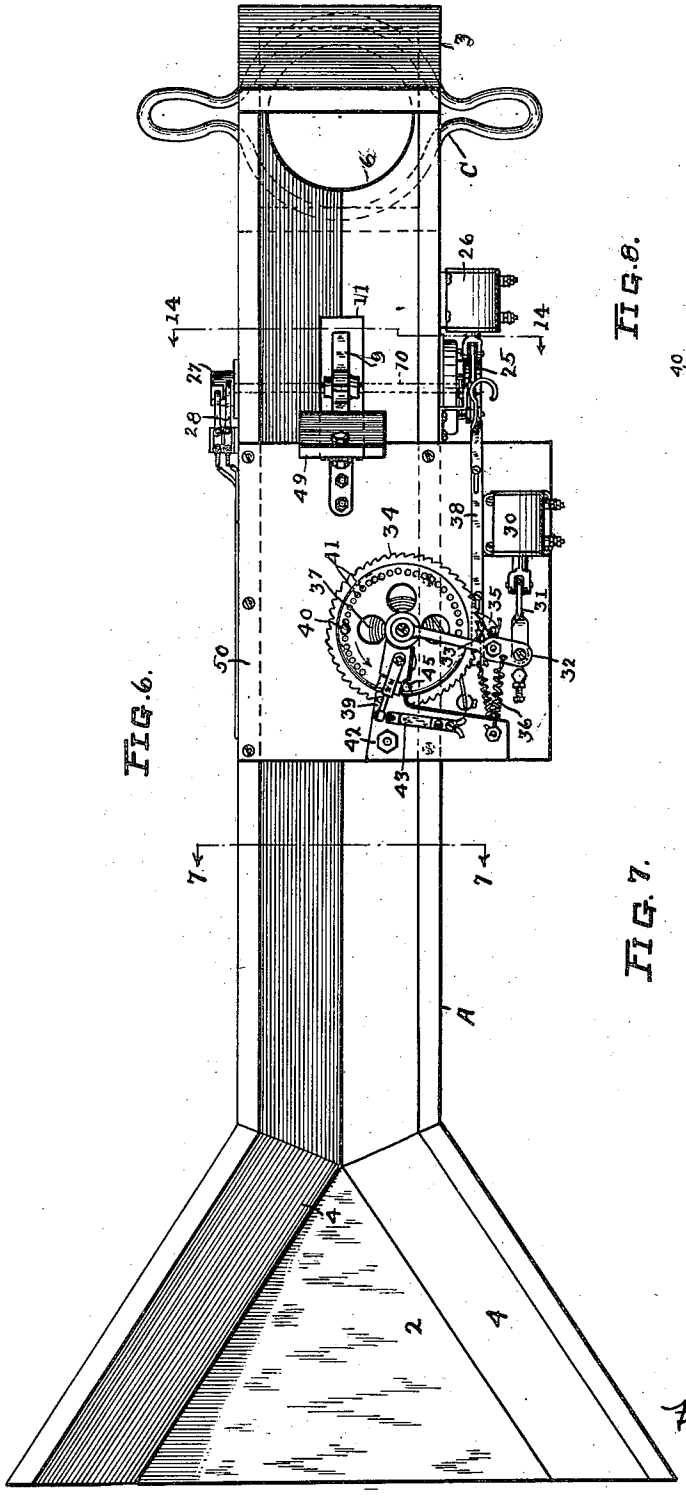

FIG. 6.

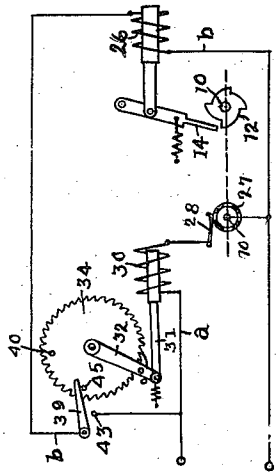

FIG. 8.

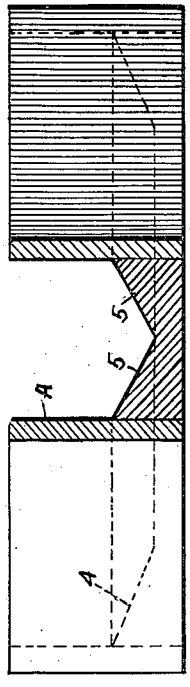

FIG. 7.

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BAG FILLING APPARATUS

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FIG. 9.

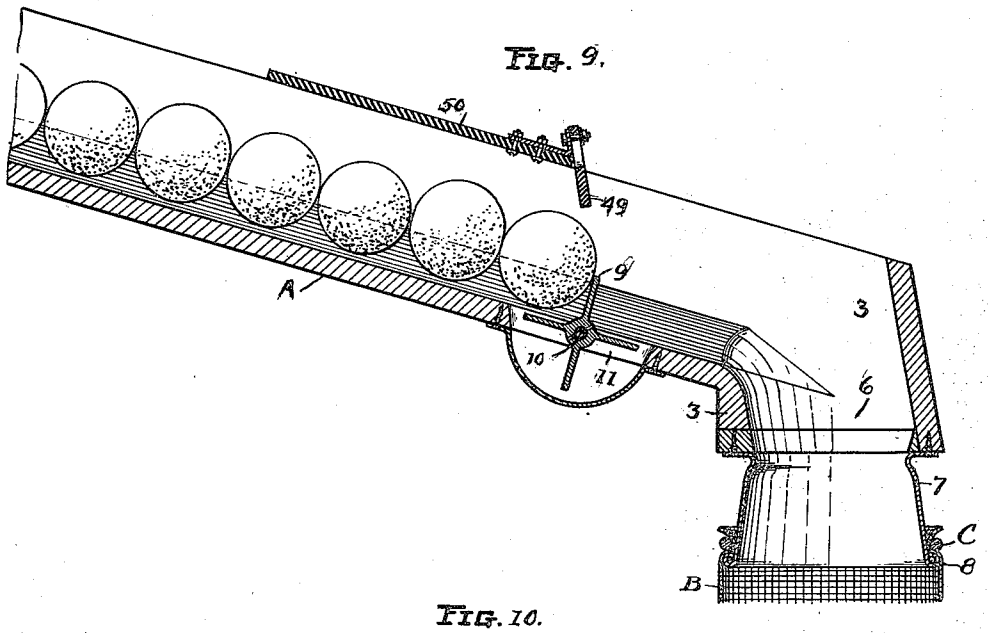


FIG. 10.

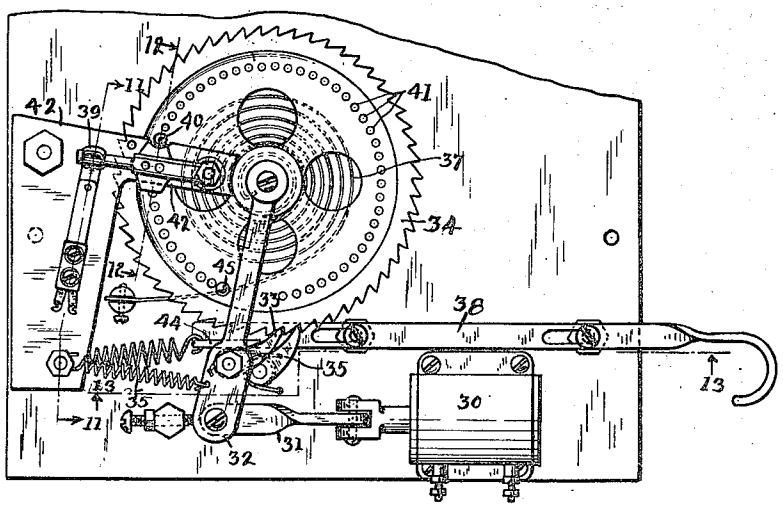


FIG. 11.

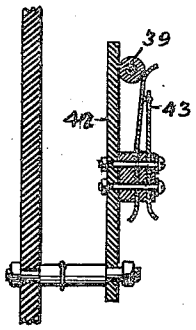


FIG. 12.

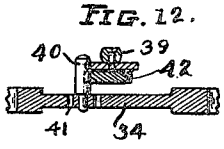
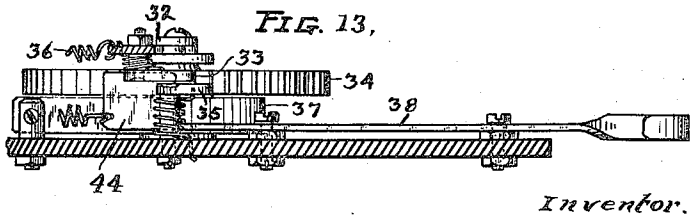


FIG. 13.



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BAG FILLING APPARATUS

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FIG. 14.

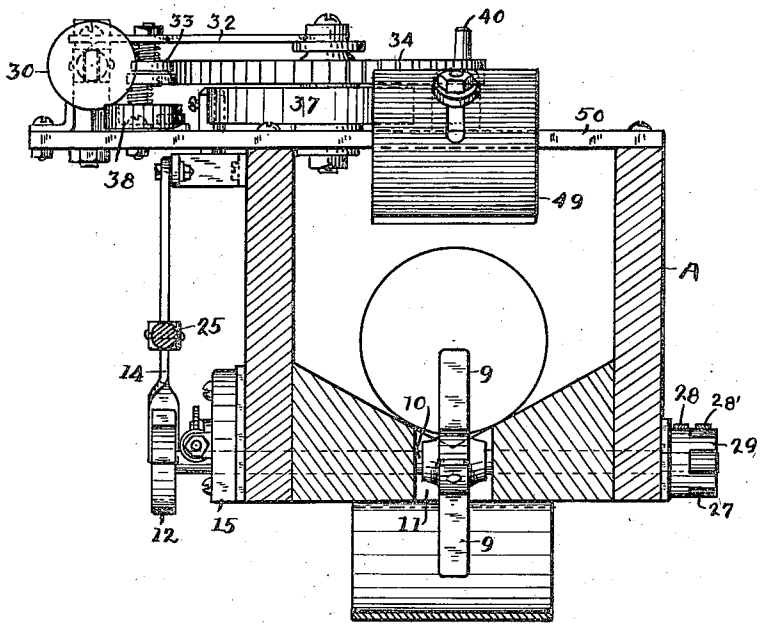
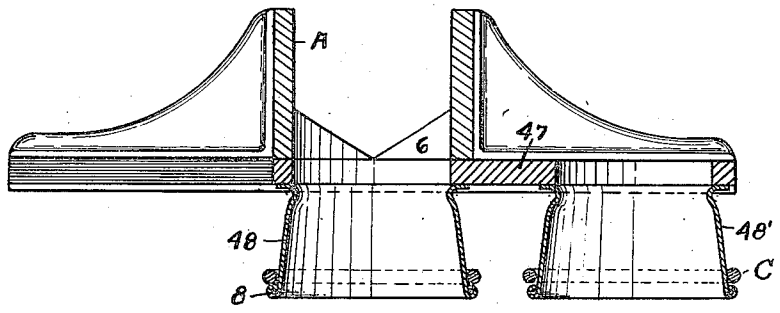


FIG. 15.



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Patented Mar. 14, 1933 1,900,907

UNITED STATES PATENT OFFICE

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BAG FILLING APPARATUS

Application filed December 5, 1929. Serial No. 411,720.

The present invention pertains to a charging and discharging apparatus, and more particularly to an electrical apparatus for charging and filling bags or other receptacles. Thus, my object in general is to provide a simple apparatus for discharging and delivering a predetermined number of objects or articles from a bin or other source of supply into a bag or other holder. The apparatus also embodies means for setting and controlling its operations, whereby any desired or predetermined number of objects or articles may be discharged and delivered. The apparatus has also been especially designed and constructed for handling citrus fruits, although it should be understood that other products, either natural or manufactured, may be handled and distributed in the same way.

In handling citrus fruits, for example, oranges, it has been customary in the past to grade and assort the fruit, and then pack and ship the same in boxes or crates. A more recent mode of handling such fruits involves the use of open-mesh shipping bags. Having a bag of given size and capacity, it will hold a greater number of smaller objects or pieces of one grade than larger ones. The fruit is therefore counted and only the same predetermined number of pieces are shipped or transported in such bags. The present apparatus is designed to fill such bags automatically with any desired predetermined number of pieces of fruit, the operator or attendant being only employed to place the bag in position, to start the machine, and to remove the filled bag. The pieces of fruit are delivered, singly and successively, into the bag, and when the desired number of pieces have been delivered, the discharge movement of the pieces is arrested and stopped automatically to permit the filled bag to be replaced by an empty bag and the operation repeated, either for the same number of pieces or for a greater or lesser number of pieces as the operator may elect.

In the accompanying drawings, Sheet 1, Fig. 1 is a side elevation of the apparatus, on a reduced scale; Fig. 2 a side and sectional view, on line 2—2 of Fig. 3, of the speed governor or brake for controlling the feed movement; Fig. 3 a sectional view of the governor on line 3—3 of Fig. 2; Fig. 4 a side view of the commutator switch; and Fig. 5 a sectional view of the same commutator switch.

In sheet 2, Fig. 6 is a top view of the apparatus on the same scale as Fig. 1; Fig. 7 is a cross sectional view of the trough on line 7—7 of Fig. 6; and Fig. 8 is a schematic diagram of the electric operating circuit for the apparatus.

In Sheet 3, Fig. 9 is a sectional view on the longitudinal medial line of the apparatus; Fig. 10 an enlarged top view of the electric and spring controlled devices for reckoning and regulating the number of pieces to be released and delivered; Fig. 11 a sectional view on line 11—11 of Fig. 10, of the jack switch for controlling the locking solenoid circuit; Fig. 12 a sectional view on line 12—12 of Fig. 10; of the ratchet wheel and switch arm; and Fig. 13 a sectional view on line 13—13 of Fig. 10, showing the operating and locking pawls for the ratchet wheel and the releasing device for said pawls. In Sheet 4, Fig. 14 is a sectional view transversely of the trough, taken on line 14—14 of Fig. 6; and Fig. 15 is a cross sectional view of the delivery end of the trough provided with a pair of bag holders mounted on a shiftable carrier.

The apparatus comprises an inclined chute or trough A having a flaring receiving end 2 and a downwardly extending delivery end 3. The receiving end 2 has inwardly sloping side walls 4—4 forming a continuation of two inclined bottom walls 5—5 in the main body of the trough, whereby round objects, such as oranges, will be guided and caused to roll by gravity, singly and successively, in a straight line downwardly through the trough when released from a source of supply, such as a bin. The trough or chute may be open on top or completely closed, but the delivery end 3 is preferably provided with a round discharge opening 6 and a tapered depending spout 7 through which the fruit or other object may be delivered into a bag B sleeved over and suspended from the spout. The sides of the spout flare downwardly and outwardly and the lower edge 8 is beaded

to permit the open upper end of the bag to be removably clamped upon the spout by a loose ring C.

The travel of each piece of fruit through the trough is barred or interrupted by a spoked wheel 9 mounted on a rotatable shaft 10 extending transversely through an opening 11 in the bottom of the trough. A ratchet wheel 12 is fixed to one end of shaft 11 outside of the trough, and a locking pawl 14 co-acts with this ratchet wheel to stop the rotatable movement of the interrupter wheel 9 after a predetermined number of pieces of fruit have been released.

The fruit itself causes the interrupter wheel to revolve, each piece of fruit producing a quarter of a revolution of shaft 10, assuming wheel 9 to have four spokes or radial arms adapted to provide four transfer pockets for the successive pieces of fruit rolling downwardly by gravity through the chute or trough. To prevent the fruit from traveling too fast or accelerating the rotatable movement of the interrupter wheel to an objectionable extent, the speed of rotation of the wheel is controlled or regulated by a friction brake or governor 22. Thus, a housing 15 is secured to one side of the chute or trough, and this housing contains a spur gear 16 fixed to shaft 10 and meshing with a pinion 17 on a short shaft 18 carrying a worm gear 19. A spiral gear 20 and governor shaft 21 is thereby driven at an increased rate of speed, including a centrifugal governor or braking device 22. When a sudden impact or an accelerated movement is imparted to the interrupter wheel, the centrifugal governor 22 is thrown outwardly with frictional braking effect against a stationary friction drum 23 fixed to housing 15, see Fig. 2.

The locking pawl 14 is normally held apart from ratchet wheel 12 by a spring 24, see Fig. 1, and is connected by a link 25 to the movable core of an electric solenoid 26 mounted upon one side of the chute or trough. When the solenoid winding is energized the pawl is shifted and held in locking position against ratchet wheel 12. De-energization of the solenoid winding permits the spring to unlock the pawl and ratchet wheel, and that is the condition while the fruit is passing downwardly in the chute or trough and revolving the interrupter wheel and its shaft 10.

To control and determine the number of pieces of fruit to be discharged, the revoluble shaft 10 is provided with a commutator 27 adapted to be engaged by one or more spring contact blades 28—28′ connected in an electric circuit *a*, see Fig. 8. The commutator segments 29 and the spokes or pockets in the interrupter wheel 9 are equal in number so that as each piece of fruit revolves wheel 9, the electric circuit *a* will be closed and opened, thereby energizing and de-energizing a solenoid winding 30. The movable core of this solenoid is connected by a link 31 to an oscillatory lever 32 carrying an operating pawl 33 for a rotatable index wheel 34 having peripheral ratchet teeth adapted to be engaged by said pawl and also by a holding pawl 35, see Fig. 10. Each intermittent operation of the solenoid rotates the index wheel 34 the distance of one ratchet tooth, and a coiled spring 36 returns oscillatory lever 32 and the operating pawl to pick up the succeeding tooth on the wheel. The index wheel 34 is connected to one end of a convolute spring 37 which is wound up in increasing degree when the index wheel is rotated step by step by the operating pawl. The holding pawl 35 prevents a return movement of the index wheel, although a releasing member 38 is provided to dis-engage said holding pawl to permit a reverse movement of the index wheel after the predetermined number of pieces of fruit have been discharged.

Any desired number of pieces of fruit may be discharged, providing a definite setting is first established between an electric switch member 39 and a removable indexing pin 40 carried by the index wheel. Thus, wheel 34 is provided with a circular row of pin receiving openings 41, each ratchet tooth having a corresponding pin opening. Switch member 39 is pivotally supported upon a stationary bracket 42 above the index wheel and in the circular path of movement of the indexing pin 40. Assuming the pin is seated in any one of the openings 41 more or less remote from switch member 39, and the index wheel is being intermittently operated, the pin will eventually strike the arm and turn it on its pivot, thereby forcing the spring blades of a jack switch 43 into contact and closing an electric circuit *b* containing the solenoid winding 26 for the locking pawl 14. Any suitable switching device may be used in lieu of a jack switch, but as shown when the index wheel is rotated a predetermined distance the indexing pin will operate the switch and close the locking circuit *b*, thereby energizing the locking solenoid to cause the locking pawl 14 to stop further revolution of ratchet wheel 12, shaft 10 and interrupter wheel 9. In that way, a measured number of pieces may be discharged automatically, and all further discharge stopped automatically.

The attendant then removes the filled bag, and attaches an empty bag to the spout. This bag may then be charged or filled with an equal number of pieces, providing the setting of the indexing pin on wheel 34 is not changed. Or, any desired number of pieces may be discharged into the bag by re-setting the pin. To start the filling operation, the operator merely pulls or draws the releasing member 38 forward, thereby causing a bev-

eled lug 44 on this member to press the operating pawl 33 and also the holding pawl 35 apart from the ratchet teeth on the index wheel, whereupon the convolute spring rotates the index wheel reversely and restores it to its original starting position. This position is determined by a fixed pin or projection 45 on the index wheel, and by the bracket 42 which acts as a stop for projection 45. In addition, when the pin or projection 45 on the index wheel approaches the edge of bracket 42 it will also strike the pivoted switch member 39, thereby shifting it to open the jack switch and in that way breaking the locking circuit *b* and releasing the locking pawl 14. The pieces of fruit in the chute or trough then roll by gravity in rapid succession over the interrupter wheel and drive the said wheel to operate the commutator, index wheel, and the electrical devices, until the desired predetermined number of pieces have been discharged and the mechanism is stopped automatically as hereinbefore described.

In Fig. 15 I show the discharge end of the chute or trough equipped with a cross slide 47 having two spouts 48—48′ suspended therefrom and adapted to be placed alternately in register with the discharge mouth 6 in the chute or trough, whereby while one bag is being filled through the working spout, a second empty bag may be attached to the idle spout. In Figs. 9 and 14, I also show a vertically adjustable guard or intercepting member 49 mounted at the front edge of the supporting plate 50 for the indexing wheel, whereby over-riding of the interrupter wheel and escape of the rolling fruit is prevented, especially in charging the apparatus or when sudden inrush of fruit occurs. Such inrush is also checked by the governor 22 if the interrupter wheel is unlocked and free to rotate.

What I claim is:

1. In a bag filling apparatus, a gravity delivery chute having a flaring receiving end, a downwardly extending discharge end including means for suspending a bag therefrom, a rotatable wheel having spokes extending into said chute and adapted to rotate said wheel by the objects passing through said chute, and adjustable indexing means for controlling the rotatable movements of said wheel, and the number of objects passing through said chute into said bag.

2. In a charging apparatus, a gravity delivery chute having a flaring receiving end and a discharge end including means for suspending a bag detachably; means for temporarily arresting said objects, singly and successively, in their travel through said chute; and means for stopping the travel of said objects automatically, including an indexing device for predetermining the number of objects to be delivered into said bag.

3. In a bag filling apparatus, a gravity delivery chute having a flaring receiving end and a downwarly extending discharge end, a series of bag suspending means attached to and shiftably arranged with respect to said discharge end, and means for controlling the passage of a predetermined number of objects through said chute including an indexing device and a device for locking said indexing device and stopping the passage of objects through said chute.

4. In a bag filling apparatus, a chute having a flaring receiving end, a downwardly extending discharge end, a V shaped bottom for guiding objects passing through said chute and rotatable means including a plurality of radial arms extending into said chute through the bottom thereof, for controlling the passage of objects through said chute.

5. In a bag filling apparatus, a gravity chute having a flaring receiving end including inwardly sloping side walls, a trough shaped main portion having two inclined bottom walls adjoining the ends of said sloping said walls and forming a V shaped bottom for said main portion, a downwardly extending discharge end, and rotatable means including a plurality of radial arms extending into said main portion of said chute through the V shaped bottom thereof, for controlling the passage of objects through said chute.

6. In a bag filling apparatus, a gravity chute having a flaring receiving end, a trough shaped main portion including a V shaped bottom for centrally guiding objects passing through said portion, rotatable means extending into said main portion through the bottom thereof for controlling the passage of objects through said chute and vertically adjustable guard means opposite said rotatable controlling means and cooperating therewith in preventing overriding of said controlling means by objects passing through said chute.

7. In a bag filling apparatus, a gravity chute having a flaring receiving end, a trough shaped main portion including a V shaped bottom for centrally guiding objects passing through said main portion, a downwardly extending discharge end provided with a tapered depending spout adapted to support a bag suspended therefrom and rotatable means extending into said main portion through the bottom thereof for controlling the passage of objects through said chute.

In testimony whereof I affix my signature.

HERMAN A. BUXTON.