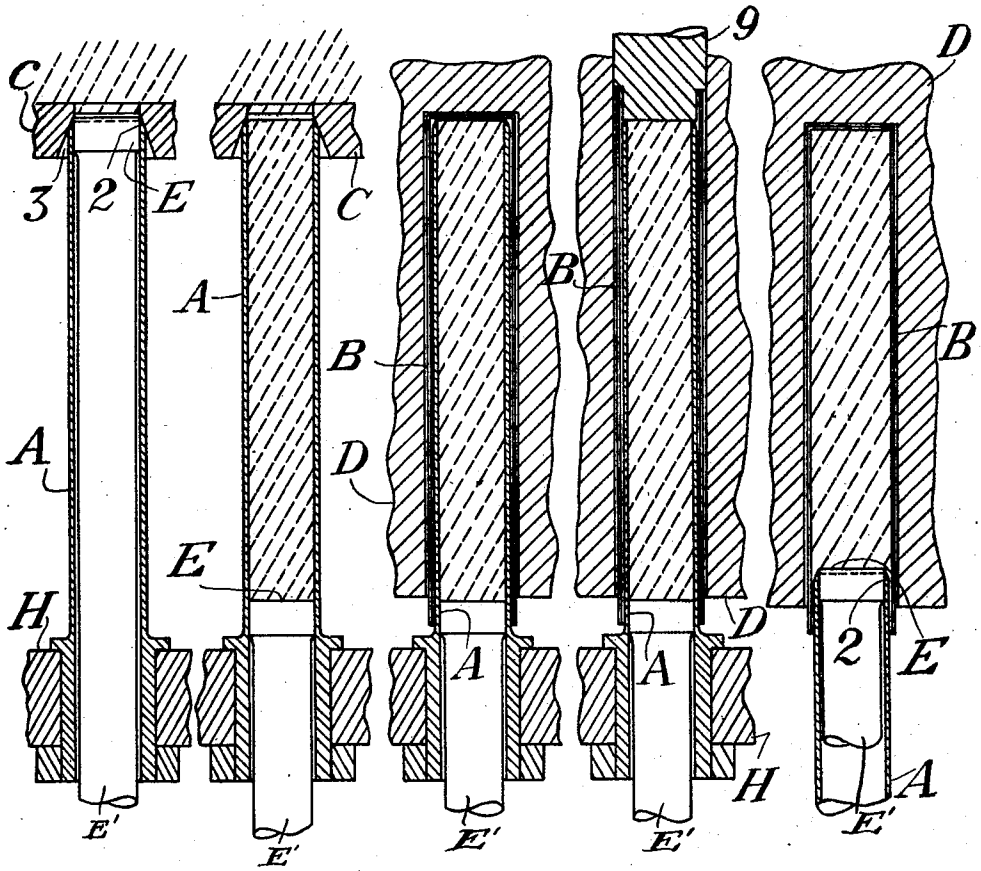
Jan. 1, 1929. 1,697,831

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APPARATUS FOR DELIVERING MATERIAL INTO RECEPTACLES

Filed Jan. 4, 1928 4 Sheets-Sheet 1

FIG:1. FIG:2. FIG:3. FIG:4. FIG:5.



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Filed Jan. 4, 1928 4 Sheets-Sheet 2

FIG. 6.

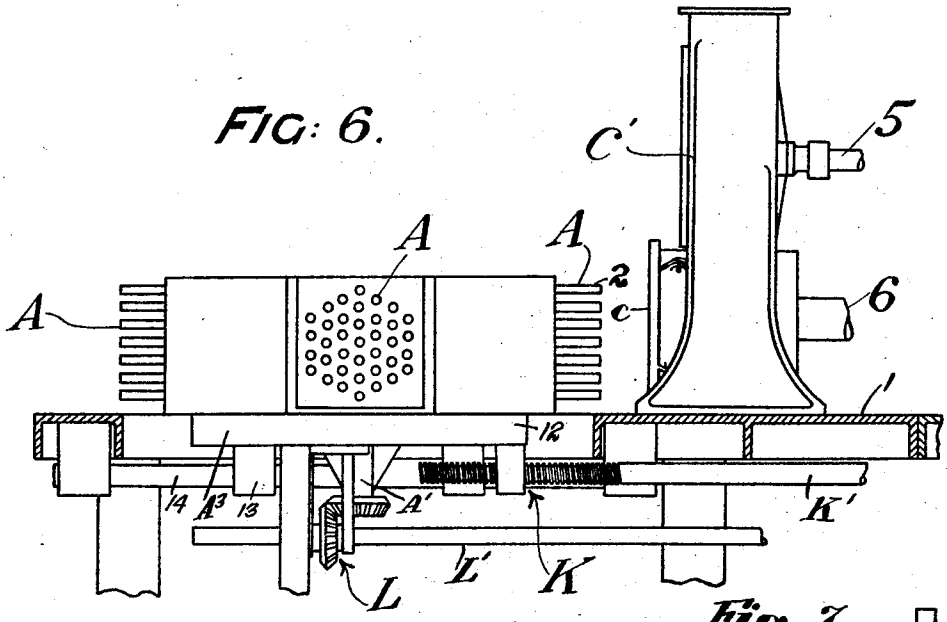


Fig. 7.

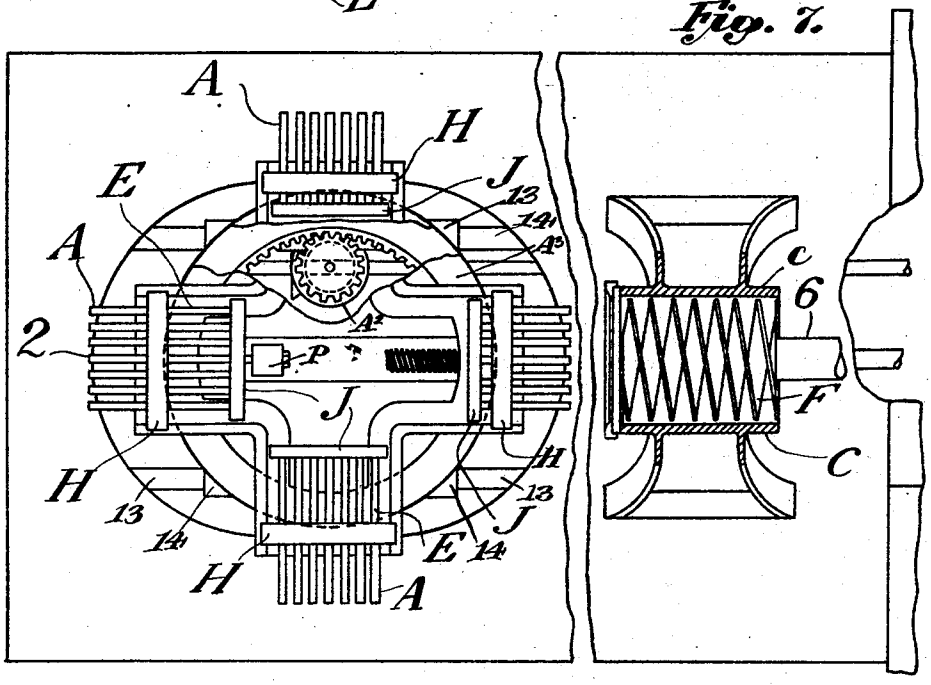


Fig. 7a.

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APPARATUS FOR DELIVERING MATERIAL INTO RECEPTACLES

Filed Jan. 4, 1928 4 Sheets-Sheet 3

FIG: 8.

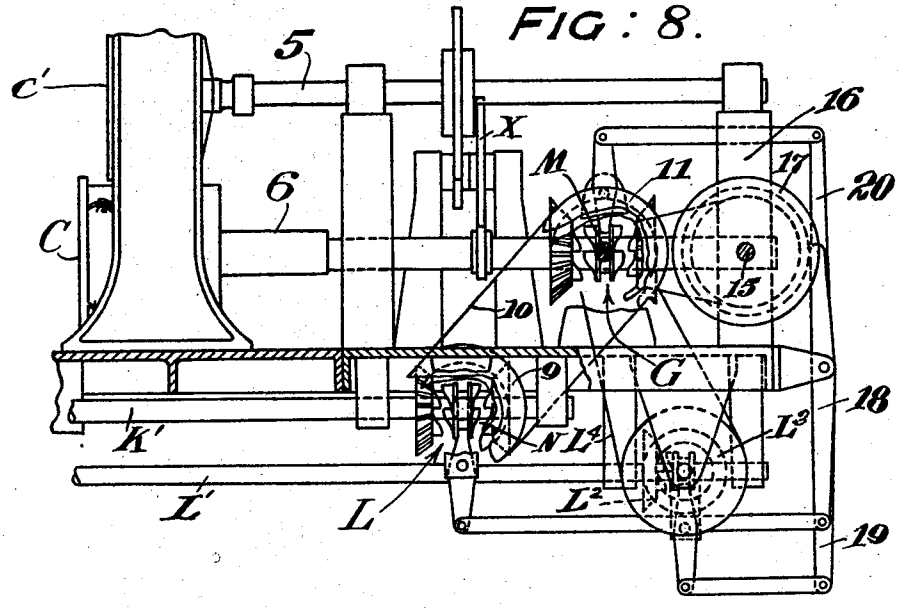
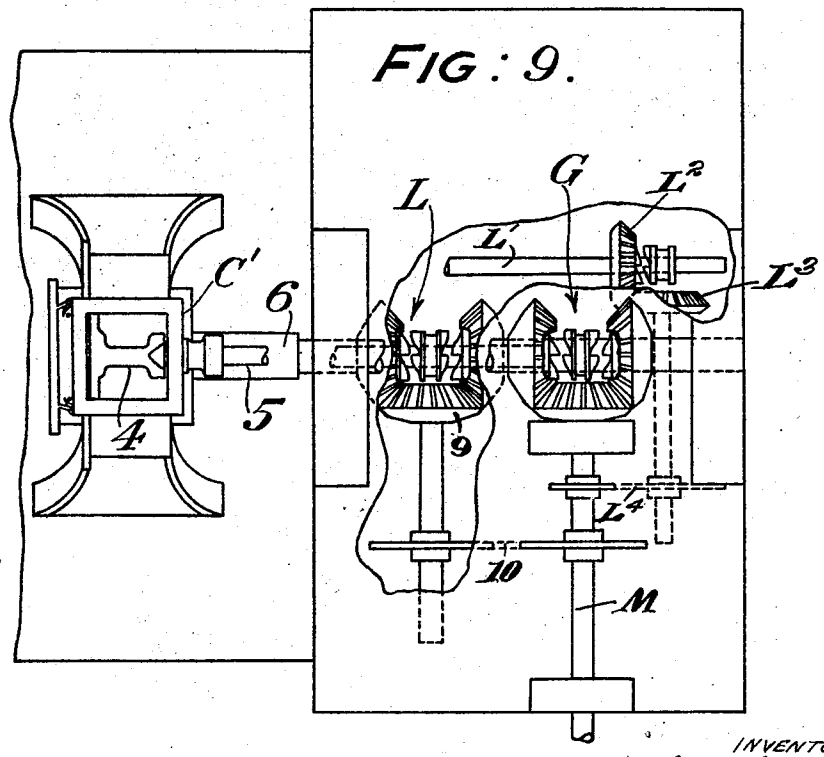


FIG: 9.



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APPARATUS FOR DELIVERING MATERIAL INTO RECEPTACLES

Filed Jan. 4, 1928 4 Sheets-Sheet 4

FIG: 10

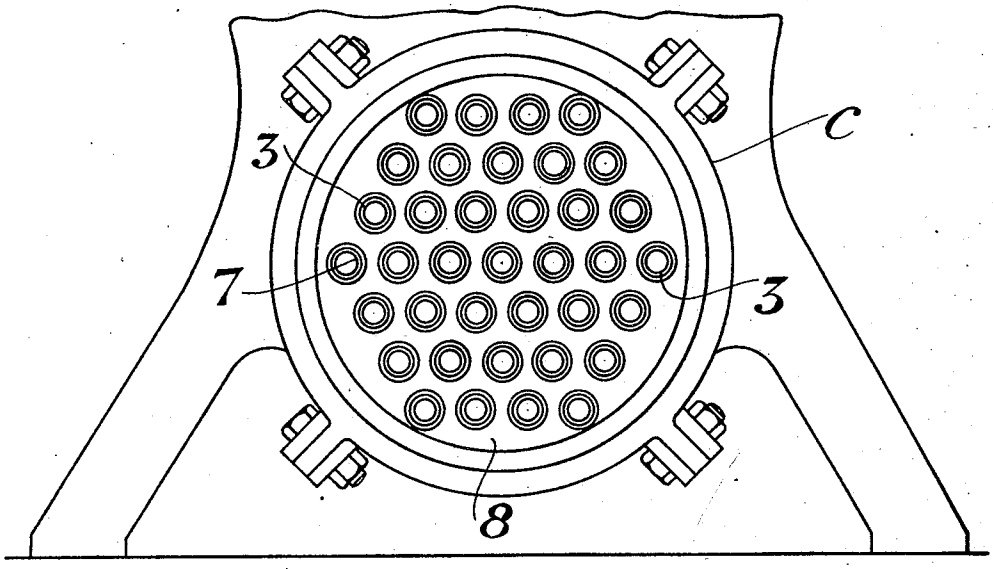


FIG: 11.

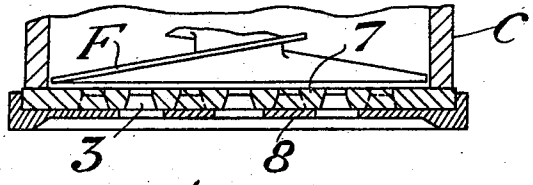
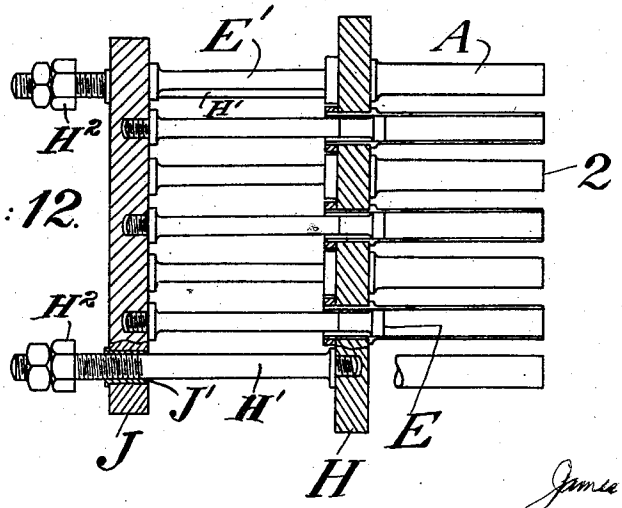


FIG: 12.



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UNITED STATES PATENT OFFICE.

JAMES GEORGE JACKSON, OF STEVENSTON, SCOTLAND, ASSIGNOR TO E. I. DU PONT DE NEMOURS & COMPANY, OF WILMINGTON, DELAWARE.

APPARATUS FOR DELIVERING MATERIAL INTO RECEPTACLES.

Application filed January 4, 1928, Serial No. 244,455, and in Great Britain December 14, 1926.

This invention relates to an apparatus for filling receptacles with commodities of a plastic, gelatinous or like nature, and includes means for dividing the commodity, or material, into specified measured charges, and in thereafter injecting each charge into a receptacle.

In the embodiment of the invention here illustrated and described, the commodity is properly treated or prepared adjacent or within a hopper mechanism provided with a plurality of vents, and means are provided for ejecting a measured charge of the commodity from each of said vents into a receiver in communication with one of the vents, each receiver thereafter delivering its charge to a receptacle or tube.

The object of the invention is the provision of means adapted to automatically and expeditiously deliver to each of a plurality of tubes, a measured charge of the commodity being treated by the machine.

Other objects of the invention will be made apparent in the accompanying specifications, when read in connection with the drawings forming a part thereof.

In said drawings:—

Fig. 1 is a horizontal section taken through a portion of the hopper and receiver, the piston being shown in plan.

Fig. 2 is a similar view showing the receiver filled with the commodity, and also showing the piston in a different position.

Fig. 3 is a sectional view showing a charged receiver, and an assembled tube and a portion of a holder therefor.

Fig. 4 is a view similar to Fig. 3, showing a modified form of holder and tube.

Fig. 5 is a view similar to Fig. 3, showing the commodity discharged into the tube.

Fig. 6 is a side elevation, partly in section, showing left hand side of the apparatus.

Fig. 7 is a vertical section taken through a portion of the apparatus, illustrating the means for forcing the commodity through the exit vents of the hopper.

Fig. 7ª is a top plan view, partly broken away, showing the mechanisms for manipulating the several batteries of receivers.

Fig. 8 is a side elevation partly in section of the right hand side of the apparatus.

Fig. 9 is a plan view, partly broken away to show the operating shafts and the clutches therefor.

Fig. 10 is a front elevation of the face of the hopper.

Fig. 11 is a lateral section through the face of the hopper, showing the ejecting mechanism in plan, and,

Fig. 12 is a sectional plan view showing a battery of receivers and associated pistons.

Now referring specifically to the drawings, in which like reference numerals indicate like parts throughout the several views, in Figs. 6 and 8 is shown a frame or table 1, adapted to support the instrumentalities to be hereinafter described. Mounted on said table 1 is a standard supporting a reservoir C, here shown as cylindrical in formation, and a spiraled vane F is mounted for rotation concentrically within said reservoir, being driven by a shaft 6, suitable power for rotating said shaft being taken from power shaft M, see Fig. 8. By means of suitable clutch mechanism G, the shaft 6 may be caused by the shaft M to rotate in either direction, as will be understood.

Mounted directly above the hopper C, is a stirring chamber C′, in which is positioned a stirrer 4, mounted on a shaft 5, extending parallel to the shaft 6, and operatively connected to the latter for rotation therewith by means of gearing indicated by X, at the top of Fig. 8. The commodity being treated is placed in the stirrer chamber C′, and is constantly agitated by the stirrer 4. While not herein illustrated it is to be understood that the chamber C′ communicates through its bottom with the interior of the reservoir C, the properly treated commodity gravitating from the chamber C′ into said reservoir to be disposed of as will be later described.

A shaft A′ extends vertically through the table 1, and carries a gear on its lower end, in mesh with a co-operating gear L fast upon a rotating shaft L′ hung below the table, said shaft L′ being rotated by a beveled gear L^2 fixed to the shaft, and meshing with a gear L^3, connected by a belt or sprocket L^4, trained over a gear wheel 11 on the shaft M, whereby to clutch or unclutch said shaft L′ to the shaft M, all as shown in Fig. 8.

The shaft A′ extends upwardly and is provided at its top with a gear pinion A^2, for

engagement with teeth formed on the inner periphery of a ring A^3, rotatively mounted on said table, it being obvious that rotation of the shaft L′ will operate to rotate the ring A^3.

Mounted upon the ring A^3, is a plurality of head-stocks H, each carrying a number of tubular receivers A, the open inner end of each receiver extending through apertures in the head-stock H, and being adapted for the reception of a piston E, carried by the end of a rod E′, fixed at its rear end to a cross-head J. To each end of the head-stock H, is secured a guide rod H′, extending rearwardly through a wear sleeve J′, mounted in a suitable aperture formed in the cross-head J, the rear end of the rods H′ being screw-threaded to receive adjusting nuts H^2, adapted for movement to vary the distance between the cross-head J and the head-stock H, and consequently, the position of the piston E within the receiver A. This structure is clearly illustrated in Fig. 12.

As illustrated in Fig. 6, a rotative shaft K′ is hung in suitable bearings below the table, said shaft being driven by gear wheel 9, connected by a belt or sprocket chain 10 to the gear wheel 11, on the power shaft M, and suitable clutch mechanism N is provided to cause rotation of said shaft in clockwise, or anti-clockwise direction. The other end of the shaft K′ is screw-threaded, and extends through a threaded block K, carried by the lower portion of a frame 12 upon which the ring A^3 is rotatively mounted. The frame 12 is provided on its lower surface with pendant ears 13, surrounding rods 14 which guide the frame 12, and the receiver batteries in their movements to and from the hopper, for a purpose to be presently described.

As illustrated in Fig. 8, a cammed shaft 15 is mounted in bearings 16 and extends in parallelism with the power shaft M, being rotated by means of a gear wheel 17, connected by a belt or chain to the wheel 11 carried by the power shaft. The shaft 15 may be provided with three spaced cams projecting therefrom in as many different planes, said cams being adapted, during the operation of the machine, to automatically and successively engage the upper ends of clutch levers 18 and 19, leading, respectively to the clutch N for the shaft K′, and the clutch on the shaft L′, or to engage the lower end of the clutch lever 20, leading to the clutch controlling the operation of the shaft 6 and the shaft 5. Suitable spring mechanisms, not shown are provided to automatically restore the several clutches to normal position. Such structure is shown in my U. S. Patent No. 1,368,934, dated Feb. 15, 1921. Or crank arms may be provided on said shaft 15, so pivotally connected to the levers 18, 19 and 20 that rotation of the shaft 15 will alternately clutch and unclutch the shafts 6, K′ and L′, as desired, during the automatic operation of the machine.

As best illustrated in Figs. 10 and 11, the hopper C is provided with a flat outer face 8, preferably formed of metal, to the inner surface of which is secured an inner lining of thick elastic material 7, such as rubber. The outer face 8 is provided with a plurality of apertures aligned with the receivers A, and the lining 7 is also provided with apertures registering with those in the face 8, it being noted that the outer walls of the apertures in the lining 7 are outwardly flared or beveled, so that the largest diameter of the said apertures is greater than that of the end of the receivers to be brought into contact with said walls, as will be hereinafter explained.

As hereinbefore stated, as the shafts 6 and 5 rotate, the commodity being treated is constantly agitated and kept in proper condition by the stirrer 4, and delivered to the hopper. By proper rotation of the shaft K′, a battery of the receivers A is pulled towards the hopper, the receivers A being so arranged, with respect to the apertures 3 in the hopper, that an open end of each receiver A will enter one of said apertures and be pressed against the rubber walls of the aperture in the lining 7, to form a leak-proof joint, the pistons E being fully advanced in said receivers, as illustrated in Fig. 1. At this point the clutch on the shaft 6 is automatically thrown into operation to rotate the vane F in clock-wise direction, thereby forcing the relatively fluent commodity through the apertures and into the receivers and causing it to contact the faces of the several pistons and force them rearwardly, the receivers then being filled with the commodity. Rotation of the shaft 6 is then interrupted, but shaft K′ is then automatically clutched for rotation to shift the battery of the receivers rearwardly, and shaft L′ then operated to move the filled battery of receivers clockwise through a 90° arc, or to the position shown at the bottom of Fig. 7^a.

In the last named position proper receptacles, having a closed bottom or end, are slipped longitudinally over each of said receivers. Such receptacles may obviously be of any desired material adapted to preserve the commodity in its proper condition until it is to be used. A receptacle may be manually slipped over each receiver, but the automatic and speedy operation of the machine necessitates a holder provided with a plurality of elongated apertures located exactly in accordance with the arrangement of the receivers, each aperture in the holder being adapted to receive a receptacle B having a cubical content adapted to receive the charge of commodity contained in the receiver to be associated therewith. Obviously, a plurality of such holders, filled with empty receptacles,

may be mounted upon a rotative shaft, and one holder be presented to the filled receivers as they reach the position last above referred to and means provided for moving the holder and receivers the one towards the other, whereby to cover each receiver with a receptacle.

After the receivers are each covered with a receptacle, the shaft L′ is operated to again rotate the ring A^3 through a 90° arc, to bring the battery to the position shown at the left of Fig. 7. At this point a die or holder D, fitted with elongated apertures adapted to receive each of the receivers and enveloping receptacles in the battery, is brought into position so that its several apertures each surround a filled receiver, a portion of said holder D being shown in Fig. 3, it being noted that the piston E is positioned within the open end of the receptacle B. In this position, the next rotation of the shaft K′, tending to move a battery of receivers A towards the hopper C, as hereinbefore described, will also move the battery of filled receivers, as shown at the left, Fig. 7^a, in the same direction, but movement of the cross-head J in such direction is prevented by a fixed stop member P which is secured to the framework of the table. The headstock H is free for limited movement however, and travels towards the hopper, the block D, carrying the receptacles B remaining stationary, as do also the pistons E connected to the cross-head J, such movement as described causing the commodity to press against the face of the pistons E while the receivers are withdrawn from the receptacles B, leaving the commodity within the latter, the receivers being thereby emptied. The battery of receivers are then rotated by the shaft L′ through another 90° arc, and, after the next revolution, are again filled from the hopper.

It is to be understood that the machine is entirely automatic in its operation, through the clutch mechanisms herein described, the shaft M being constantly rotated, the clutches being so consecutively operated, positively and negatively, that, as the open ends of the receivers contact and become seated against the face of the aperture in the lining 7, the shaft 6 rotates the vane F, causing the latter to force the commodity through the apertures 3 and into said receivers, and then immediately reverses the direction of rotation of said shaft and vane whereby the forward blade of the vane operates to shear off the end of the rope of commodity, within the hopper. Immediately after this operation shaft K′ is operated to move the receivers away from the hopper, and, in turn, shaft L′ is rotated to turn the battery to the 90° position, where the receptacles are applied to the receivers, as has been explained, such rotation bringing the battery then in the 270° position, to the zero position in front of the hopper, where the empty receivers are filled. It is to be understood therefore, that the continuous operation of the machine sequentially and automatically completes the steps, it being noted that a movement of the battery in zero position in front of the hopper, also automatically, and by the same movement of the frame, evacuates the receivers of the battery in the 180° position, and discharges the definitely measured contents of the receivers into the receptacles, which latter are then removed and closed at the end.

It is to be noted that, by the use of a machine as described, a very large number of receptacles may be filled during the rotation of the batteries through two arcs of 90° each. Of course each battery of receivers may contain a larger or smaller number of receivers than is herein shown, dependent upon the capacity of the hopper, and the capacity of the receivers may be adjusted by varying the position of the pistons therein, as before explained. Also the hopper may be moved towards the receiver, instead of the reverse being true, in the embodiment of the invention herein illustrated.

In Fig. 4 is illustrated a modified form of tubular receptacle B, open at both ends. In this form of holder, a removable plug 9 is utilized, to close the inner end of the receptacle.

Various modifications of the structure herein described may be suggested to those skilled in the arts, but my invention covers all embodiments falling fairly within the scope of the appended claims.

I claim:

1. Apparatus for filling receptacles with a commodity comprising a hopper adapted to contain a supply of the commodity, and having a vent in one face thereof, a receiver movable into position such that its open end may extend into said vent, means for forcing a charge of the commodity into said receiver, means for thereafter moving said receiver away from said hopper, and means for thereafter expelling the charge from said receiver into a receptacle.

2. Apparatus for simultaneously filling each of a plurality of receptacles with a commodity, comprising a hopper containing a supply of said commodity, a rotative table, a plurality of batteries of receivers mounted on said table, each receiver being adapted to take a charge of commodity from said hopper, means for rotating said table to successively locate each battery in front of the hopper, means for successively moving each battery into receiving position with respect to the hopper, means for forcing a charge of said commodity into each receiver of a battery, means to thereafter move said batteries away from the hopper, and means for thereafter

ejecting the charge from each receiver of a battery into a receptacle.

3. Apparatus for simultaneously filling each of a plurality of receptacles with a commodity, comprising a hopper containing a supply of said commodity, a plurality of receivers movable in a circular path in front of said hopper, each receiver being adapted to take a charge of commodity from the latter, means for successively moving said receivers in arcs of a circle in front of said hopper, means for successively bringing each receiver into charge taking position with respect to the hopper, means for filling the receiver with commodity from the hopper, and means thereafter operable to eject into a receptacle the charge contained in said receiver, said means being actuated by the movement of another receiver to charge taking position with respect to said hopper.

4. Apparatus of the class described, including a hopper adapted to contain a commodity, a plurality of batteries of tubular receivers rotatively mounted at the delivery side of said hopper and adapted to receive charges of the commodity from the latter, means for moving said batteries of receivers to successively bring each battery in position whereby the receivers thereof may be filled with charges from the hopper, and means whereby the movement of one battery to receiving position with respect to the hopper, is operative to expel into receptacles the charge in each of the receivers of another battery.

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