Dec. 10, 1929. A. P. STIANSEN 1,738,803

BOTTLE SEALING MACHINE

Filed Feb. 14, 1925 3 Sheets-Sheet 1

Fig. 1.

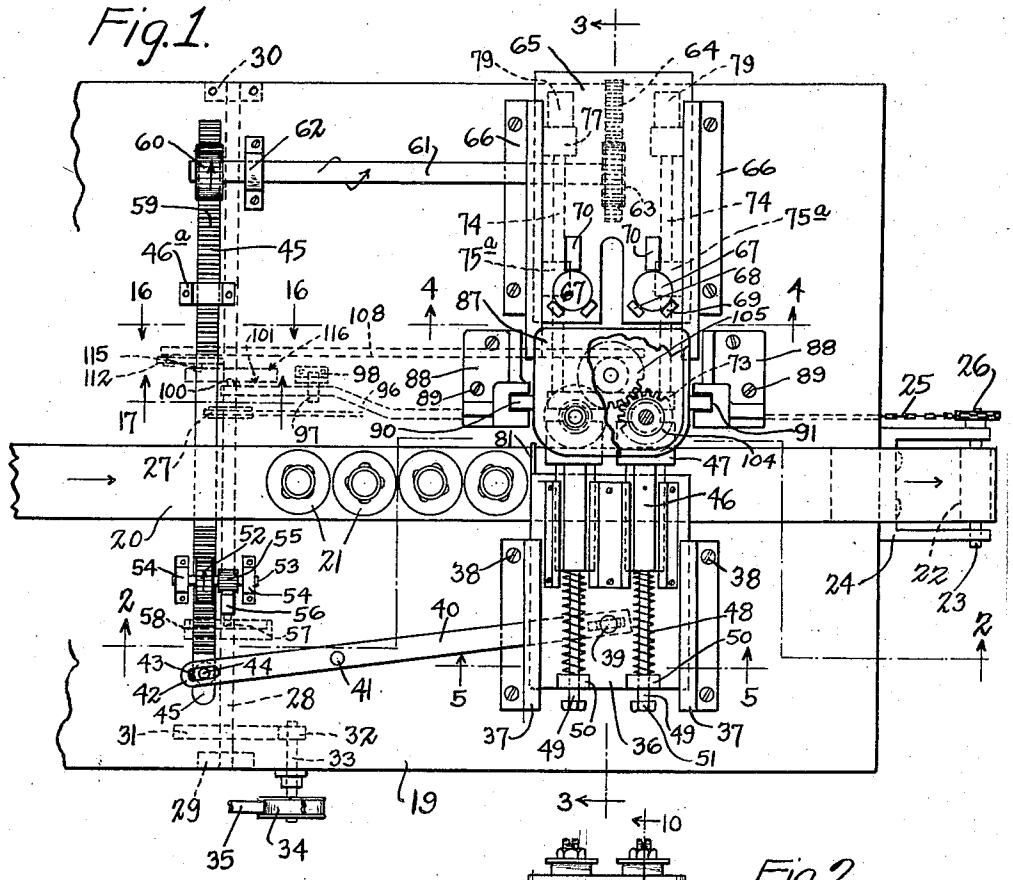
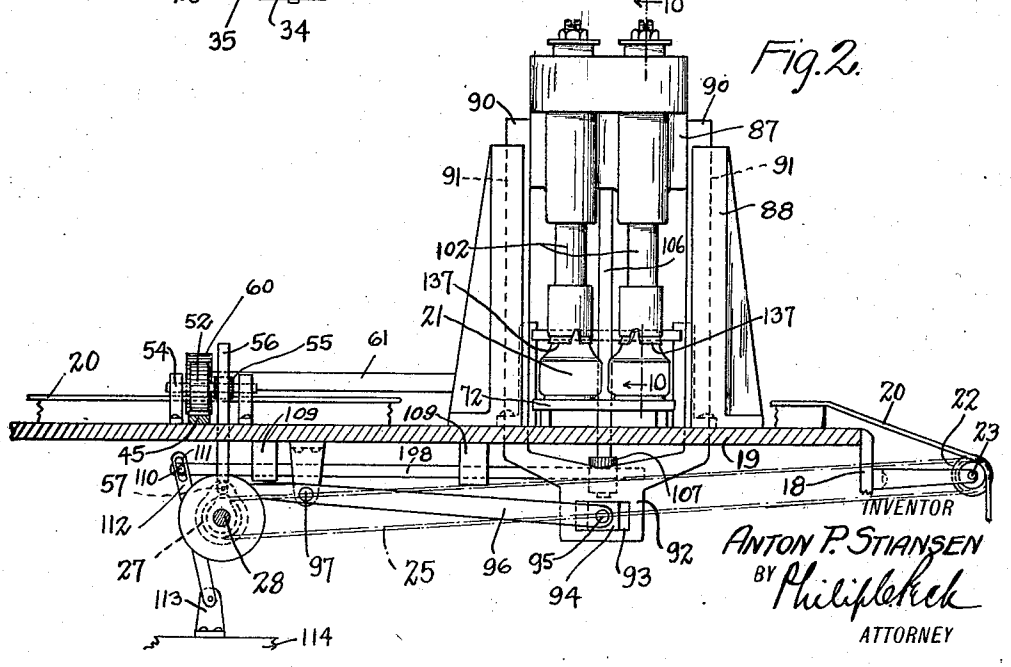


Fig. 2.



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BOTTLE SEALING MACHINE

Filed Feb. 14, 1925 3 Sheets-Sheet 2

Fig. 16.

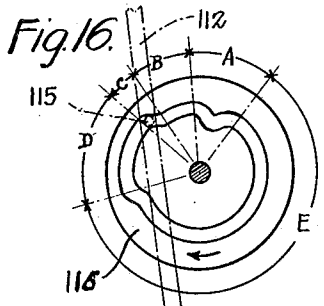



Fig. 3.




Fig. 17.




Fig. 4.

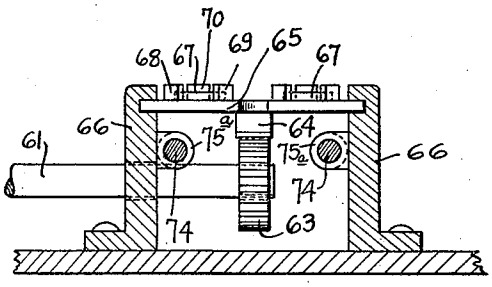



Fig. 5.

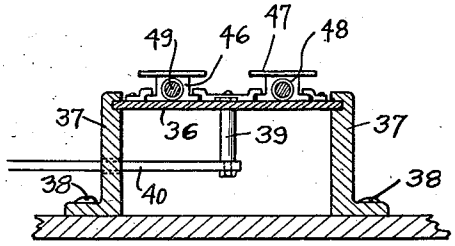



Fig. 6.

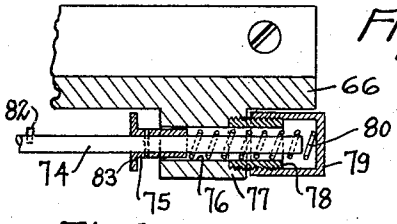



Fig. 7.

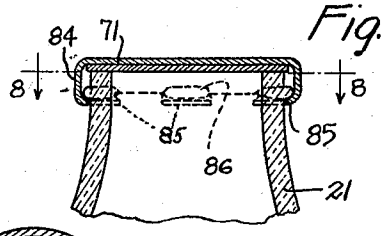



Fig. 8.

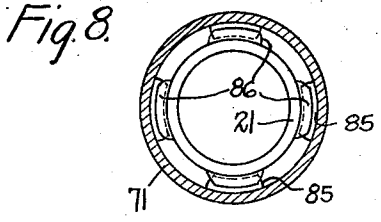
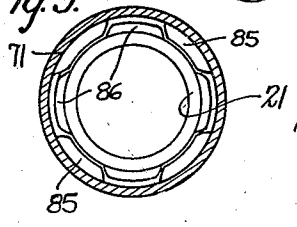



Fig. 9.




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Dec. 10, 1929. A. P. STIANSEN 1,738,803

BOTTLE SEALING MACHINE

Filed Feb. 14, 1925 3 Sheets-Sheet 3

Fig. 10.

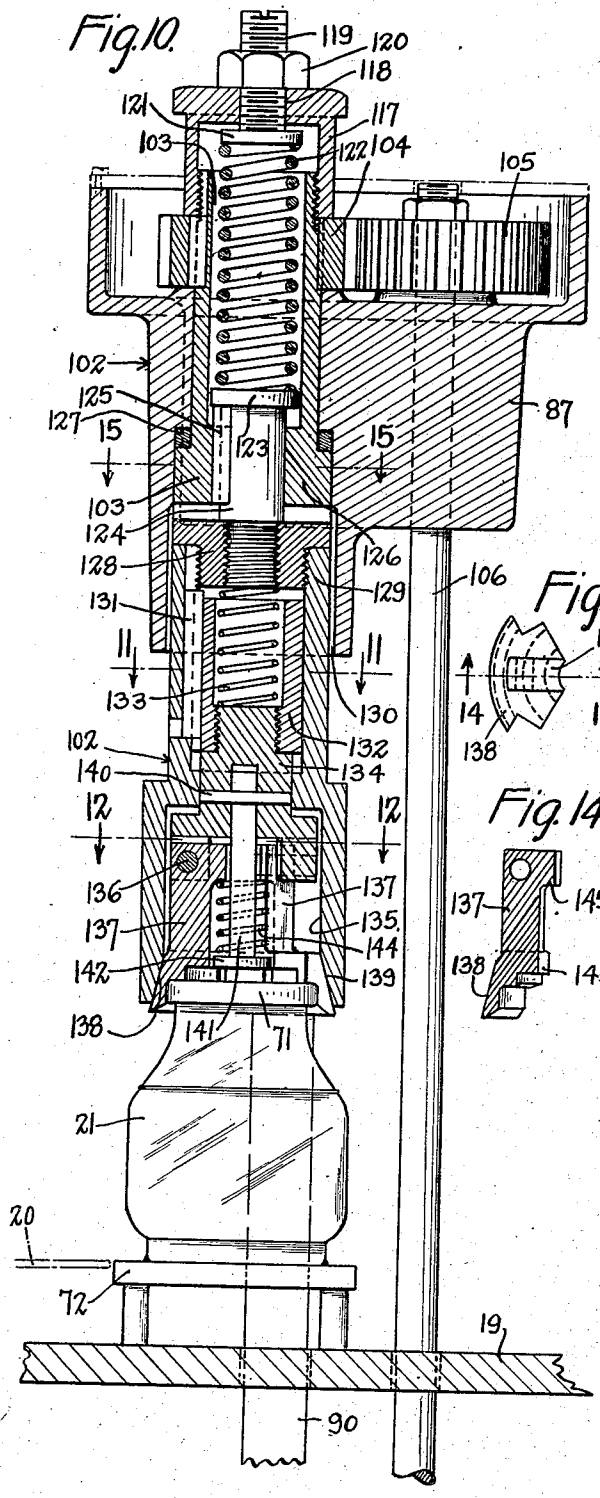



Fig. 11.

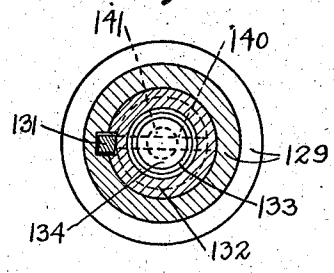



Fig. 12.

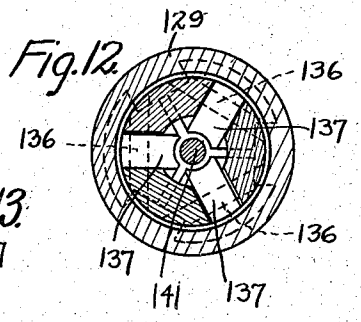


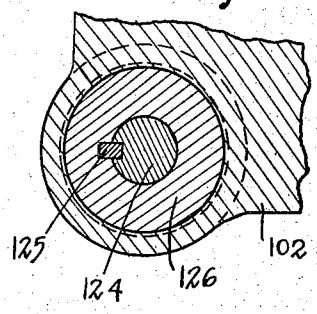

Fig. 13.




Fig. 14.




Fig. 15.




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Patented Dec. 10, 1929 1,738,803

# UNITED STATES PATENT OFFICE

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## BOTTLE-SEALING MACHINE

Application filed February 14, 1925. Serial No. 9,086.

My invention relates to automatic machines for applying metallic seals or caps to the openings in the necks of bottles, jars or similar containers, and is particularly adapted for use with the type of seal or closure for bottles and containers shown in the two U. S. Rivers Patents No. 1,304,098 of May 20, 1919, and No. 1,365,274 of January 11, 1921, and also in the U. S. Lee Patent No. 1,516,046 of November 18, 1924, the essential features of which are illustrated in diagrammatic form in the drawings accompanying this specification.

The objects of my invention are, among other things, to provide an improved machine of this character embodying a special mechanism which will automatically and rapidly apply the metallic seals to the tops of the neck openings of the bottles or containers and then properly position the seals horizontally on the tops of the bottle-necks in registering alinement with the spaced-apart lugs on the outside of such necks, followed by locking the seals to the bottle-necks, such seals or caps being turned or partially rotated in contact with the rim of the bottle-neck so that the inturned portions or lips on the depending flanges of the seal or cap may engage the under sides of the spaced-apart lugs formed on the outside of the bottle-neck. My improved machine is also devised so as to be readily adjusted to bottles of different sizes and heights, and a further feature is to simplify the construction and operation so that the likelihood of bottle breakage is reduced to a minimum through the provision of yieldable mountings for the clamping and locking members which apply, position and partially rotate the seals on the bottle-necks in the final locking position.

With these and other objects in view, the invention comprises the construction of the operating parts herein shown and hereinafter described as a preferred embodiment of my invention, and then particularly pointed out in the appended claims.

Of the drawings Fig. 1 is a top plan view of my improved machine, certain parts being omitted;

Fig. 2 is a sectional elevation taken on the line 2—2 of Fig. 1;

Fig. 3 is a sectional elevation taken on the line 3—3 of Fig. 1;

Fig. 4 is an enlarged sectional detail view on the line 4—4 of Fig. 1;

Fig. 5 is an enlarged sectional detail view on the line 5—5 of Fig. 1;

Fig. 6 is an enlarged sectional detail view on the line 6—6 of Fig. 3;

Fig. 7 is an enlarged fragmentary section showing the seal in locking position on the bottle neck;

Fig. 8 is a sectional view on the line 8—8 of Fig. 7;

Fig. 9 is a view similar to Fig. 8 with the seal applied to the bottle neck but not yet forced into locking position;

Fig. 10 is an enlarged view partly in section on the lines 10—10 of Fig. 2, showing one of the seal-locking heads and associated parts;

Figs. 11, 12 and 15 are sectional detail views taken on the lines 11—11, 12—12 and 15—15 respectively of Fig. 10;

Fig. 13 is a top plan view of one of the seal gripping jaws;

Fig. 14 is a sectional detail view on the line 14—14 of Fig. 13;

Fig. 16 is a side elevation on the line 16—16 of Fig. 1 showing the form of the cam for actuating the mechanism in the locking heads used for applying and locking the seals to the bottle-necks; and

Fig. 17 is a side elevation on the line 17—17 of Fig. 1 showing the form of the cam for raising and lowering the seal-locking heads.

Similar numerals refer to similar parts throughout the several figures.

Referring to Figs. 1, 2 and 3, the standards 18 support the horizontal platform or table 19 over which the conveyor belt 20 carrying the bottles 21 passes in the direction of the arrows (Fig. 1) around the pulley 22 mounted on the shaft 23 journalled to the bracket 24 secured to the table 19 as shown in Figs. 1 and 2. The belt 20 is continuously driven by the sprocket chain 25 passing around the sprocket wheel 26 fastened to the shaft 23 (Fig. 1) and the sprocket wheel 27 fastened

to the constantly revolving cam-shaft 28 journalled in the brackets 29 and 30 secured to the under side of the table 19 as shown in Fig. 1. The cam-shaft 28 is in turn driven by the gear 31 mounted thereto, which gear 31 meshes with the pinion 32 mounted on the stub-shaft 33 which carries the pulley 34 in turn driven by the belt 35 actuated from any suitable source of power, for example, an electric motor which is not shown.

Means are provided in this embodiment to bring a pair of the bottles 21 in proper vertical alinement with a pair of similarly constructed seal-locking heads in suitably timed relation with the mechanism which carries the seals in vertical position above the openings in the bottle-necks, which devices are best shown in Figs. 1–6 inclusive. The horizontally disposed carriage plate 36 is slidably mounted in the spaced apart guide-supports 37 affixed to the top of the table 19 by the cap-screws 38 as shown in Figs. 1, 3 and 5. The carriage 36 carries the depending stud 39 to which is pinned the rock-lever 40 fulcrumed to the stud 41 secured to the top of the table 19 (Fig. 1). The outer end 42 of the lever 40 is slotted at 43 to operatively engage with the pin 44 mounted on the horizontally reciprocating rack-bar 45 supported in the bracket 46ª secured to the table 19 as shown in Fig. 1. The top of the carriage 36 supports a pair of push plates 46 each carrying the L-shaped bracket 47 adapted to bear yieldingly against the pair of bottles 21 (Fig. 3) when the plates 46 are yieldingly advanced (Fig. 1) by the force of the expansion springs 48 coiled about the rods 49 attached to the plates 46; these rods 49 are adapted to slide through holes in the lugs 50 mounted on the rear ends of the carriage 36 (Figs. 1 and 3), while the ends of the springs 48 bear against the lugs 50 and plates 46 as shown. The cap-nuts 51 on the outer ends of the rods 49 limit the forward thrust of the plates 46 by the force of the springs 48.

The rack-bar 45 is reciprocated over the table 19 by the gear 52 meshing therewith, which gear 52 is mounted on the stub shaft 53 journalled in the brackets 54 secured to the top of the table 19. The shaft 53 carries the gear 55 in mesh with the vertically-reciprocating rack 56 (Figs. 1 and 2) which has pinned to its lower end the cam-roller 57 engaging the box-cam 58 mounted on the cam-shaft 28, the rack 56 being raised and lowered in each revolution of the cam 58. The opposite end of the bar 45 is provided on its top side with the row of teeth 59 which engage with the gear 60 mounted on one end of the cross-shaft 61 journalled in the bracket 62. The other end of the shaft 61 carries the gear 63 meshing with the rack 64 (Figs. 1, 3 and 4) secured to the under side of the slide plate 65 mounted in the guide supports 66 secured to the top of the table 19. The plate 65 carries the two seal nests 67 each comprising the lugs 68 and 69 and the inclined guide 70 as shown which hold the seals 71 in proper transverse alinement with the tops of the bottle necks after the push plates 46 have moved the pair of bottles 21 from the conveyor belt 20 to the standard 72 mounted on the top of the table 19 as shown in Figs. 2 and 3, both mechanisms being actuated by the rack-bar 45 in timed relation with each other to position the seals over the bottles. The operator slides the seals 71 up the inclined guides 70 from the plate 65 to position such seals in the two seal nests 67.

Means are provided to return the pair of bottles 21 to the conveyor belt 20 after the seals 71 have been applied and locked thereto which are best shown in Figs. 1, 3, 4 and 6. Opposite to brackets 47 and in horizontal alinement therewith is the L-shaped plate 73 adapted to engage the neck and side of the bottles (Fig. 3) which plate 73 is mounted on the inner ends of the rods 74 slidably mounted in the lugs 75ª integral with the supports 66 (Fig. 4). Referring more particularly to Fig. 6, the outer ends of the rods 74 have pinned thereto the sleeves 75 adapted to slide in the bores 76 of the brackets 77 formed on the outer ends of the supports 66. The outer ends of the bores 76 are screw-threaded and have fitted thereto the exteriorly threaded sleeves 78 on which are threaded the hollow adjusting caps 79. Coiled about the rods 74 are the compression springs 80, one end bearing against the outer ends of the sleeves 75 while the other ends press against the heads of the caps 79. When the bottles 21 are held on the standard 72 between the push-plates 46 and plate 73 (Fig. 3), the springs 80 are compressed by the outer movements of the rods 74; when the push-plates 46 are retracted across the conveyor belt 20, the springs 80 force rods 74 and the plate 73 to the left (Fig. 3), and so push the pair of bottles 21 back again upon the constantly-moving conveyor belt 20. The bar 81 of the carriage plate 36 holds the line of bottles 21 from forward movement on the belt 20 when the carriage 36 is in its extended position as shown in Figs. 1 and 3. The pins 82 mounted on the rods 74 and the rings 83 integral with the sleeves 75 limit the inner and outer movements of the rods 74 by engaging the lugs 75ª and brackets 77 respectively. By turning the caps 79 on the sleeves 78 the tension of the springs 80 may be adjusted for bottles of different sizes and diameters.

Referring to Figs. 7, 8 and 9, the seals 71, more particularly shown and described in the U. S. Letters Patent hereinbefore mentioned, comprise the depending skirt or flange 84 having a plurality (in this embodiment four) of inturned lips 85 adapted to engage

with the under surface of a like number of spaced apart projecting lugs 86 formed on the neck of the bottle 21 as shown in Figs. 7 and 8. Fig. 9 shows the position of the lips 85 between the lugs 86 before the former are partially rotated to force the lips 85 beneath the lugs 86 to lock the seal 71 in position on the rim of the bottle 21.

The devices for applying the seals or caps to the bottles 21 comprise the head frame 87 slidably mounted for vertical reciprocations in the upright standards 88 secured to the top of the table 19 by cap-screws 89 (Figs. 1 and 2). The frame 87 is provided with a pair of guide bars 90 adapted to slide within the vertical grooves 91 formed in the supports 88 as shown. The lower part of the frame 87 carries the dependent bracket 92 formed with the rectangular slot 93 within which slides the block 94 carrying the pin 95 pivoted to the rock-lever 96. The rock-lever 96 is fulcrumed on the stub-shaft 97 mounted on the bracket 98 secured to the under side of the table 19 as shown in Figs. 1 and 2. The outer end of the rock-lever 96 (Fig. 17) carries the cam-roller 100 adapted to ride in the runway of the box-cam 101 fastened to the cam-shaft 28 by which the head frame is raised and lowered in suitable timed relation with the seal gripping devices which thereafter position and then rotate to lock the pair of seals 71 to the bottles 21 as shown in Figs. 7 and 8.

The devices for gripping, positioning and locking the seals on the bottles together with the mechanism to actuate same are best shown in Figs. 1, 2, 3 and 10 to 15 inclusive, and comprise the pair of heads 102 secured to the frame 87. As the detailed structure and operation of the two heads 102 are the same, the description of a single head and its associated parts will only be set forth. Referring more particularly to Fig. 10, the head 102 has journalled therein the rock-sleeve 103 to which is keyed the pinion 104 in mesh with the gear 105 mounted on the upper end of the rock-shaft 106 journalled in the head 102; the lower end of the shaft 106 passing through the table 19 carries the wide gear 107 (Figs. 2 and 3) which is engaged by the rack-bar 108 slidably supported by the brackets 109 secured to the under side of the table 19 (Fig. 2). The outer end of the rack-bar 108 carries the cross-pin 110 which engages with the slotted end 111 of the rock-lever 112 pivoted to the bracket 113 secured to the standard 114, all as shown in Fig. 2. The lever 112 has pinned thereto the cam-roller 115 (Fig. 1) which is adapted to ride in the runway of the box-cam 116 mounted on the cam-shaft 28 and shown in detail in Fig. 16. The reciprocating motion imparted to the rack-bar 108 under the influence of the cam 116 partially rotates the gear 105 and sleeve 103 with predeterminedly variable movements in both directions as will hereinafter be more particularly described.

To the upper exteriorly-threaded end of the sleeve 103 is removably secured the hollow cap 117 having its head formed with the threaded bore 118 engaged by the screw-bolt 119 adjustably held by the lock-nut 120 in any predetermined position. The head 121 of the bolt 119 bears against the coil compression spring 122 extending through the sleeve 103 with the lower end of the spring 122 bearing against the head 123 of the spindle 124 held by the key 125 to slide in the lower enlarged end 126 of the sleeve 103 which carries the gasket 127 held against the head 102. The lower end of the spindle 124 is screw-threaded to carry the collar 128 which is screw-threaded in the upper end of the vertically movable clamping sleeve 129 which fits loosely in the bore 130 formed in the lower end of the head 102 as shown. Slidably held within the upper part of the sleeve 129 by the key 131 is the tubular collar 132 adapted to have a reciprocating movement relatively to the sleeve 129. The coil-spring 133 bearing against the collar 128 and the head of the chuck 134 threaded to the collar 132 normally forces the collar 132 and chuck 134 to their lowest position in the clamping sleeve 129, Fig. 10 showing them in their midway position.

The seal-gripping devices are actuated in suitable timed relation with the positioning and locking mechanism and are best shown in Figs. 10, 12, 13 and 14 enclosed within the bore 135 formed in the lower end of the clamping sleeve 129. The lower end of the chuck 134 carries three cross-pins 136 (Figs. 10 and 12) on which are pivoted the three gripper jaws 137 (Figs. 13 and 14) having their lower ends outwardly beveled at 138 to slidably coact with the flared rim 139 of the sleeve 129 as shown in Fig. 10 simultaneously to force the jaws 137 inwardly to firmly grip the seals 71. The chuck 134 carries the cross-pin 140 on which is secured the centrally-disposed bar 141 having its head 142 in alinement with and adjacent the shoulders 143 formed on the jaws 137. Coiled about the bar 141 is the spring 144 the upper end bearing against the inner lugs 145 integrally formed on the gripping jaws 137 while the lower end bears on the head 142 carried by the bar 141, the pin 140 preventing the spring 144 from withdrawing the bar 141 from the chuck 134. The force of the spring 144 on the lugs 145 normally keeps the jaws 137 in yieldingly compressed position ready to pick up the seal or cap, while the head 142 prevents the jaws from being pressed inwardly by the spring 144 or the clamping sleeve 129 before the chuck 134 is lowered so as to preclude any possibility of the jaws 137 breaking the rims of the bottles 21 when the head 102 is lowered in case the operator has failed to place seals in the nests 67.

The operation of the hereinbefore described mechanism during a cycle is substantially as follows: The carriage plate 36 is retracted at which time the conveyor belt 20 carries a pair of bottles 21 opposite the push-plates 46 when the carriage 36 is projected, the bar 81 holding the flow of bottles 21 in check as shown in Fig. 1. The pair of bottles 21 are thereupon carried from the belt 20 on to the standard 72 (Figs. 2 and 3) with the plate 73 forced outwardly with the springs 80 under compression. Thereafter the plate 65 is advanced inwardly with a pair of seals 71 which have already been manually moved up the inclined guides 70 and positioned in the nests 67 until such nests 67 are in alinement with the bottles 21 and heads 102, after which the plate 65 and nests 67 are brought to their retracted position as shown in Fig. 3. The timing of the push-plates 46 is such that they will move forward the instant the uncapped bottles 21 are in alinement and the plates 46 and slide plate 65 approach the capping position in alternate succession which may be set forth as follows: After the seals 71 have been placed in the nests 67 the slide plate 65 will carry the seals into vertical alinement with the heads 102 and the push-plates 46 will simultaneously recede from their Fig. 1 position which permits the pair of sealed bottles to be pushed back on the conveyor belt 20. The sealing heads 102 will then lower and pick up the seals 71 from the nests 67 while the push-plates 46 will advance to bring a pair of unsealed bottles 21 onto the standard 72 beneath the heads 102; simultaneously the slide-plate 65 will withdraw bringing the nests 67 into seal-positioning for the operator while the heads 102 will descend to position and lock the seals 71 on the bottles. The particular mechanisms actuated by the cams 101 and 116 in timed relation with each other come into operation, according as the cam-rollers 100 and 115 pass simultaneously through the respective A, B, C, D and E sectors of the two cams 101 and 116 rotating as shown in Figs. 17 and 16 respectively with the relative positions of these cams on the shaft 28 as illustrated in these two figures. The heads 102 are first lowered from their raised position to pick up the seals by the spring-pressed jaws 137 when expanded as the roller 100 rides along the first half of the E sector of the runway of the cam 101 (Fig. 17) and the heads are then raised (last half of E sector in Fig. 17) with the seals taken from the nests 67 during which time roller 115 rides along the dwell of the cam 116 (E sector Fig. 16); at the end of the E sector of the cam 101 (Fig. 17) the heads 102 are again lowered to locate the seals between the lugs 86 on the bottle-necks. While the heads 102 are so lowered (A sector Fig. 17) the spindles 124 have a quick twisting movement imparted to them (approximately 135°) in both directions as the cam-roller 115 rides through the A sector of the cam 116 (Fig. 16), which twist locates or registers the inturned lips 85 between the lugs 86 (Fig. 9) with the seals fitting snugly on the bottle openings. This twisting movement of the spindles 124 is followed by a further lowering movement of the heads 102 as shown by the B sector (Fig. 17) during which the clamping sleeve 129 is forced downwardly to cause the jaws 137 to positively grip the seals, as shown by the B sector in Fig. 16, heretofore lightly held by the jaws 137 through the tension of the spring 144 bearing on the lugs 145. The spindles 124 are then rotated clockwise about 45° as shown by the C sector (Fig. 16), with the heads 102 lowered as the roller 100 passes through the C sector in Fig. 17, during which the bottles 21 are held tightly as shown in Fig. 3, such clockwise rotation being sufficient to bring the lips 85 beneath the lugs 86 as shown in Figs. 7 and 8 with the seals 71 in firm locking engagement with the bottles 21. Thereafter the heads 102 are lifted as the cam-roller 100 passes through the D sector (Fig. 17) which movement raises the clamping sleeve 129 to release the jaws 137, and then the spindles 124 are rotated counter-clockwise about 45° as the cam-roller 115 passes from the D sector to the E sector (Fig. 16). At this movement the carriage plate 36 is withdrawn by the reverse movement of the bar 45 and the plate 73 pushes the sealed bottles back onto the conveyor belt 20 and the bar 81 is retracted to permit the forward unsealed bottle 21 to abut against the left sealed bottle (Figs. 1 and 2) with the pair of adjacent unsealed bottles 21 ready to be advanced on the standard 72 in the next cycle as the two sealed bottles are carried away on the conveyor belt 20, and the cycle of operation is completed.

While the construction herein shown and described embodies the invention in a preferred form, it will be understood that changes and variations may be made in the various parts without departing from the principles and scope of the invention.

I claim as my invention:

1. In a bottle-sealing machine, a sealing head having a therein rotatable seal clamp, means for lowering said head and clamp to the bottle, and means for preliminarily twisting the clamp and seal positioned on the bottle in both directions horizontally on the bottle opening, said means thereafter turning the clamp in one direction to lock the seal to the bottle.

2. In a bottle-sealing machine, a vertically movable sealing head having a therein rotatable seal clamp, means for lowering and raising said head and clamp to and from the bottle, means for preliminarily twisting the clamp and seal positioned on the bottle in both directions horizontally on the bottle

opening, said means thereafter turning the clamp in one direction to lock the seal to the bottle.

3. In a bottle-sealing machine, a sealing head having a therein rotatable seal clamp, means for lowering and raising said head and clamp to pick up a seal for the bottle opening and for thereafter lowering said clamp and seal to position the latter on the bottle opening, means for twisting the clamp and seal in both directions horizontally on the bottle opening during said last-mentioned lowering movement, said means thereafter turning the clamp in one direction to lock the seal on the bottle.

4. In a bottle-sealing machine, a vertically movable sealing head having a therein rotatable seal clamp, means for lowering and raising said head and clamp to pick up a seal for the bottle opening and for thereafter lowering said clamp and seal to position the latter on the bottle opening, means for twisting the clamp and seal in both directions horizontally on the bottle opening during said last-mentioned lowering movement, said means thereafter turning the clamp in one direction to lock the seal on the bottle.

5. In a bottle-sealing machine, a sealing head having a therein rotatable seal clamp, means for imparting to said clamp and seal a compound twisting movement horizontally in both directions to register the seal on the bottle opening, said means thereafter turning the clamp in one direction to lock the seal on the bottle.

6. In a bottle-sealing machine, a sealing head having a therein rotatable seal clamp, means for lowering said head to the bottle and means for imparting to said clamp and seal a twisting movement in both directions horizontally on the bottle opening with a subsequent turning movement in one direction while said head is being lowered to the bottle.

7. In a bottle-sealing machine, a bottle-holder, a coacting sealing head vertically movable with respect to said holder, means vertically movable and rotatable in said head to grip a seal and position same on the bottle, means for lowering said head to the bottle, means for twisting said seal-gripping means in both directions on the bottle opening, said means thereafter twisting said seal in one direction to lock same on said bottle during continued movement of the head to the bottle.

8. In a bottle-sealing machine, a sealing head having a plurality of depending, pivoted jaws concentrically disposed for gripping a seal at a plurality of spaced apart points, a centrally-disposed spring bearing on said jaws for lightly gripping the seal, a vertically movable clamping sleeve surrounding said jaws to force the latter inwardly on the seal, and means to limit the inward movement of said jaws.

9. In a bottle-sealing machine, a sealing head having a plurality of depending, pivoted jaws concentrically disposed for gripping a seal at a plurality of spaced apart points, a centrally-disposed spring bearing on said jaws for lightly gripping the seal, a vertically movable clamping sleeve surrounding said jaws to force the latter inwardly on the seal, and a centrally-disposed stop adjacent said central spring to limit the inward movement of said jaws.

10. In a bottle-sealing machine, a plurality of bottle-holders, a like plurality of coacting sealing heads each having a therein rotatable seal clamp to grip a seal and position same on the bottle openings, means for preliminarily twisting each clamp and seal on the bottle in both directions horizontally on the bottle openings, said means thereafter turning the clamp in one direction to lock the seal to the bottle, all operated through the continued movement of the machine.

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