Dec. 10, 1929. J. M. McCLATCHIE 1,738,783

MECHANISM FOR PLACING CAPS ON CANS

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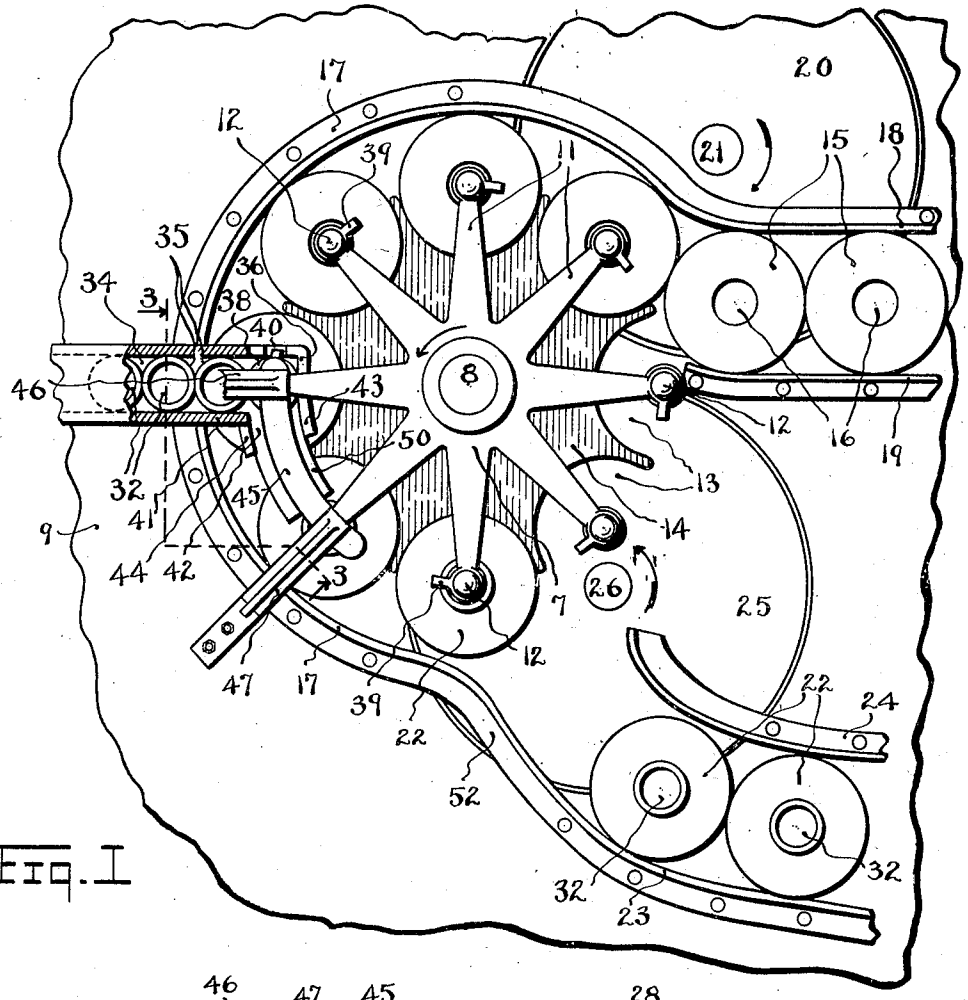


Fig. 1

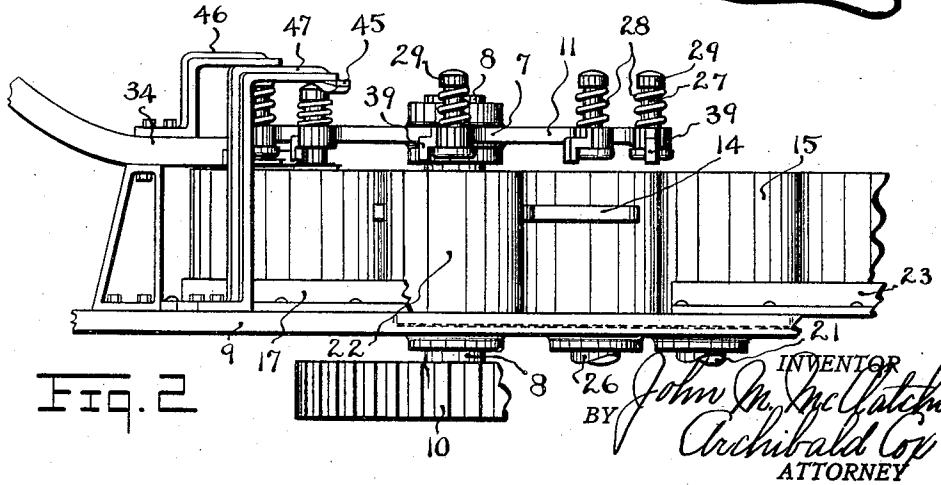


Fig. 2

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Fig. 3

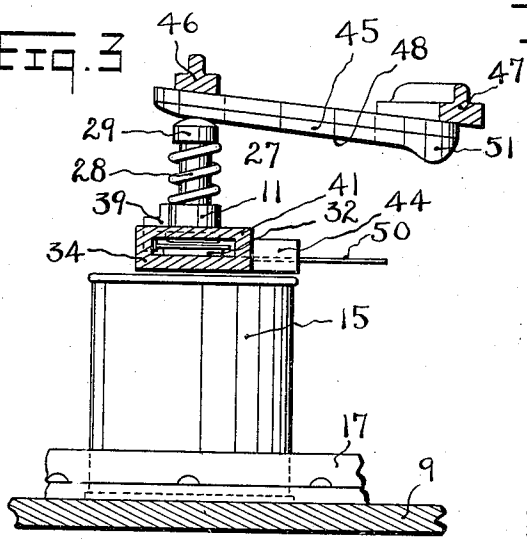


Fig. 4

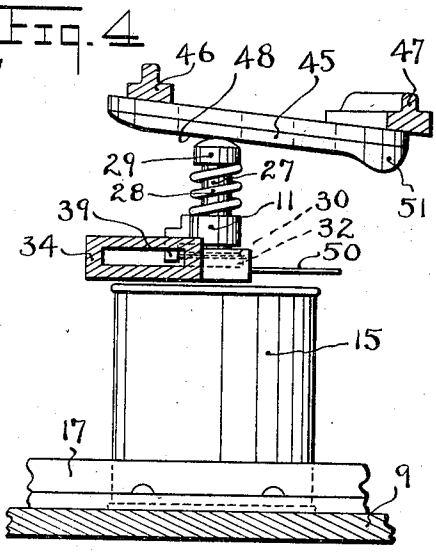


Fig. 5

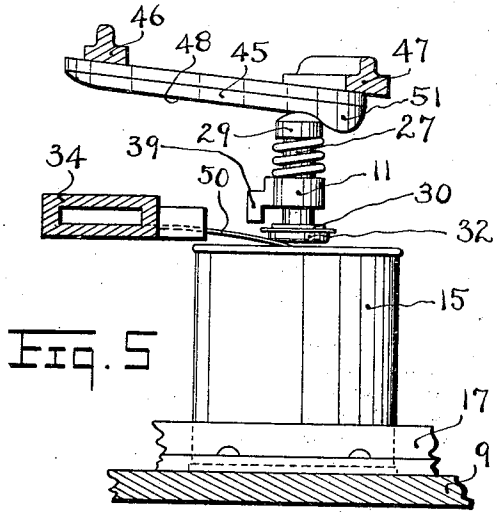
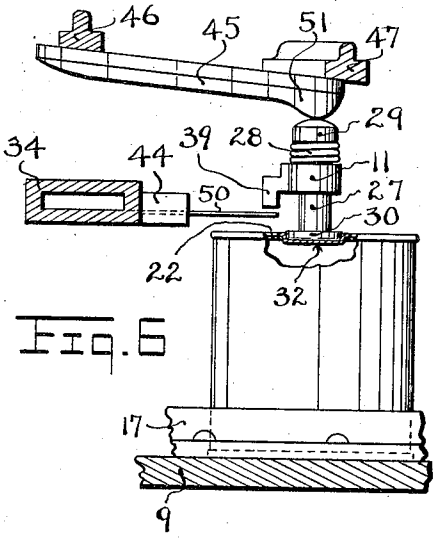


Fig. 6



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UNITED STATES PATENT OFFICE

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MECHANISM FOR PLACING CAPS ON CANS

Application filed May 11, 1927. Serial No. 190,465.

The invention relates to an improvement in mechanism for placing caps on cans, and more particularly to an improvement in mechanism for placing the cap in the relatively small central hole in the head of cans used for containing condensed milk or the like.

One object of the present invention is to produce a mechanism for placing caps on cans which will operate more accurately and at greater speed than the machines heretofore used for this purpose. Another object of the invention is to simplify the construction and mode of operation of the mechanism so that it will operate more efficiently and may be produced at less cost than the cap placing machines of this type heretofore used. To the accomplishment of these ends the invention consists in the improved mechanism for placing caps on cans hereinafter described and particularly pointed out in the appended claims.

In the accompanying drawings illustrating the preferred form of the invention, Fig. 1 is a top plan, partly in section, of the improved cap placing mechanism; Fig. 2 is a partial side elevation of the parts shown in Fig. 1; and Figs. 3, 4, 5 and 6 are sectional details taken on the line 3—3 of Fig. 1 and showing progressively in four stages the operation of placing a cap on a can.

The improved cap placing mechanism as illustrated in the drawings comprises a star-wheel 7 mounted on the vertically arranged shaft 8 journaled in the table 9. The lower end of the shaft 8 carries a gear 10 which may be driven from any convenient source of power to rotate the star-wheel 7 in a counter-clockwise direction, as indicated by the arrow on the star-wheel in Fig. 1. The outer end of each arm 11 of the star-wheel 7 carries a vertically reciprocable cap placing plunger 12 which is located exactly over the center of one of the arc-shaped recesses 13 formed in the periphery of a plate 14 mounted on the shaft 8 beneath the star-wheel. Both the star-wheel 7 and the plate 14 are secured to the shaft 8 to rotate in fixed relation. The arc-shaped recesses have substantially the same radius as the cans 15 to be provided with the covers. The plate 14 acts to advance the cans through the mechanism for the cap placing operation and holds the cans centrally under the cap plungers 12 so as to keep the holes 16 in the top covers of the cans in alinement with the plungers 12 so that the caps may be accurately placed in the holes 16.

The cans 15 are held in the recesses 13 in the plate 14 for the cap placing operation by means of a circular rail 17 concentric with the shaft 8 and secured to the table 9. The cans to be supplied with caps are fed into position to be engaged by the arms of the plate 14 through an inlet consisting of an extension 18 of the rail 17 and a rail piece 19 secured to the table 9. To assist in feeding the cans into the recesses 13 of the plate 14, a disk 20 is provided, rotating in a horizontal plane in the direction indicated by the arrow thereon. A disk 20 is mounted on the vertical shaft 21 journaled in the table 9 and driven from any convenient means which will impart to it a greater speed of rotation than the rotation of the plate 14. The top surface of the disk 20 is substantially flush with the top surface of the table 9.

The capped cans 22 are discharged from the cap placing mechanism through an outlet consisting of the extension 23 of the rail 17 and the rail piece 24 secured to the table 9. The cans are carried away from the plate 14 by means of a disk 25 mounted on the shaft 26 and constantly rotating in the direction indicated by the arrow thereon. The top surface of the disk 25 is substantially flush with the top surface of the table 9. The disk 25 is driven at a higher rate of speed than the plate 14 so as to carry away each capped can from the plate 14 before the next can can strike it. A jam of cans at the discharging point is thereby avoided.

Each plunger 12 for forcing the caps into the holes 16 of the cans 15 comprises a stem part 27 slidingly mounted in a vertical hole in the end of each arm 11 of the star-wheel 7. A coil expansion spring 28 interposed between the top surface of the end of each arm 11 and the head 29 of the plunger 12 normally maintains the plunger in raised inoperative posi-

tion. The lower end of each plunger is provided with a disk-like foot 30 which is slightly smaller in diameter than the opening in each dish-shaped cap 32 and is adapted to enter therein to force the cap into the hole 16 of a can placed thereunder, as shown in Figs. 2 to 6, inclusive.

The means for supplying the caps to the cans, for placing each cap over the central hole 16 in the cover of its respective can and for forcing the cap into the hole comprise the following elements:—The caps 32 are fed one at a time down a chute 34 of which only the curved lower end is indicated in the drawings. The chute 34 is rectangular in cross-section and is slightly deeper and wider than the caps so that the caps may slide freely therein and yet be prevented from overlapping. By reference to Fig. 1 it will be seen that the caps 32 are fed forward with their upper flange-like edges 35 in abutment with each other. The lower forward end of the chute 34 is provided with a transverse wall 36 which acts as a stop. The wall 36 is so positioned with respect to the path of travel of the plungers 12 and the means for carrying the cans through the capping mechanism that the lowermost cap 38 in the chute held by the end wall 36 thereof is in position to be engaged by each plunger 12 as the rotation of the star-wheel 7 moves it into position over the middle of the lower end of the chute.

When a plunger 12 reaches the lowermost cap 38 held by the wall 36 of the chute, the cap is carried forward with the plunger by means of a finger 39 extending downwardly from the rear side of the outer end of each arm 11 of the star-wheel. The forward face of each finger 39 is spaced apart from the axis of the plunger 12 with which it is associated a distance substantially equal to the radius of the circular flange part 35 of each cap 32. The rear wall of the lower end of the chute 34 is provided with a slot 40 to permit the finger 39 to pass therethrough. The forward wall 41 of the chute is provided with a discharge opening 42 formed by the forward arcuate extension 43 of the end wall 36 and the arcuate wall 44.

As the cap is carried out of the discharge end of the chute 34 by means of the finger 39 the plunger 12 is depressed to force the lower end 30 thereof into the cap. This is done by means of an obliquely arranged cam rail 45 one end of which is supported from the chute 34 by the bracket 46 and the other end which is supported on the table 9 by the bracket 47. The rail 45 is arcuate in plan on substantially the same radius as the path of travel of the plungers 12. The rear end of the arcuate cam rail 45 is positioned over substantially the middle part of the lower end of the chute 34 and extends forwardly and parallelly with the path of travel of the plungers 12. The lower surface 48 of the rail constitutes a cam track which slants downwardly from the rear end of the rail to the forward end thereof. As a plunger 12 passes under the rail 45 it is pushed downwardly by the cam track 48. As the cap is carried through the discharge opening 42 of the chute by the finger 39 it is supported in position to permit the foot 30 of the plunger to enter the central hole in its upper side by means of a flexible platform 50. The platform 50 assures that the foot 30 of the plunger 12 will properly enter the cap as shown in the dotted lines in Fig. 4 and in full lines in Fig. 5 and the flexibility of the forward end of the platform permits it to be depressed with the cap and plunger as the latter travels under the forward end of the rail 45. As the plunger and cap travel along the flexible platform 50 the latter is depressed in conformity with the cam track 48 of the rail 45, so that the cap and the lower end of the plunger constantly approach nearer the top end of the cam beneath them. In the meantime, the finger 39 is traveling in a horizontal plane. Consequently as the cap and plunger approach the discharge end of the platform the cap is depressed below the bottom end of the finger 39 and thereafter the plunger alone carries the cap forward to insert it into the hole in the cam beneath it. The forward end of the cam track 48 is provided with a knob 51 positioned in a vertical plane beyond the forward end of the platform 50 so that immediately after the cap 32 is carried by the plunger beyond the forward end of the platform 50, the cap will by a sudden downward movement of the plunger be inserted into the hole in the can, as shown in Fig. 6. When the plunger passes beyond the knob 51 of the rail 45 the spring 28 acts to restore the plunger to raised normal position.

The further rotation of the star-wheel 7 and plate 14 bring the capped can 22 to the point 52 of the rail 17 at which point the rail 17 is deflected to form with the rail 24 a discharge chute for the capped cans. At the point 52 the capped can is delivered by the plate 14 onto the rotating disk 25 which carries it into the discharge chute, thereby moving forward the cans already in the chute.

Having thus described the invention what I claim as new is:—

1. A cap placing mechanism comprising, a rotatable member for advancing a series of cams in upright position through the mechanism, the upper end of each can being provided with a cap receiving hole, means traveling in fixed relation with the can advancing means for supporting above the hole in each can a vertically reciprocable plunger, means for supporting a dish-shaped cap under the path of travel of the plungers, means associated with each plunger for engaging the cap and advancing it with the plunger, means

for forcing the plunger downwardly to cause the lower end thereof to enter the cap, and flexible means for holding the cap against the plunger to permit the cap to be carried along by the plunger, said plunger depressing means acting to cause the plunger to insert the cap in the can thereunder after passing the flexible means.

2. A cap placing mechanism comprising, a rotatable star-wheel, a vertically reciprocable plunger carried by the outer end of each arm of the star-wheel, means movable in unison with the star-wheel for holding under each plunger a can in upright position and having a hole in its upper end in alinement with the plunger, means for holding a dish-shaped cap under the path of travel of the plungers, a finger connected with the outer end of each arm of the star-wheel for engaging and advancing the cap, means for depressing the plunger to cause the lower end thereof to enter the cap to force the cap into the hole in the can thereunder.

3. A cap placing mechanism comprising, a rotatable star-wheel, a vertically reciprocable plunger carried by the outer end of each arm of the star-wheel, means movable in unison with the star-wheel to hold under each plunger a can in upright position with a hole in its top end in alinement with the plunger, means for holding a dish-shaped cap in alinement with the path of travel of the plungers, a finger connected with the outer end of each arm of the star-wheel for engaging and advancing the cap, means for depressing the plunger to cause the lower end thereof to enter the cap, and flexible means for supporting the cap as it is depressed with the plunger, said plunger actuating means acting to cause the plunger to force the cap into the hole in the can thereunder when the cap leaves the flexible supporting means.

4. A cap placing mechanism comprising, a vertical shaft, a star-wheel mounted on the shaft, a vertically reciprocable plunger carried by the outer end of each arm of the star-wheel, a plate mounted on the shaft under the star-wheel and having arcuate depressions in its periphery, each depression being adapted to hold a can in upright position with a hole in the upper end thereof in alinement with a plunger, means for actuating the shaft to rotate the star-wheel and plate in unison, a chute for conveying caps to the mechanism, the lower end of the chute being located over the path of travel of the tops of the cans and under the path of travel of the lower ends of the plungers to hold the lowermost cap in the chute in alinement with the path of travel of the plunger, a finger carried by the outer end of each arm of the star-wheel for engaging and advancing the lowermost cap in the chute, an arcuate cam under which the plungers travel for depressing each plunger and causing the lower end thereof to enter the cap being advanced by the finger, and flexible means for holding the cap against the plunger, the forward end of said cam acting to cause the plunger to insert the cap in the hole of the can thereunder when the cap leaves the forward end of the flexible supporting means.

5. A cap placing mechanism comprising, means for advancing a can having a hole in one end, a plunger located opposite the hole in the can and arranged to travel in unison with the can, means for holding a cap in position to be engaged by the inner end of the plunger, and means for actuating the plunger to cause the inner end thereof to enter the cap to carry the cap along with the plunger, said last named means causing the plunger to insert the cap in the hole in the can.

6. A cap placing mechanism comprising, rotatable means for advancing a series of cans in upright position, said cans being provided with a central hole in their upper ends, means moving in unison with the can advancing means for supporting a vertically reciprocable plunger over the hole in each can, means for holding a cap under the path of travel of the plungers, means associated with each plunger for advancing the cap with the plunger, a flexible platform for supporting the cap, an inclined surface for forcing the plunger into the cap, the continued downward movement of the plunger acting to advance the cap, and means associated with the inclined surface for depressing the plunger sufficiently to insert the cap in the hole in the can.

7. A cap placing mechanism comprising, means for advancing a can having a hole in its top cover, a vertically reciprocable plunger mounted in alinement with the hole in the can and arranged to travel in unison with the can, means for supporting a cap, and means for actuating the plunger to insert the lower end of the plunger into the cap so that the plunger will carry the cap forward with it and then force the cap into the hole in the cover of the can.

8. A cap placing mechanism comprising, means for advancing a can having a hole in one end, a reciprocable plunger located opposite the hole in the can and arranged to travel in unison with the can, a cam surface in the path of travel of the plunger for forcing the plunger toward the hole in the can, means for supporting a cap, and means associated with the plunger for advancing the cap with the plunger until the plunger moves into the cap to carry the cap along with it, said cam surface then causing the plunger to insert the cap into the hole in the can.

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