March 6, 1934. J. L. FERGUSON 1,949,536

PACKAGING DEVICE

Filed April 28, 1930 4 Sheets-Sheet 1

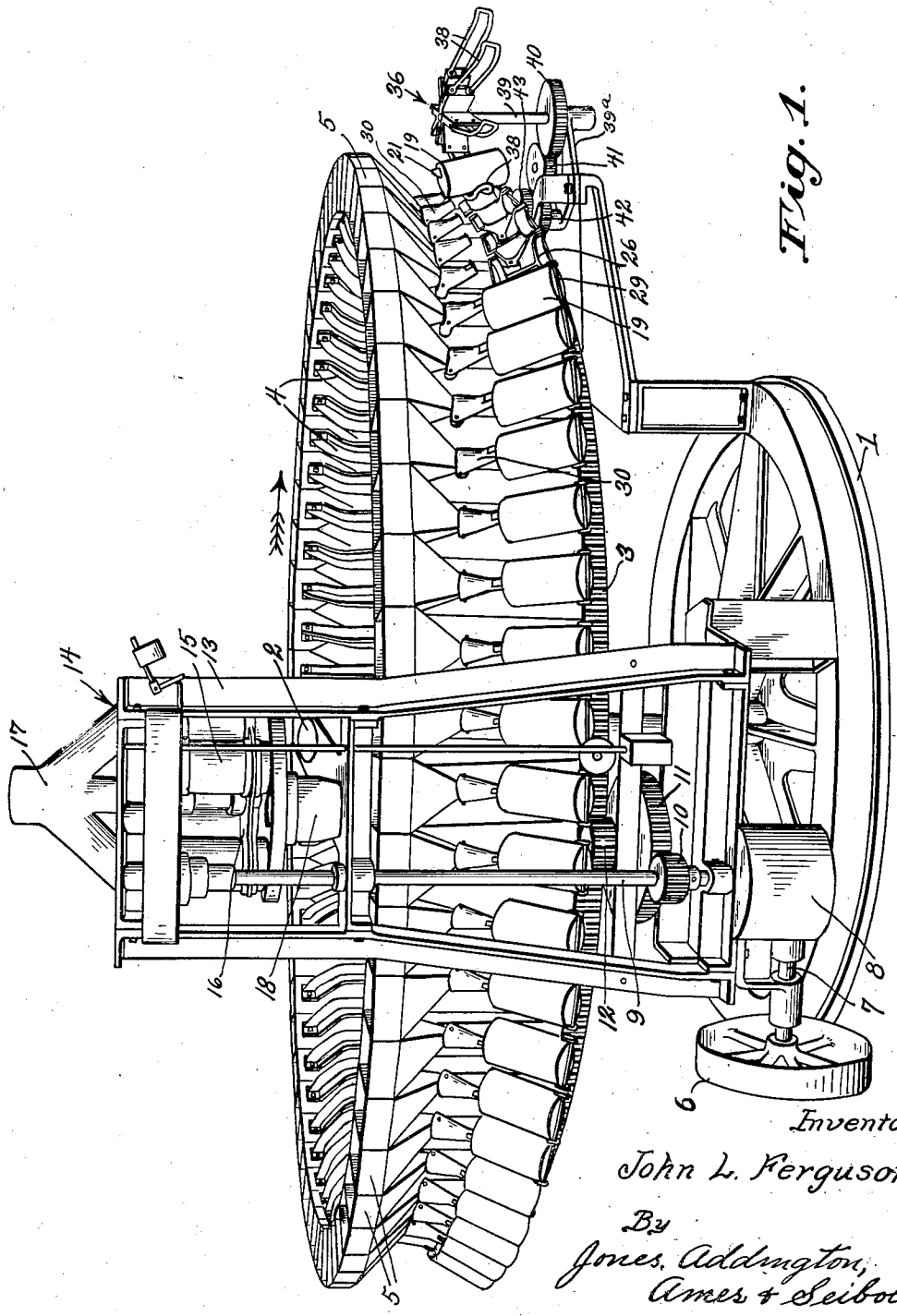


Fig. 1.

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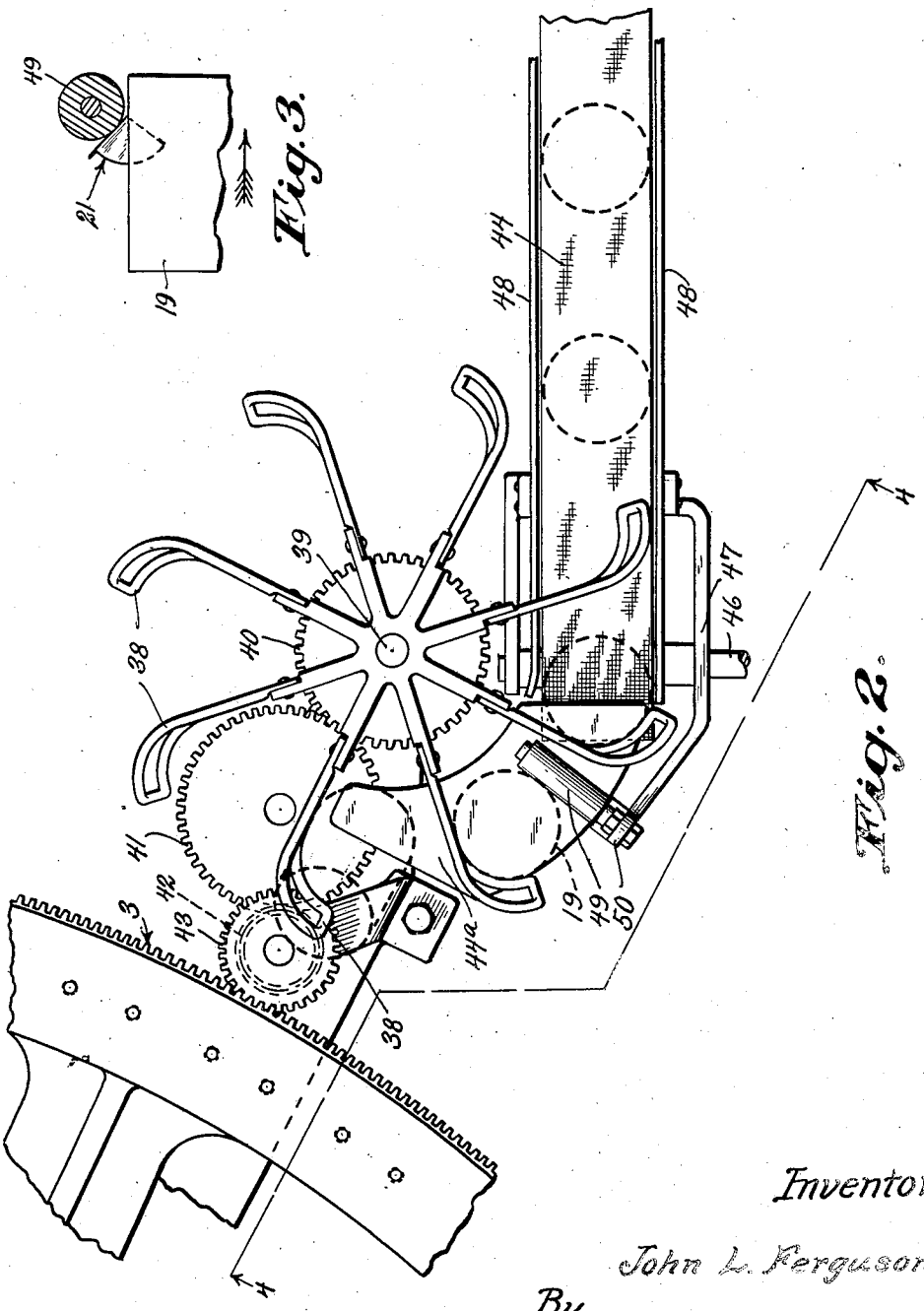


Fig. 3.

Fig. 2.

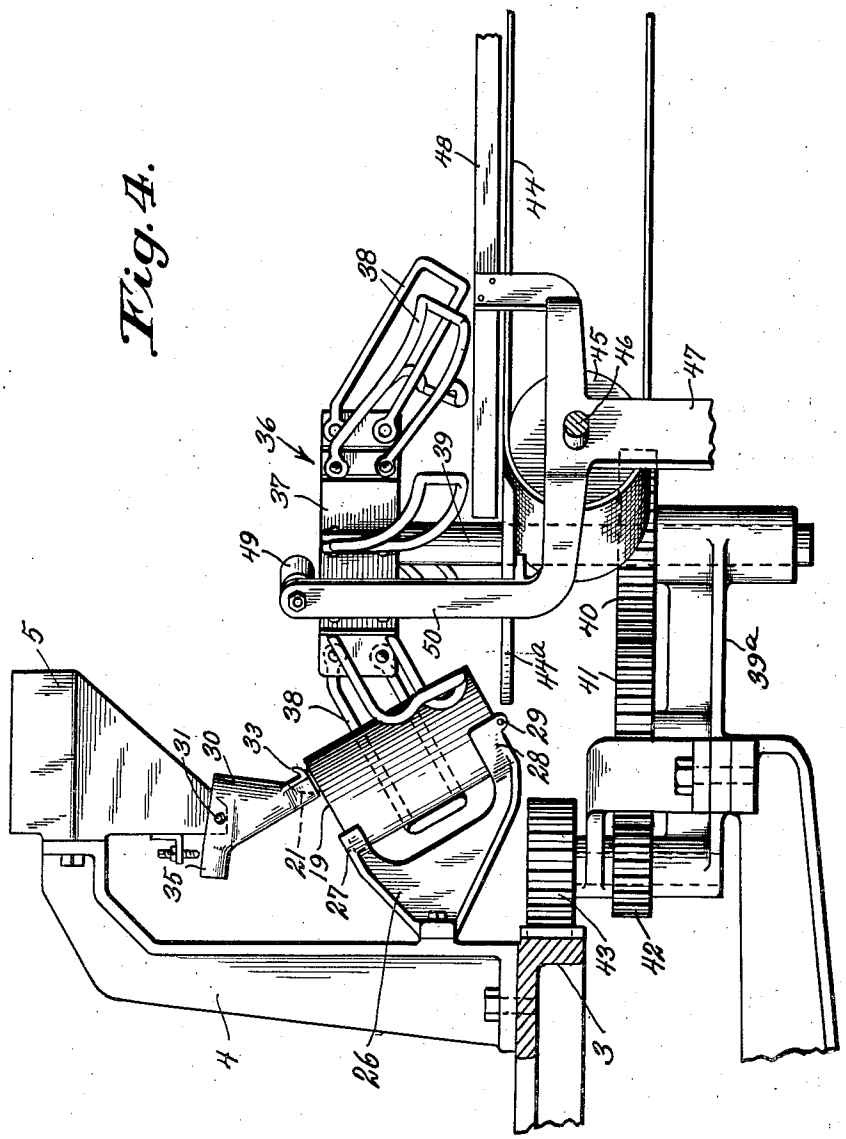
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Fig. 4.



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Filed April 28, 1930 4 Sheets-Sheet 4

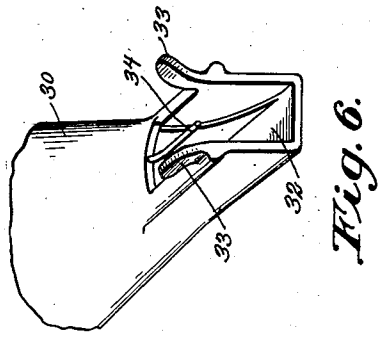


Fig. 6.

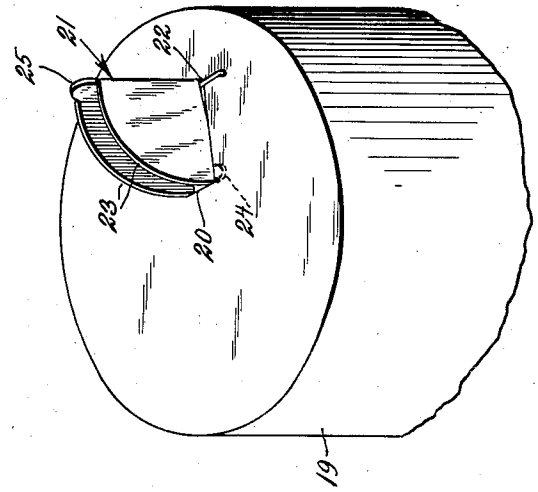


Fig. 7.

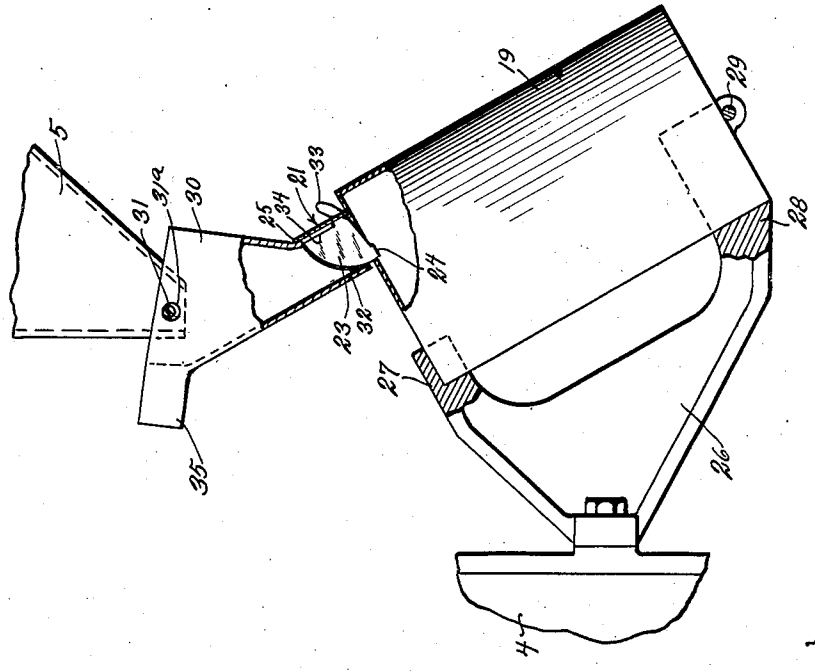


Fig. 5.

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Patented Mar. 6, 1934 1,949,536

UNITED STATES PATENT OFFICE

1,949,536

PACKAGING DEVICE

John Lee Ferguson, Joliet, Ill., assignor to J. L. Ferguson Company, Joliet, Ill., a corporation of Illinois

Application April 28, 1930, Serial No. 447,805

17 Claims. (Cl. 226—75)

My invention relates to a method of filling packages and to package filling machines, and more particularly to machines for automatically filling packages with salt or any desired granular material, with special reference to the means and method of directing the granular material into the packages and of supplying the latter to, and removing them from, the machine.

While the word "granular" is used throughout the application, I desire it to be understood to include any suitable comminuted substance capable of freely running in the manner indicated.

My invention is especially useful in connection with a machine whereby the material is first delivered to an automatic measuring device which accurately measures the amount required for each package, a measured amount being placed in each of a plurality of hoppers as the latter are moved consecutively adjacent the measuring device. Empty cans or containers are fed into the machine, one being arranged adjacent each of the hoppers and in a position to receive the material therefrom, during the movement of the can and its respective hopper to a position where the filled can may be removed from the machine by a suitable take-off mechanism.

Common table salt is ordinarily retailed in cylindrical paper or cardboard containers or cans having a hinged spout for pouring the salt from a restricted opening in the end of the can. The hinged spout may be closed to cover the opening, and is usually sealed with transparent paper for shipment. It is desirable to fill the cans through the restricted opening and this has heretofore been very difficult, due to the salt piling up adjacent to and closing the opening before the can is completely filled.

My invention also contemplates a means and method whereby the can may be completely filled without waste and also provides means for automatically removing the filled cans from the machine and closing the spout.

It is not possible, in the manufacture of such spout cartons, to prevent some variation in the position of the spout and the exact shape thereof, particularly since the spout is metal and the carton is pasteboard or fiber. A rigid filling connection might, therefore, fail to register with all the cans supplied to the filling machine with consequent high wastage of material and possibility of jamming the machine. My invention accordingly provides means for insuring registration of the filling means with all spouts even though the latter may exhibit minor variations.

The latter desirable feature of my invention is the provision of a floating hopper outlet means which is arranged to cooperate with the can spout for directing the material into the can, and which is automatically adjustable to slight variations in the position of the spout. This provides a flexibility which is of considerable advantage to the operator in inserting the cans in the machine so that the hopper outlet and can spout are in cooperative alignment.

While the embodiment shown and described is especially designed for filling round cans with salt, it may be modified for use in filling cans of various shapes and sizes and any desired granular material may be handled, and it will be apparent to those skilled in the art that these and other modifications may be made without departing from the spirit and scope of the invention, and, therefore, I wish to be limited only by the scope of the prior art and by the appended claims.

Further objects and advantages will be apparent from the following description and accompanying drawings, in which latter:

Figure 1 is a perspective view of a machine embodying my invention, the take-off plate and can conveyor being removed;

Fig. 2 is a top plan view of the take-off mechanism;

Fig. 3 is a transverse section through the spout closing roller and illustrates the method of closing the can spout during the movement of the can;

Fig. 4 is a side elevation of the take-off mechanism, the rotatable hopper table being shown in section substantially on line 4—4 of Fig. 2;

Fig. 5 is a side elevation of one of the containers in cooperative relation with the filling and the supporting means, portions being broken away for better illustration;

Fig. 6 is a perspective view of the delivery end of the floating hopper funnel as constructed to receive the container spout; and

Fig. 7 is a fragmentary view of the end of one of the containers, the hinged spout being shown in open position.

Referring to the drawings in detail, the embodiment shown comprises a base 1 having a centrally located vertical post or shaft 2 on which is horizontally and rotatably mounted a comparatively large gear 3. This gear forms a rotatable container conveyor and hopper table on which a plurality of upwardly and outwardly extending brackets 4 are mounted for supporting the radially disposed hoppers 5, Figs. 1 and 4. These hoppers are arranged adjacent each other

and overhanging the periphery of the gear or table 3.

The hopper supporting gear 3 is driven from any suitable power source by means of a pulley 6 on a transverse shaft 7. A suitable transmission is provided in a transmission case 8, for driving a vertical shaft 9, on which latter is mounted a pinion 10 through which the gear 3 is driven by means of a gear 11 and a pinion 12 thereon.

The operating mechanism is supported in suitable bearings in an upwardly extending frame 13 which also supports a material-measuring device indicated broadly as 14. This measuring device comprises a plurality of tubular members 15 supported on a rotatable frame 16, which latter is driven through a suitable transmission from the shaft 9. A tripping device is also provided to prevent the operation of the measuring device when containers are not consecutively inserted in the machine.

The measuring device is arranged to receive the salt or other material from a convenient supply, through an ingress pipe 17 and to deliver a measured amount, sufficient to fill a container, to each consecutive hopper as it passes under a chute 18, through which latter the material is dropped. The measuring device forms no part of the present application and a further description is believed unnecessary.

The hopper table 3 also forms a conveyor for the containers 19, which in the present instance are of the usual cylindrical form, one end having a comparatively small rectangular opening 20 therein, which is normally closed by a sheet metal chute or spout 21, which latter is hinged at 22 and provided with side walls 23. Inturned lugs 24 provide stop means engaging inside the container when the spout is open, the rear wall 25 engaging the outside of the container and closing the opening 20 when the spout is closed. A container-supporting bracket or chair 26, Figs. 4 and 5, is mounted on each of the hopper supports 4 and provided with outwardly extending arcuate container-holding arms 27 and 28, the lower arcuate arm 28 having a cross rod 29 on which the container is angularly supported in the arcuate portions of the arms and in a position to receive the material from the hopper. The container may be supported in any suitable angular position, preferably with its longitudinal axis at substantially 30° from the vertical.

A spout engaging funnel 30 is pivotally supported in floating relation on the pins 31 secured adjacent the outlet end of the hopper 5, and extending through the enlarged holes 31*a* in the sides of the funnel. The outlet opening 32 conforms to and is arranged to receive and snugly engage the container spout 21 as shown in Fig. 5. Outwardly extending ears 33 assist in guiding the spout into the opening 32, a downwardly extending member 34 engaging the back wall 25 of the chute and preventing it from closing during the filling operation. A weight 35 on the funnel 30 retains the latter in engaged position, and the above-described method of supporting the floating funnel allows considerable flexibility in operation, and variation in the relative position of the container and container spout.

The above described funnel and mounting therefor provides a self-adjusting arrangement whereby the containers may be easily and quickly inserted in the machine and the floating funnel readily adjusts itself to direct the granular material through the spout regardless of inaccurate positioning of the container or inaccuracy in the construction and assembly of the container and spout.

The weight 35 normally holds the outlet end of the funnel 30 forward of its loading position and the enlarged holes 31*a* provide a floating bearing therefor. The outwardly extending ears 33 guide the floating funnel to a position of aligned engagement with the spout 21 when it is placed therebetween and without the necessity for accurate positioning of the container. The funnel is pushed rearwardly as the container is positioned and swings forwardly again as the container is removed thereby providing an efficient self adjusting device. If the operator misplaces the container to such an extent that the spout 21 is beyond the limits of self adjustment of the funnel 30, the out-turned ears 33 will slightly rotate the empty container as it enters and the funnel and container will cooperate for mutual self adjustment.

The hopper table, including the hoppers and containers, is rotated in a clockwise direction as indicated by the arrow in Fig. 1, and a take-off mechanism is indicated broadly as 36. The empty containers are inserted in the machine substantially midway between the take-off mechanism and the measuring device.

The hoppers are filled during their movement under the measuring device, and the comparatively long time required for the movement of the container to the take-off mechanism allows all of the material in the hopper to pass through the funnel 30 and into the can 19.

The angular position of the container during the filling operation allows the material to pile up in the highest corner and completely fill the container.

It will be noted that while the speed per minute of the hopper table is comparatively slow, the number of cans filled per minute is relatively high, for instance, if the embodiment shown, having 60 hoppers, is operated at the rate of one revolution per minute, the time is sufficient to allow the containers to be completely filled during their travel to the take-off mechanism and they will be taken off at the rate of one per second.

The take-off mechanism 36 comprises a rotatable member 37 having angularly disposed outwardly and downwardly extending skeleton arms 38 for engaging and removing each filled container from its respective chair as it passes the take-off device. The member 37 is secured to a vertical shaft 39 rotatably mounted on bracket 39*a*, and is driven from the hopper table by means of a gear 40 secured to the shaft 39, the idler 41, pinion 42, and a gear 43, the latter being in mesh with the hopper table gear 3.

A conveyor belt 44 is mounted on a pulley 45 adjacent the take-off mechanism. The pulley is secured to a shaft 46 which is supported in a bracket 47 and may be driven from any suitable power source. A take-off plate 44*a* is located substantially in alignment with the container chairs and the conveyor belt and is arranged to receive the containers as they are raised to a vertical position and removed from the chairs 26. The movement of the arms 38 cause the containers to be tilted to a vertical position on the supporting rods 29 and to be moved therefrom and slide over the take-off plate and on to the conveyor by which they are carried away between the guide bars 48. The speed of the conveyor is considerably greater than that of the arms 38, and the containers are, therefore, quickly removed from engagement

therewith to allow the arms to continue their movement. A spout-closing roller 49, Fig. 4, is mounted on the upwardly extending arm 50 and in a position to engage and close the container spout during the movement of the container over the take-off plate, the engagement and closing operation being effected as indicated in Fig. 3.

The embodiment described provides a comparatively slow speed machine with a large out-put of filled and closed containers per unit of time in combination with a flexible filling means and an efficient take-off mechanism.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. A device for filling containers with granular material comprising a container conveyor, means for supporting containers on said conveyor in an angular position relative thereto, said containers having restricted openings adjacent their highest point, means for measuring a predetermined amount of material for each container, and means cooperative with each container for automatic self alignment with said restricted opening while said container is being positioned and for directing said measured material to fill said container during the movement of said conveyor.

2. A machine for filling containers with granular material, comprising a continuously moving conveyor, means for disposing containers thereon in an angular position relative to the plane of movement of said conveyor, hoppers carried by said conveyor, and freely movable means automatically cooperating with a hopper and a container while the container is being positioned for directing a predetermined amount of material by gravity from each of said hoppers into its respective container at a point adjacent the highest point of said container.

3. A machine for filling containers by gravity through a restricted opening therein, comprising an endless conveyor, a plurality of hoppers on said conveyor for receiving granular material, means for angularly supporting a container adjacent each hopper and in a position to receive material by gravity therefrom, and floating means for automatic alignment with said restricted opening during positioning of said container for directing said material through said opening to substantially fill said container.

4. In a machine of the character described, a moving conveyor, means for supporting containers in an angular position thereon relative to the plane of movement of said conveyor, said containers having restricted ingress openings, a hopper adjacent each container for receiving and delivering granular material, a floating funnel supported adjacent each hopper and self adjustable with the opening in the container to direct material therefrom into said container, and means for aligning said funnel with said restricted opening.

5. In a device for filling containers with granular material, said containers having a restricted opening and a spout therefor, a hopper, a floating funnel for directing material from said hopper through said opening, said funnel having an outlet arranged to receive said spout, and means on said funnel to prevent the movement of said spout during the filling operation.

6. In a device for filling containers by gravity with granular material, said containers having a restricted opening and a folding spout therefor, means for angularly supporting said container, a hopper positioned above said container, a floating funnel to direct material from said hopper through said opening, said funnel having a side opening arranged to receive said spout and to be closed thereby.

7. In a device for filling containers by gravity with granular material, said containers having a restricted opening and a folding spout therefor, means for angularly supporting said container, a hopper positioned above said container, a floating funnel to direct material from said hopper through said opening, said funnel having a side opening arranged to receive said spout and to be closed thereby, and means to direct said spout into said side opening.

8. In a device for filling containers by gravity with granular material, said containers having a restricted opening and a folding spout therefor, means for angularly supporting said container, a hopper positioned above said container, a floating funnel to direct material from said hopper through said opening, said funnel having a side opening arranged to receive said spout and to be closed thereby, means to direct said spout into said side opening, and a weight on said funnel to retain said funnel in engagement with said spout.

9. In a device for filling containers by gravity with granular material, said containers having a restricted opening and a spout therefor, a hopper, a floating funnel supported adjacent said hopper to direct material therefrom through said opening, and means for supporting a container in a position to receive said material from said funnel, said funnel having a side opening to receive said spout, said funnel cooperating with said spout for variable alignment with said opening.

10. In a machine of the class described having a moving conveyor and means for angularly supporting containers thereon, a take-off device for removing the angularly disposed containers therefrom, comprising a rotary member having angularly disposed take-off arms thereon, for successively engaging the containers, the arms being substantially perpendicular to the longitudinal axis of the containers only during the initial engagement therewith.

11. In a machine of the class described having a moving conveyor and means for supporting angularly disposed containers thereon, a take-off device for removing angularly disposed containers therefrom, comprising a rotary member having angularly disposed take-off arms thereon, for successively engaging the containers, the arms during the initial engagement only being substantially perpendicular to the longitudinal axis of the containers, and a receiving conveyor for removing the containers from engagement with said arms.

12. In a machine of the class described having a moving conveyor and means for supporting angularly disposed containers thereon, a take-off device for removing angularly disposed containers therefrom, said take-off device comprising a rotary member having angularly disposed take-off arms thereon, for successively engaging the containers, the arms during the initial engagement being substantially perpendicular to the longitudinal axis of the containers and arranged to move said containers to vertical position during removal from said conveyor, and a receiving conveyor for removing the containers from engagement with said arms at a speed substantially greater than the speed of said arms.

13. In a machine of the class described having a moving conveyor and means for supporting

angularly disposed containers thereon, a rotary take-off means for removing angularly disposed containers therefrom, said containers having folding spouts, arms on said take-off means for engaging and moving said containers to an upright position, and means for folding said spouts to closed position during the movement of said containers.

14. In a machine of the class described having a moving conveyor and means for supporting angularly disposed containers thereon, a take-off means for removing containers therefrom, said containers having a restricted opening and a cover for said opening, a conveyor, said take-off means including movable means for engaging successive containers and delivering them to said conveyor in a vertical position, and means for closing said covers during the movement of said containers.

15. In a machine of the class described having a rotary container filling table, a horizontally disposed rotary take-off means for removing containers from said table, said containers having restricted openings and hinged covers therefor, said take-off means including angularly disposed container engaging means for engaging and removing said containers, means for removing said containers from engagement with said engaging means, and means for folding said hinged covers to close said openings during the movement of said containers.

16. A machine of the character described comprising a conveyor, container chairs on said conveyor and arranged to provide fulcrums over which said containers may be rocked during removal, and a rotatable member having a plurality of outwardly extending arms thereon arranged to consecutively engage and rock said containers over said fulcrums to remove said containers.

17. A machine of the character described comprising a conveyor, container chairs on said conveyor and arranged to provide fulcrums over which said containers may be rocked during removal, said containers having folding spouts, and a rotatable member having a plurality of angularly disposed curved arms arranged to consecutively engage and rock said containers over said fulcrums to a vertical position, and means for folding said spouts during movement of said containers by said arms.

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