Sept. 20, 1960 J. F. CELLA 2,953,407

APPARATUS FOR DEPOSITING PAPER CONTAINERS IN CRATES

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Fig. 1.

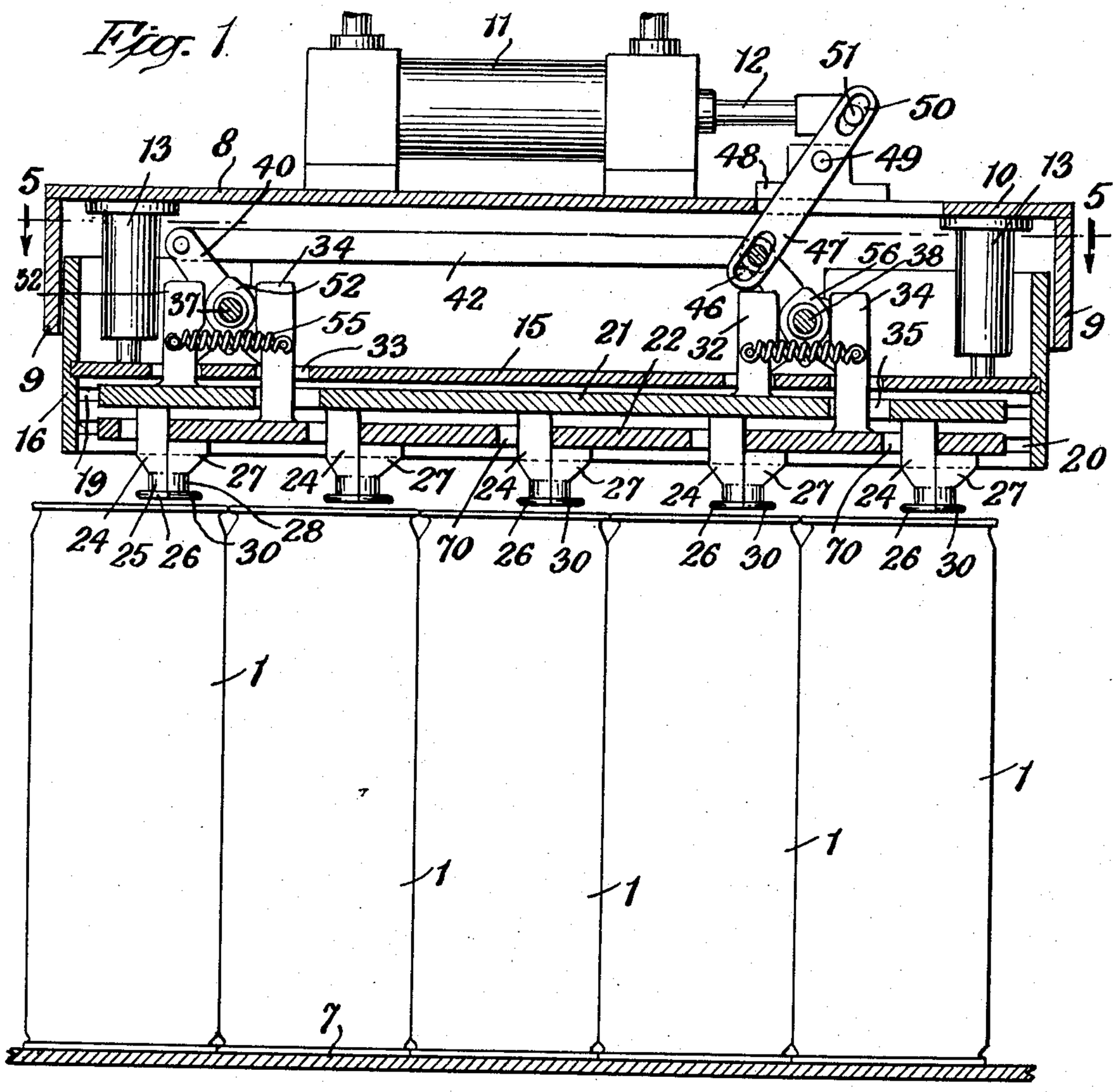

Fig. 2.

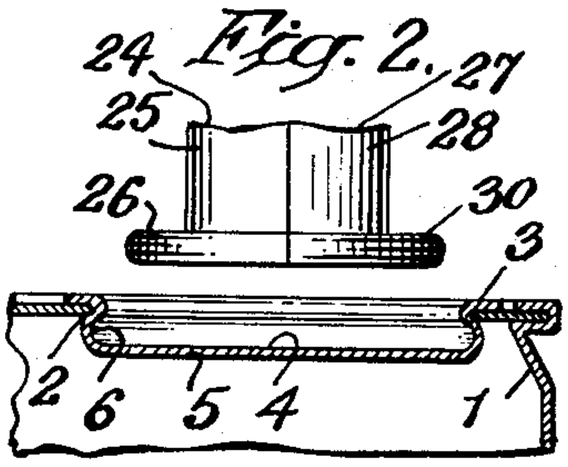

Fig. 3.

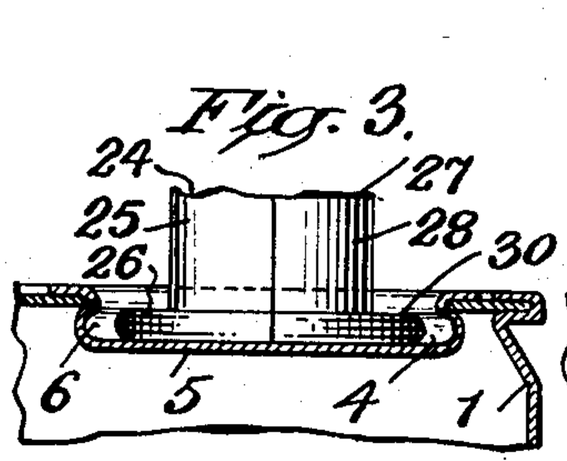

Fig. 4.

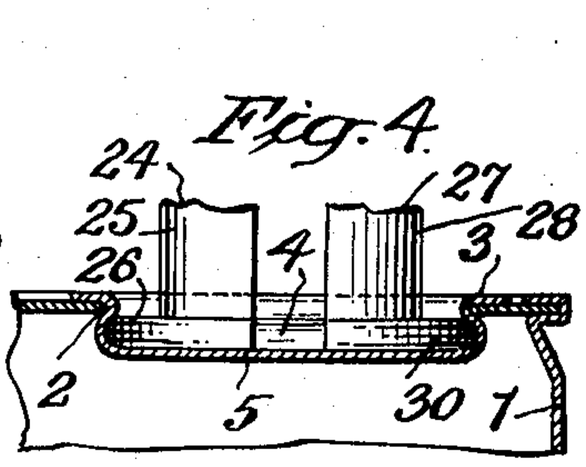

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Fig. 5.

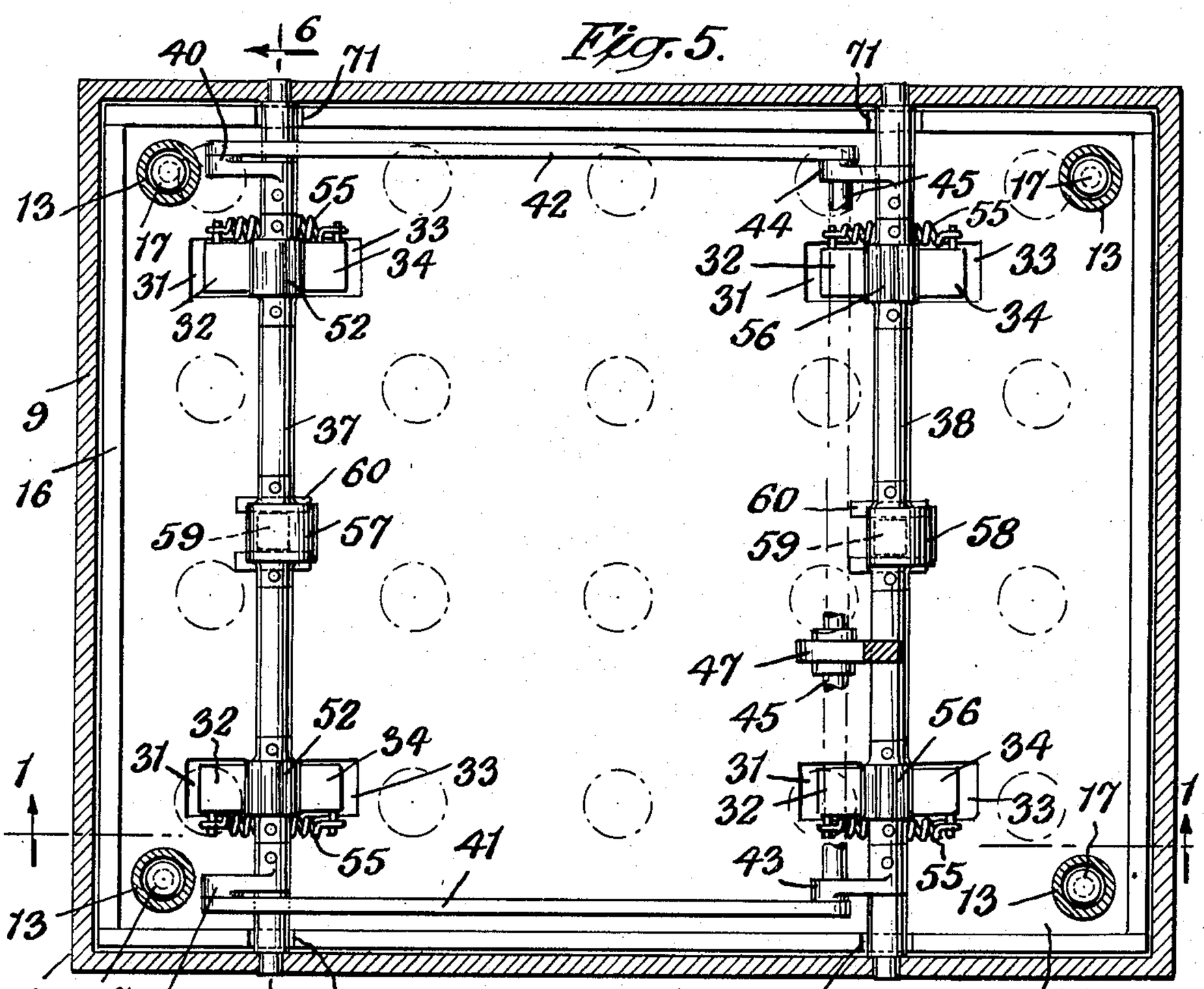

Fig. 6.

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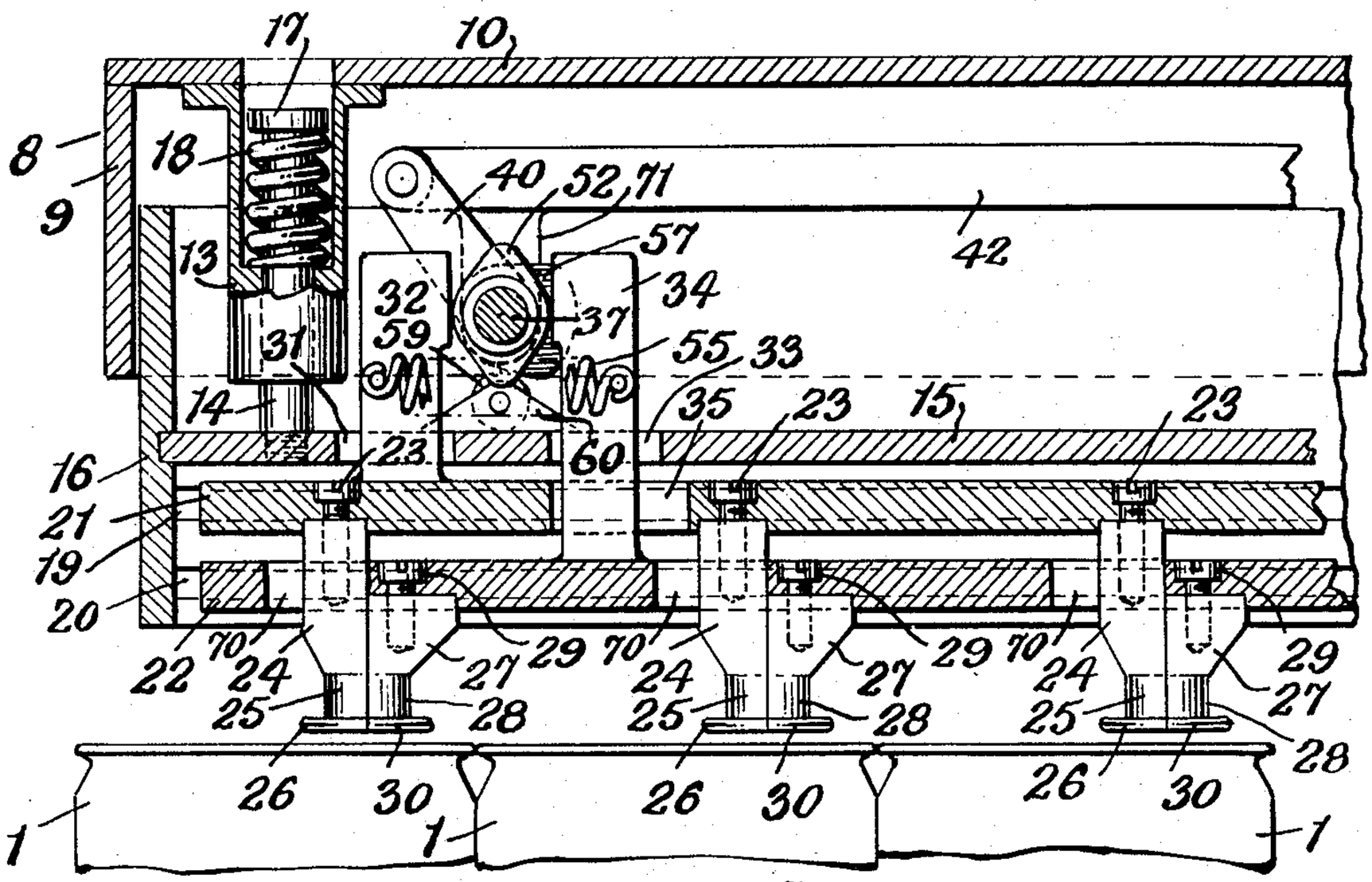

Fig. 7.

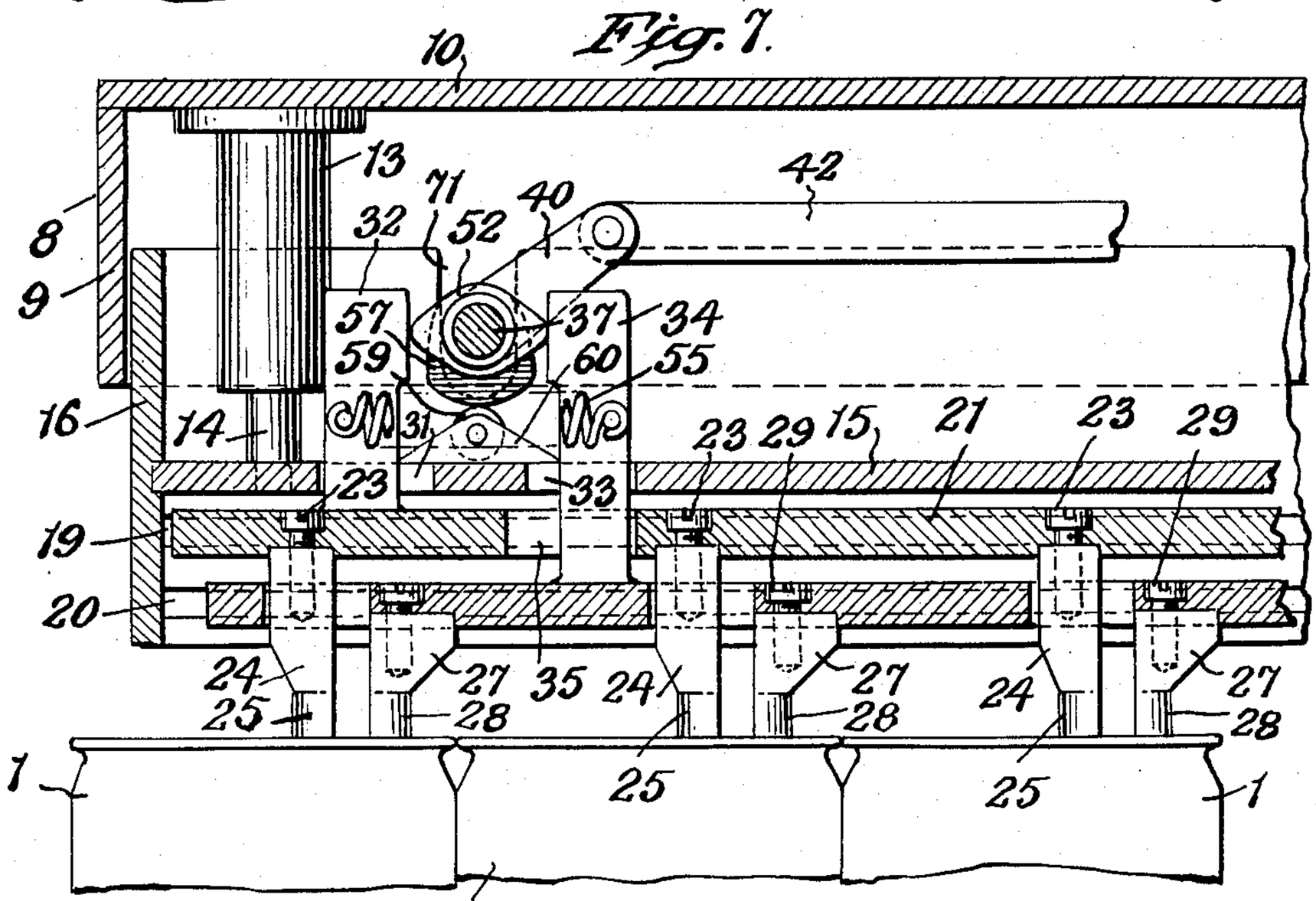

Fig. 8.

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APPARATUS FOR DEPOSITING PAPER CONTAINERS IN CRATES

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Filed Oct. 5, 1956, Ser. No. 614,108

8 Claims. (Cl. 294—94)

This invention relates to an apparatus for depositing into crates or boxes paper cartons, containers or similar receptacles, and particularly those of the type usually employed for containing milk, orange juice, and numerous other liquids. An example of the type of apparatus to which the present invention relates, will be found in my co-pending application Serial No. 602,885, filed August 8, 1956. The present invention has reference to an apparatus for handling a type of carton of a different construction from that handled by the apparatus of the above-mentioned application.

It is one of the objects of this invention to provide an apparatus by means of which a plurality of cartons will be simultaneously engaged by expansible holders or fingers carried by a carrier in the form of a plunger head, and which holders are operative to enter depressions or recesses in the closure flaps of the cartons, and so engage with the walls of such recesses as to enable the cartons to be held in a suspended position by the carrier and lowered into the crates or boxes located in position to receive them.

It is an object of the invention to provide a novel form of carton-engaging means by which each carton will be engaged by an expansible holder; will be held thereby while the plunger or carrier on which the holders are mounted is lowered; the expansible holders will be contracted and the cartons held thereby thus released for deposit into the crate or box.

It is another object of the invention to provide a carton-handling means as above described in which the carton-engaging elements will be hydraulically operated, and the operation of the apparatus will be smooth, fast and effective.

With these, and other objects to be hereinafter set forth in view, I have devised the arrangement of parts to be described and more particularly pointed out in the claims appended hereto.

In the accompanying drawings, wherein an illustrative embodiment of the invention is disclosed,

Fig. 1 is a vertical sectional view through an apparatus constructed in accordance with the invention, the view being taken substantially on the line 1—1 of Fig. 5, looking in the direction of the arrows;

Fig. 2 is a vertical sectional view of a portion of the top of one of the cartons, showing one of the holders about to descend into the recess or depression formed in the closure flap of the carton;

Fig. 3 is a similar view, but showing the holder located in the depression;

Fig. 4 is a similar view showing the holder expanded into engagement with the walls of the depression to thereby enable the carton to be supported by the holder;

Fig. 5 is a sectional view, taken substantially on the line 5—5 of Fig. 1, looking in the direction of the arrows;

Fig. 6 is a sectional view, taken substantially on the line 6—6 of Fig. 5, looking in the direction of the arrows;

Fig. 7 is a vertical sectional view through a portion of the plunger head, or carton carrier, showing the same in its raised position, and

Fig. 8 is a similar sectional view, showing the plunger head or carton carrier in a position wherein the carton holders have been lowered and expanded to enable them to engage in the depressions in the tops of the cartons.

By reference to Figs. 1 to 4 inclusive, construction of cartons of the type handled by the present apparatus will be apparent. These cartons, indicated at 1 in the drawings, are composed of cardboard or treated paper and are usually square in cross-sectional shape. Each carton 1 is provided in the top with a pouring opening 2, normally closed by a pivoted cup-shaped flap or plug 3, formed with a recess or depression 4 that produces an integral, button-like protuberance 5 pressed into and snugly fitting within and closing the pouring opening 2. The protuberance 5 is so formed around its edge as to provide an undercut channel 6 which aids in locking the button-like protuberance 5 tightly in the pouring opening and enables the carton to be securely engaged by the holders on the plunger head or carton carrier to be presently described.

In the operation of the apparatus, the cartons 1 are delivered in successive rows to position on a slidable flat supporting plate 7 that is located directly below the carton carrier or plunger generally indicated at 8. The means for delivering the cartons onto plate 7 in rows is shown in my co-pending application herein mentioned and forms no part of the present invention. It is sufficient to herein state that predetermined numbers of the cartons are successively delivered to position below the carton carrier or plunger; the plunger has its holders lowered and expanded to engage in the depressions 4 of the cartons; the supporting plate 7 is then withdrawn from position below the cartons, leaving the cartons then wholly supported or suspended from the holders on the plunger and the plunger then lowered to bring the cartons down into a crate or box positioned directly below the plunger. The cartons are then released to be deposited into the crate or box, whereupon the plunger will be raised to its initial elevated position and the plate 7 is moved back to its position below the plunger in readiness to receive the next supply of cartons for handling as above described.

The plunger or carton carrier 8 is mounted directly above the supporting plate 7 for vertical, properly-timed reciprocation, by suitable mechanism not shown but which can be that disclosed in my co-pending application Serial No. 602,885 or some other suitable means. The plunger includes a substantially rectangular frame 9 provided with a top wall 10 on which is mounted a hydraulic cylinder 11, operative to reciprocate its piston rod 11 by means of which movement the carton holders are opened or closed and lowered into carton-engaging position in a manner to be described. Extending downwardly from the under face of the top wall 10 of the plunger, are bosses 13 through which guide rods 14 are vertically slidable. These guide rods 14 are secured to and extend upwardly from a plate 15 mounted within and surrounded by an inner plunger frame 16. Each of the pins 14 is provided at the top with a head 17 beneath which is disposed a coil spring 18 that has its

lower end seated in the boss 13 and its upper end located under the head 17 to thereby tend to hold the plate 15 and the inner frame 16 and parts carried thereby in an elevated position as shown in Figs. 1, 6 and 7.

Respectively slidably supported in the grooves 19 and 20 in the side walls of the frame 16 is a pair of plates, indicated at 21 and 22. Secured by the screws 23 to the uppermost plate, or that indicated at 21, is a plurality of carton lifter means in the form of carton-holder sections, or fingers, 24, each of which is provided adjacent to its lower end with a semi-cylindrical portion 25 terminating in a half-disk or semi-circular element 26. The lowermost plate, or that indicated at 22, is also provided with similar carton-holder sections or fingers shown at 27, secured to the plate 22 by the screws 29, and having the lower cylindrical portions 28 each terminating in the half-disk 30.

The two plates 21 and 22 are slidable in their respective grooves 19 and 20, and when in one position therein, as shown in Figs. 1 and 7, the holder sections, or fingers, 24 and 27 are together or in contact and the half-disks 26 and 30 form a complete disk, as shown in Fig. 2, that can enter into the depression 4 in the top of a carton in the manner shown in Fig. 3. The second position of the plates 21 and 22 is that shown in Fig. 8, wherein the holder sections, or fingers, 24 and 27 are separated, and in this position the separated half-disks 26 and 30 extend into the undercut channel 6 of the depression 4, thus firmly engaging with the side wall of the depression and enabling the cartons so engaged to be suspended from holders or fingers on the plunger.

Provided in the plate 15 are slots 31 and secured to and extending upwardly from the upper slidable plate 21 are posts 32 which pass through said slots. Slots 33 are provided in the plate 15, and post 34, secured to and rising from the plate 22, extend upwardly through the slots 33, said posts 34 also passing through the slots 35 formed in the lower plate 22. This arrangement is such that cam means to be presently described, and which is operative against the posts 32 and 34, will be effective to move the plates 21 and 22 in opposite directions and thus move the carton-holder sections or fingers 24 and 27 to separated positions. It will also be noted that the plate 22 is slotted, as indicated at 70, to permit of the downward passage of the holder sections or fingers 24.

Mounted for rocking movement in the side walls of the frame 9 are cam shafts 37 and 38. The inner frame 16 has its side walls slotted as indicated at 71 to clear these cam shafts. Shaft 37 is provided with radially-extending arms 39 and 40. A link 41 is pivotally attached at one end to the arm 39 and a similar link 42 has one end pivotally connected to the end of the arm 40. The cam shaft 38 is provided with the radial arms indicated at 43 and 44, and the second end of the link 42 is pivotally attached to arm 44, while the second end of the link 41 is pivotally connected to arm 43. Arms 43 and 44 are connected by a shaft 45 which extends through a slot 46 provided at one end of a lever 47 (Fig. 1). Said lever 47 is pivoted between its ends at 49 in the bearing 48 mounted on top of the top wall 10 of the plunger, or carrier 8. The upper end of the lever 47 is provided with a slot 50 which receives a pin 51 carried by the end of the piston rod 12. Provided on the cam shaft 37 are cams 52 which are located between the posts 32 and 34 and upon oscillating movement of the cam shaft 37 these cams will move the posts apart to the distended positions of the carton-holder sections, or fingers, 24 and 27, as shown in Fig. 7. This distending movement of the carton holder sections, or fingers, occurs only when the holder sections or fingers are lowered into position within the depressions 4 of the cartons. Fig. 3 shows one of the holders located in one of the depressions in the carton and in readiness to be distended and Fig. 4 shows the parts of the holder distended and in carton-engaging position. Springs 55 extending between the posts 32 and 34 tend to not only hold the posts into constant contact with the cams 52, but also act to draw the posts toward one another to bring the carton-holder sections 25 and 28 into abutting relationship at the proper times as permitted by the cams. Cams 56 are provided on the shaft 38 and the same are similar to those shown at 52 and operate in the manner just described in respect to the latter cams.

The inner frame 16 is mounted for a relatively slight raising and lowering movement with respect to the outer frame 9 and the lowering movement is accomplished by means of cams 57 and 58 mounted respectively on the cam shafts 37 and 38, and which cams are operative against rollers 59 rotatively mounted in brackets 60 secured on the upper face of the plate 15. The elevating movement of the inner frame 16 and the elements carried thereby is attained by the springs 18.

From the foregoing, the operation of the improved carton-depositing apparatus will be readily understood. The filled cartons 1 to be deposited in a crate or box positioned directly below the plunger 8 and below the supporting plate 7, are delivered to position on top of the supporting plate 7, with each carton having its depression 4 located beneath a pair of the carton-holder sections, or fingers, 24 and 27. At this time, the holder sections 24 and 27 are in closed, or abutting position, as shown in Figs. 1 and 7 and the inner frame 16 is in elevated position with respect to the outer frame 9. By movement of the hydraulically-operated piston in the cylinder 11, the piston rod 12 is moved in a manner to oscillate the cam shafts 37 and 38 and cause the frame 16 to be moved downwardly by action of the cams 57 and 58 against rollers 59 to bring the carton holders down into the depressions 4 as shown in Fig. 3. Thereupon, further rotative movement of the cam shafts 37 and 38 causes the cams 52 and 56, carried respectively by said cam shafts, to slidably shift the plates 21 and 22 in opposite directions, or to the position shown in Fig. 8. This causes the carton-holder sections or fingers 24 and 27 to be spread apart or separated as shown in Fig. 8, and since the half-disks 26 and 30 on the carton-holder sections or fingers are then located in the depressions 4 of the cartons, these half-disks will enter the undercut channels 6 and engage therewith, thus firmly gripping the cartons. The cartons are now thus firmly held by the holders 24 and 27 and the plate 7 is slidably moved to withdraw it from below the cartons, leaving the cartons suspended from the holders of the carrier or plunger. The carrier or plunger is thereupon bodily lowered and it moves downwardly to deposit its load of cartons into a crate or box positioned below it. When the cartons thus carried downwardly, reach the bottom of the crate or box, or a position closely adjacent thereto, cams 52 and 58 permit the springs 55 to bring the carton holder sections or fingers together by sliding movement of the plates 21 and 22, thus disengaging the holders from the depressions in the cartons, and permitting the cartons to come to rest on the bottom of the crate or box. The cams 57 and 58 now permit the raising movement of the inner frame 16 under the force of the springs 18, thus withdrawing the holder sections 24 and 27 out of the depressions 4. The plunger is then elevated to a raised position as shown in Fig. 1 to permit the next supply of cartons to be positioned below it and engaged and conveyed in the manner just described.

By means of the apparatus described, the filled cartons are speedily transported into crates and properly positioned therein.

While I have herein described a single embodiment of the invention, it is obvious that the same is not to be restricted thereto, but is broad enough to cover all structures coming within the scope of the annexed claims.

What I claim is:

1. An apparatus for depositing cartons in crates comprising, a carrier having a holder in the form of two separable semi-circular sections which when placed together provide a circular disk at one end, means for inserting

said disk into a depression in the closed top of a paper carton; means for separating the two sections of the holder to cause the disk to be expanded within the depression and engage against the walls thereof, said means being operative to again bring the two sections of the holder together to release the disk from the recess after the carrier had been moved to a position to deposit the carton engaged by the holder into a crate or other container.

2. An apparatus for depositing paper cartons into crates comprising, a slidable support for a plurality of closed and filled cartons, each of said cartons being provided with a depression in its top, a carrier mounted above the support and being vertically-reciprocable, said carrier having an outer frame, an inner frame disposed within the outer frame and have a predetermined limited axial movement relatively to the outer frame, a pair of horizontally-disposed sliding plates mounted in the inner frame, each of said plates carrying sections of a carton holder, which sections on the two plates are adapted to co-operate to form means for engaging in the depressions in the cartons without entering into the cartons, cam means for slidably moving the plates in a direction transverse to movements of the plunger to thereby bring the carton-holder sections toward or away from one another, and means for moving the inner frame toward the cartons on the support while the carton-holder sections are together and for moving the inner frame in a direction away from the support after the carton-holder sections have been spread apart and thereafter brought together again.

3. In an apparatus for depositing filled and closed paper cartons into containers, and which cartons each have a depression in their top formed by a closure element, a movable plunger including an outer frame, an inner frame within the outer frame and movable up or down with respect to the outer frame, said inner frame having opposite grooved walls, a pair of spaced sliding plates mounted for sliding movement in opposite directions in the grooves in said walls, one of said plates being mounted above the other, each plate having a plurality of carton-holder elements in the form of semi-circular disks, with the carton-holder elements on one of the plates being adapted to be brought toward or move away from those on the other plate by sliding movement of the plates, the lowermost plate having openings through which the carton-holder elements on the upper plate protrude so that the carton-holder elements on both plates terminate on the same level, the ends of the carton-holder elements terminating in semi-circular heads which enter the depressions in the cartons in the closed tops of the same and engage against the walls of the same when the carton-holder elements are separated, means operative above the plates to slide the plates apart and thus separate the carton-holder elements to bring them to carton-gripping position.

4. In an apparatus for depositing filled and closed paper cartons into containers and which cartons are each provided at the top with a recess, a plunger provided with a pair of slidably-mounted plates positioned one above the other, the lower plate having downwardly-projecting fingers, each of which is provided at its lower end with a semi-circular head, the upper plate having similar fingers, the lower plate having openings through which the fingers on the upper plate extend, means normally tending to move the plates on parallel lines in a manner to bring the fingers on one of the plates adjacent to those on the other plate to thereby cause the semi-circular heads to co-operate in forming disks, cam means for moving the plates to separate the fingers on one plate from those on the other plate, means on the plunger for supporting the plates, said means being axially movable relatively to the plunger, and cam means for moving the plate-support relatively to the plunger.

5. In an apparatus for depositing closed and filled

paper cartons into containers, which cartons are each provided with a shallow depression at the top, a lifter for each carton consisting of a pair of fingers, each of which is provided at its lower end with a semi-circular flat disk so that when two of the fingers are brought together they co-operate in the formation of a circular disk of less size than the depression to permit said disk to be entered into the depression and means for separating the fingers while their ends are in the depression to thereby move the semi-circular disks apart to cause the peripheries of said disks to engage against the side walls of the depression and support the carton through such engagement.

6. In an apparatus for depositing filled and closed cartons into containers and which cartons are each provided with a walled depression in the top, a movable plunger including an outer frame, an inner frame located within the outer frame and movable telescopically within the outer frame, spring means for supporting the inner frame relatively to the outer frame, a plate fixedly mounted within the inner frame, cam shafts rotatively carried by the outer frame, rollers carried by the plate, cams on the cam shafts for engaging said rollers to cause lowering movement of the inner frame relatively to the outer frame, a pair of vertically-spaced, horizontally-disposed sliding plates located in the inner frame below the fixed plate therein, said sliding plates carrying co-operating grippers for engaging in the depressions in the cartons and gripping the walls of the same, the fixed plate having apertures, upstanding posts on the sliding plates extending above the top of the fixed plate, cam means on the cam shafts operative against said posts for slidably moving the slidable plates in opposite directions, and springs for moving the plates to a position in which the grippers will not engage the cartons.

7. In an apparatus for depositing filled and closed paper cartons into containers, and which cartons are each provided with a depression in the top, a plunger carrying a pair of slidable plates located one above the other, the lower plate being slotted, the upper plate having a plurality of rigid gripper fingers extending downwardly through the slots in the lower plate and projecting below the lower plate, the lower plate having a plurality of similar rigid fingers extending downwardly and adapted to be brought to meet the fingers on the upper plate when the plates are slidably moved, each of the fingers being provided with a semi-circular lower end for engagement with the wall of the depression when the fingers are in separated relation, means for normally bringing the fingers on one of the plates adjacent to the fingers on the other plates, and cam means by which the plates are moved in a manner to bring the fingers apart.

8. In an apparatus for depositing filled paper cartons into containers, each of which cartons is provided with a circular pouring opening in the top and a cup-shaped plug having a bottom wall and an encircling side wall and receivable and expandible in such opening to close the same and providing a shallow depression in the top of the container; a carton carrier supported for carton transfer movement toward a container; lifter means for each carton to be transferred; each lifter means mounted on and extending downwardly from the carrier and vertically shiftable toward and away from a carton disposed therebelow; carton-engaging elements, each having a generally semi-circular periphery and a flat plate-like bottom surface mounted at the lower extremity of each lifter means for laterally shiftable movement between a closed position in which the elements cooperably form a circle of lesser peripheral diameter than the inside diameter of the cup-shaped plug whereby elements may be entered within the cup-shaped plug and the flat lower surface of the elements may juxtapose the inside bottom wall of the plug during vertical movement of the lifter means toward the cartons to ensure that the plug is properly received in said opening, and an open position in which said elements are laterally shifted apart within

the plug with the periphery of the elements urged outwardly against the interior of the encircling side wall of the plug below said opening in the carton top to grippingly engage the carton for transfer movement by the carrier.

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