Jan. 18, 1966 C. E. ROUSE 3,229,444

CONTAINER-FILLING APPARATUS

Filed July 13, 1962 2 Sheets-Sheet 1

FIG. 1

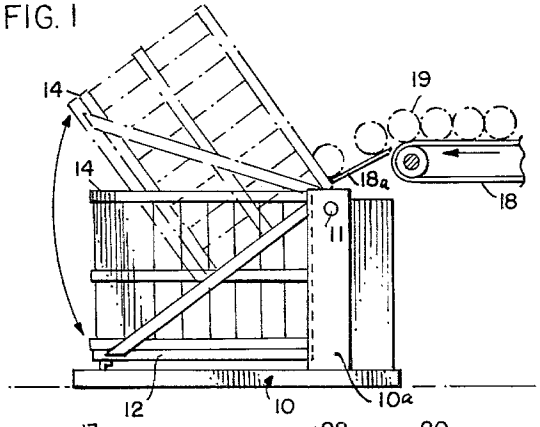

FIG. 4

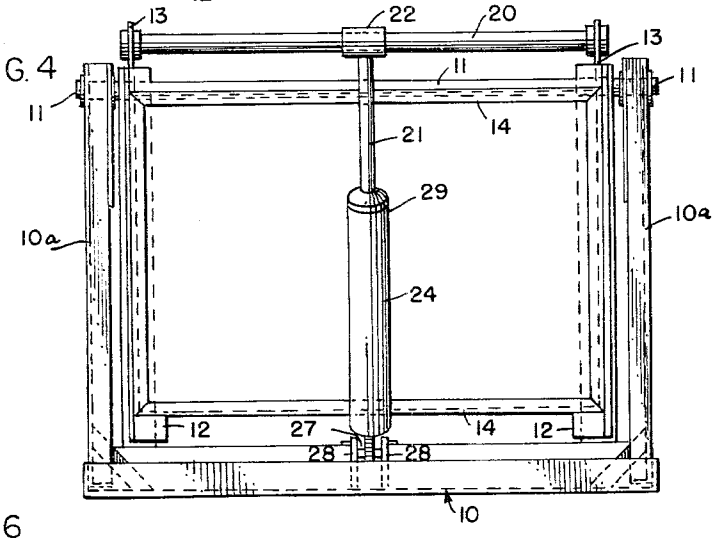

FIG. 6

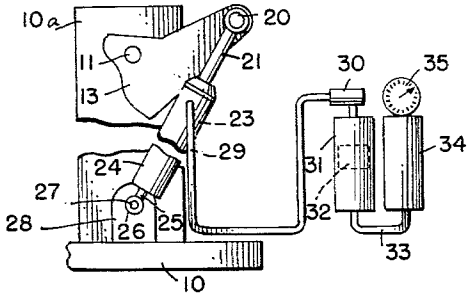

FIG. 5

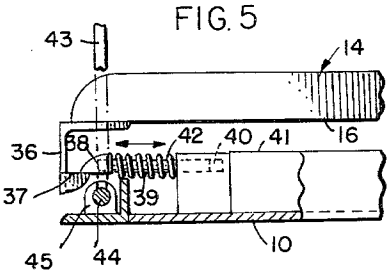

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FIG. 2

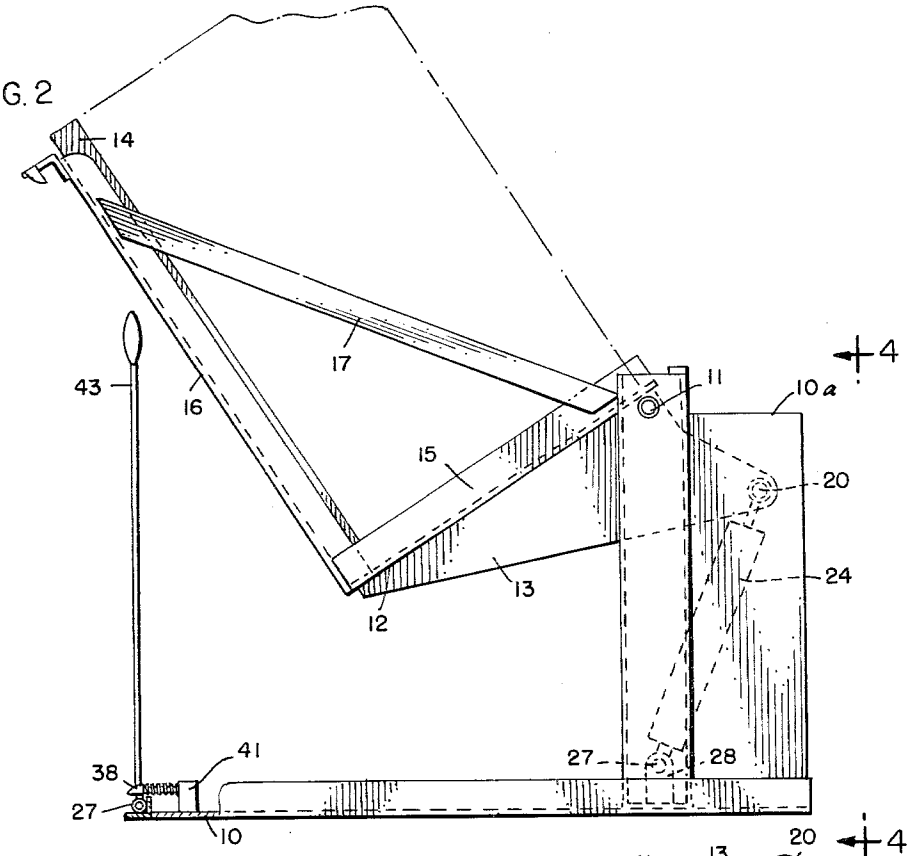
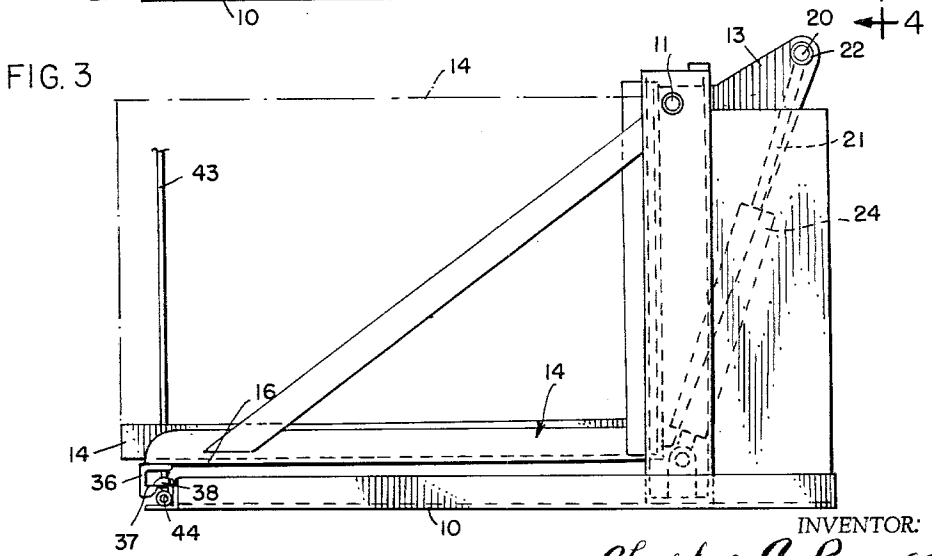


FIG. 3



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CONTAINER-FILLING APPARATUS

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2 Claims. (Cl. 53—245)

This invention relates to container-filling apparatus, and is particularly useful in the filling of containers with fruit and like products which are easily bruised in handling and shipping.

An object of the invention is to provide apparatus which will receive and move containers to positions for receiving fruit, vegetables, and other products in such a manner as to fill the container without substantial fall of the objects. A further object is to provide such apparatus which automatically tilts containers into positions for receiving globular and other objects for the filling of the containers while at the same time permitting return of the containers to their original positions for removal, etc. A further object is to provide container-filling apparatus and support means for the containers in combination with power-accumulator devices for tilting containers to bring a normally vertical side thereof into inclined and nearly horizontal position for receiving objects from a discharge station along a gradient which does not produce a fall or bruising of the objects, while at the same time allowing the containers to move downwardly during filling and to be latched in a lowered position for the removal of the containers. A still further object is to provide with such structure means accessible to a lift truck operator or the like for releasing the filling and lifting mechanism to return empty containers to tilted filling position. Other specific objects and advantages will appear as the specification proceeds.

The invention is shown in an illustrative embodiment, by the accompanying drawings, in which:

FIG. 1 is a broken side view in elevation of apparatus embodying my invention; FIG. 2, a broken part-sectional view on an enlarged scale and showing the carriage mechanism in raised and tilted position; FIG. 3, a view similar to FIG. 2 but showing the carriage in its initial or lower position; FIG. 4, a rear view in elevation, the view being taken as indicated at line 4—4 of FIG. 2; FIG. 5, an enlarged detailed part-sectional view showing the latch mechanism and release lever; and FIG. 6, broken side view in elevation showing the power means for raising the carriage and power-accumulator means charged by the lowering of the carriage under weight of the loaded container.

In the illustration given, **10** designates a base provided with a vertical standard portion **10***a*. Mounted in the spaced standards, as shown best in FIG. 4, is a pivot shaft **11**. Pivotally mounted upon shaft **11** is a carriage **12** having on each side thereof rearwardly-extending support plates **13** which are generally triangular in shape and which receive the shaft **11**. The carriage **12** is preferably open at its top and front so as to freely receive an empty container **14**. The container **14** may be any ordinary wooden or metal container having generally vertical side walls and which is open at its top to receive fruit, vegetables, and any type of products. In the illustration given, the carriage **12** has a vertical rear wall **15** and a bottom wall **16**, and diagonal braces **17** provide side supports for the container **14**.

With the carriage tiltably supported, as shown best in FIGS. 1 and 2, on the pivot shaft **11**, it is possible to raise the container **14** therein to the inclined position, approaching horizontal, illustrated in FIGS. 1 and 2, in order that fruit, vegetables, and other commodities

may be discharged from a conveyor **18** or other discharge station into the conveyor with a minimum fall. A dead plate **18***a* may be provided as a part of the discharge station for guiding the fruit or other commodity **19** into the container.

Any suitable means may be provided for tilting the carriage as above described. In the illustration given, a shaft **20** extends between the rear portions of the plates **13**, and a piston shaft **21** is provided with a sleeve **22** receiving a central portion of shaft **20**. The shaft **21** is fixed to a piston **23** within hydraulic cylinder **24**, and when the carriage is in its initial or lower position the piston **23** is in the upper area of the cylinder **24**. The cylinder **24** is rotatably secured at its bottom by a strap **25** and sleeve **26** to a shaft **27** carried by a bracket member **28** fixed to base **10**, as shown best in FIGS. 4 and 6.

The cylinder **24** is a single acting cylinder and fluid is supplied thereto near the top of the cylinder through conduit **29**. Conduit **29** is preferably a flexible hose which leads to a restrictor valve **30**. The restrictor valve in turn communicates with a cylinder **31** equipped with a piston **32**. The lower portion of the cylinder **31** communicates through conduit **33** with an accumulator tank or cylinder **34** which may be provided with a pressure indicator **35**. Any suitable power-accumulator system for actuating the power cylinder **24** may be employed. In the specific illustration given, nitrogen gas is employed in the accumulator tank **34** and the gas is compressed as the loaded container forces the carriage downwardly. The compressed gas is later utilized for forcing the piston **32** upwardly and thus causing the hydraulic fluid above the piston to pass into the cylinder **24** and move piston **23** downwardly. This causes the piston shaft **21** to draw the plates **13** downwardly and thus elevate the carriage and the container to the position illustrated in FIGS. 1 and 2. It is found that when the nitrogen has a pressure of about 280 pounds per square inch in apparatus of the character illustrated, it is found that the stored or accumulated power is sufficient to elevate the carriage to the tilted position, while at the same time permitting the carriage to be lowered to initial position under the weight of the conduits filling the container.

After the container is filled and is lowered to its initial position, latch means are provided for anchoring the carriage in its lower position and thus enabling a lift truck operator, etc., to remove the loaded container for shipping, etc. As illustrated best in FIGS. 3 and 5, the bottom wall **16** of carriage **12** is provided at its front with a depending lug **36** having an inwardly-extending shaft **37**. A spring-urged latch member **38** is adapted to engage the shaft **37** and to locate the carriage in its lower or intial position. The lug **36** and the latch **38** preferably have beveled or cammed forward surfaces to facilitate the latching operation.

The latch **38** is carried by a rod **39** slidably mounted in a recess **40** in casing **41**, and a spring **42** normally urges the latch outwardly. A release rod **43** extends upwardly along one side of the base and is accessible to the operator of a lift truck so that after the lift truck operator has removed the loaded container and replaced it with an empty container, he can manipulate the rod **43** for releasing the catch. The rod **43** is reduced in cross section at its lower end, passing through the movable latch **38**, and at its lower end the rod engages a shaft **44** rotatably mounted in brackets **45** carried by the base **10**, as shown more clearly in FIG. 5.

Operation

In the operation of the apparatus, a container **14** is placed in position upon the carriage or container holder

12, and this is usually done by a lift truck. The lift truck operator moves the release rod 43 to release the catch 38 from engagement with the shaft 37 of lug 36, and the compressed nitrogen gas in chamber 34 forces upwardly the piston 32, causing the hydraulic fluid in the upper portion of chamber 31 into conduit 29 and into the upper portion of power cylinder 24 above piston 23. Piston 23 is then depressed, drawing the rod 21 downwardly and thereby elevating the carriage 12 and the container 14 carried thereby. In this operation, the vertical side wall of the container adjacent the conveyor 18 is tilted to an inclined position, approaching horizontal (about 15° from the horizontal), and the globular objects 19 are discharged without falling and without bruising into the inclined portion of the container. Oranges, grapefruit, apples, melons, and a great variety of globular products may roll easily into the container. Even though the objects have different shapes, they may also glide or tumble into the container without any substantial fall. As the container fills, the weight is exerted against the piston 21 of the power cylinder and hydraulic fluid is forced outwardly through the conduit 29 and restrictor valve 30 into the upper portion of cylinder 31, thus forcing the sealing or floating piston 32 downwardly and compressing further the nitrogen gas in the accumulator system. As the container moves downwardly, the products already in the container form a path for the support of new articles so that again there is no substantial fall in the travel of such articles from the discharge station into the container.

Finally, after the container is full, the weight thereof brings the catch lug 36 into engagement with the latch 38 and the carriage is automatically latched against movement. A fork lift truck operator may then remove the container to a shipping point and may insert an empty container within the carriage, releasing at the same time the latch 38 so that the carriage will swing again to the tilted position illustrated best in FIGS. 1 and 2. In the latter operation, with the accumulator precharged to a specified pressure, oil is forced out of the chamber 31 into the power cylinder 24, and this pressure on the cylinder piston is sufficient to lift the pivoted frame or carriage containing the box to the tilted or filling position.

In the foregoing operation, the only labor required is in removing loaded containers and replacing them with empty containers, releasing the latch for each operation, the entire lifting and lowering of the container being automatic, and the lowering being in such a manner that the incoming objects roll upon each other evenly and without any substantial drop so that bruising does not occur.

While I have set out a specific power actuating and accumulator means in which nitrogen gas is employed as the elastic element, it will be understood that other gases or resilient metal spring means may be employed for storing power under the weight pressure of the load filling the container, and the same later utilized in automatically returning the container to its tilted and receiving position.

While in the foregoing specification I have set forth certain structures and procedural steps in considerable detail for the purpose of illustrating an embodiment of

the invention, it will be understood that such details may be varied widely by those skilled in the art without departing from the spirit of my invention.

I claim:

1. In container-filling apparatus adapted to receive objects from an elevated discharge station having a guide member over which said objects travel in discharge, a base provided with vertical standards, a container carriage pivotally supported at its upper edge upon said standards and adapted to receive an open container having generally vertical sides, power means for moving said carriage to bring a vertical side of said container into an inclined position, approaching horizontal, adjacent to and in alignment with said discharge guide whereby objects from said station may move substantially without falling into said container, said power means comprising a piston rod pivotally secured to said carriage, a piston secured to an opposite end of said rod, a single-acting cylinder receiving said piston at one end and having its other end pivotally secured to said base, means for introducing hydraulic fluid into said cylinder above said piston, and an accumulator cylinder in which a piston is mounted, said cylinder having a compressible elastic fluid on one side thereof and being connected on the other side of said piston by a conduit to said first-mentioned cylinder below said first-mentioned piston.

2. In container-filling apparatus adapted to receive objects from an elevated discharge station having a guide member over which objects travel in discharging, a base equipped with vertical standards, a container carriage pivotally supported at its upper edge upon said standards and adapted to receive an open container having generally vertical sides, power means for tilting said carriage to bring a vertical side of said container into an inclined position, approaching horizontal, adjacent to and in alignment with said discharge guide member whereby objects from said station may move substantially without falling into said container, said power means yielding under the weight of said objects filling said container to lower said container to its initial position, and power accumulator means associated with said power means adapted to actuate said power means to raise said carriage to said inclined position when the container is removed from said carriage, said power means being a single-acting hydraulic cylinder and said power accumulator means being a cylinder having a piston therein and a compressible gas on the lower side of said piston.

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