

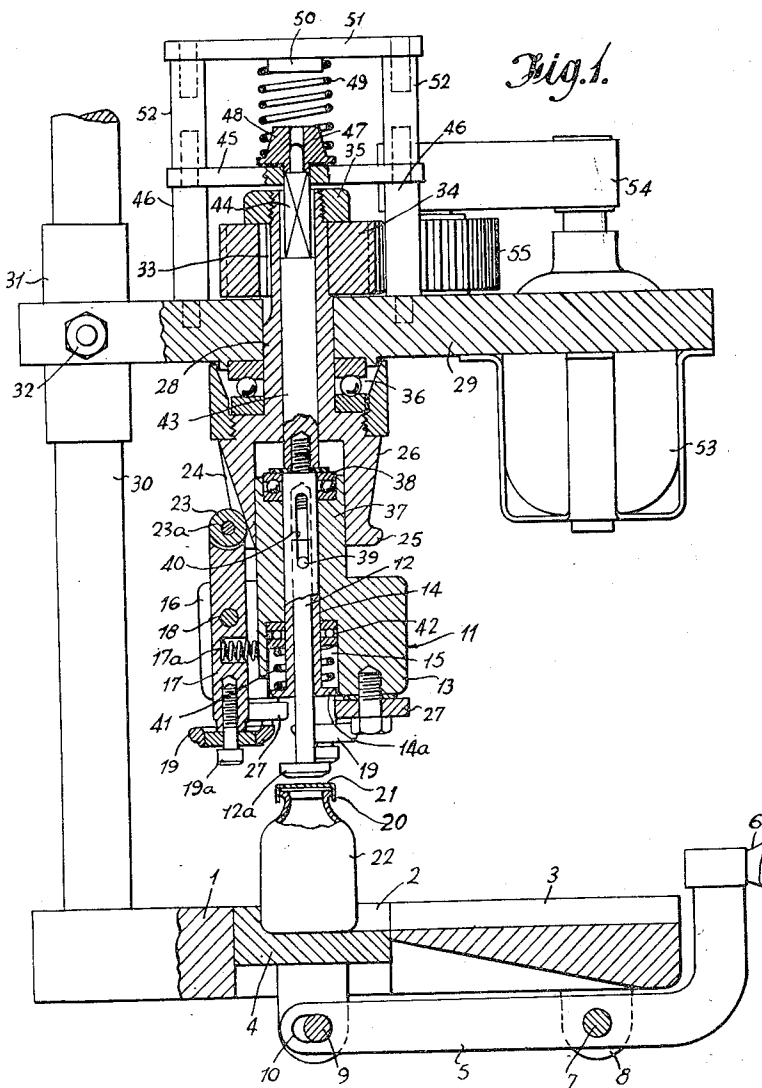
Oct. 9, 1956

G. E. FORD ET AL
CAP SPINNING APPARATUS

2,765,608

Filed Sept. 4, 1953

2 Sheets-Sheet 1



Inventors
Geoffrey Ewart Ford
and
George Charles Hubbard
By *Frederick J. Ruff*
Attorney

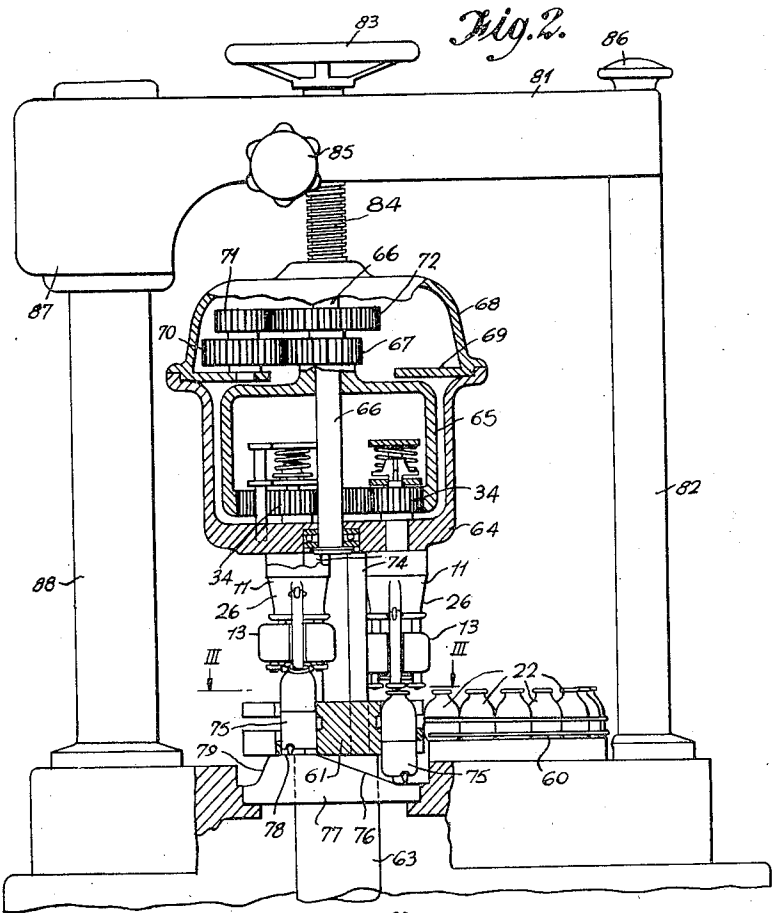
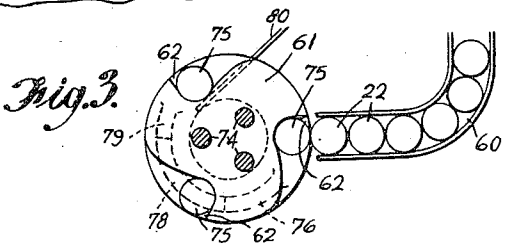
Oct. 9, 1956

G. E. FORD ET AL
CAP SPINNING APPARATUS

2,765,608

Filed Sept. 4, 1953

2 Sheets-Sheet 2



Inventors
Geoffrey Ewart Ford
George Charles Hubbard
W. H. H. H.
Attorney

1

2,765,608

CAP SPINNING APPARATUS

Geoffrey Ewart Ford and George Charles Hubbard, Bedford, England, assignors to Fords (Finsbury) Limited, Bedford, England, a British company

Application September 4, 1953, Serial No. 378,502

Claims priority, application Great Britain
September 4, 1952

6 Claims. (Cl. 53—339)

The present invention relates to apparatus for spinning flanged caps on to cylindrical objects, such as bottles, in order to seal an opening therein.

In order to spin such flanged caps on to bottles or the like, the bottles are provided with a peripheral lip or groove at their upper ends and the caps have straight depending flanges. The caps are placed over the mouths of the bottles that are to be sealed and presented to the spinning head which is adapted to spin the depending flanges under the lip or into the groove as the case may be. It will be understood that the expression "spinning the cap on the object (or bottle or the like)" as herein-after used should be construed as applicable to both variants.

It is a more specific object of the present invention to provide spinning apparatus which is foolproof in operation and the spinning heads of which can be rapidly serviced in case of need.

It is a further object of the invention to provide spinning apparatus in which a plurality of objects may be capped substantially simultaneously.

According to the invention there is provided apparatus for spinning a flanged cap over a shoulder on a substantially cylindrical object, such as a bottle, to seal an opening therein comprising a spinning head, means for presenting said object with a cap placed over the said opening to said spinning head, means for rotating said spinning head about the flange of the cap and means for quickly detaching said head from said rotation means.

According to another feature of the invention there is provided apparatus for spinning a flanged cap over a shoulder on a substantially cylindrical object, such as a bottle, to seal an opening therein, comprising a spinning head itself comprising a cap-contacting member against which the cap is caused to abut upon presentation thereto of the object with the cap placed over said opening, a collar coaxial with and surrounding said cap-contacting member, a plurality of toggle arms pivoted to said collar, means for effecting relative rotation between said collar with its toggle arms and said cap-contacting member, means for effecting relative vertical movement between said cap-contacting member and said collar, after presentation of the cap to the said member, means for swinging said toggle arms about their pivots during said vertical movement to cause said toggle arms to be moved radially inwards towards said flange and to press against said flange to spin same under said shoulder during said rotation, and means for moving said toggle arms radially outwards after said spinning operation and during a reverse relative movement between said socket and said object with its spun cap.

In order that the invention may be more clearly understood, reference will now be made to the accompanying drawings which show two specific embodiments thereof by way of example, and in which

Fig. 1 shows an axial section through a first embodiment.

2

Fig. 2 shows an axial section through a second embodiment, and

Fig. 3 shows a scrap plan view of certain elements shown in Figure 2 along the line 3—3 thereof.

In Fig. 1 there is shown an arrangement according to the invention which is adapted as a single unit for spinning flanged caps on to bottles, one at a time. In the drawing there is shown a bottle-receiving and guiding member 1 comprising a plate of any suitable shape having a recess 2, communicating with the outer periphery thereof by a guide slot 3. A plunger 4 is located for substantially vertical movement within the said recess and is arranged to be moved by means of a lever arm 5 operated by a handle member 6 and working about a pivot point 7 arranged on a bracket 8 secured to the guiding member 1, connection between the plunger 4 and the lever arm 5 being effected by a lost-motion pin-and-slot arrangement 9, 10, so that when pressure is exerted on the handle member 6 the lever arm 5 will rock about pivot 7 to raise the plunger 4 substantially vertically towards the spinning head, generally indicated at 11.

The spinning head 11 comprises a vertical spindle 12 located within a central recess 15 in a collar 13 by means of a guiding sleeve 14. The spindle 12 has a cap-contacting plate 12a and the sleeve 14 terminates at its lower extremity in an annular flange 14a. Pivoted within slots 16 in the collar 13 is a plurality of toggle arms 17, the said toggle arms 17 moving about the pivots 18 against the action of springs 17a. The lower end of each toggle arm 17 is provided with a spinning roller 19 secured to the arm by a screw 19a and adapted to contact the flange 20 of the cap 21 of the bottle 22 when the latter is moved vertically upwards by movement of the plunger 4. The other end of each toggle arm 17 is provided with a roller 23 mounted on a pin 23a through the toggle arm, said pin engaging over a forked lip 25, one lip for each toggle arm, and formed on the periphery of a driving collar 26, each roller resting in a shaped slot 24 in collar 26, the arrangement being that the spinning unit 11 is held in association with the driving collar 26 by engagement of the rollers 23 over the said lips 25.

The slots 24 are inclined upwardly and outwardly so that upward movement of the spinning head 11 causes the rollers 23 to ride up the slots 11, turning toggle arms 17 about their pivots 18 so that the rollers 19 move radially inwards. When a bottle 22 is moved upwards by operation of plunger 4, the cap 21 contacts the member 12a (normally held in the lower position by a pin 39 resting in a slot 40 in the sleeve 14), and moves spindle 12 upwards until member 12a abuts against flange 14a to compress spring 41. A thrust race 42 is provided between the upper end of the spring 41 and the upper end of the recess 15 in collar 13. When the spring 41 is compressed the collar 13 moves upwards by which time the flanged cap is centralised between guide rollers 27, and the toggle arms move radially inwards as explained above, to contact flange 20.

The driving collar 26 extends upwardly into a hollow extension 28 passing through a bracket support 29 which is horizontally mounted and secured to a vertical pillar 30 by means of the collar 31, secured in position on pillar 30 by means of the nut 32. The said extension 28 has a keyway 33 so that a drive gear 34 may be associated with it, the gear 34 being secured to the extension 28 by means of the nut 35. Between the bracket support 29 and the drive collar 26 is a thrust bearing 36.

The collar 13 terminates in an upper extension 37, which is located within the drive collar 26 and has at its upper end a thrust bearing 38.

Within the hollow extension 28 of the drive collar 26 is a vertical shaft 43 which has at its upper end a squared section 44 passing through a horizontal bracket 45 sup-

ported by pillars 46. Above the squared section 44 the shaft 43 terminates in a locating peg 47 which is located within a collet 48 located on the upper surface of the bracket 45 and having a spring 49 between it and a boss 50 projecting downwardly from a further horizontal bracket 51 supported by further pillars 52. Thus upward movement of the spindle 12 effects upward movement of the shaft 43 after the pin 39 has contacted the top of slot 40 and causes the collet 48 to be raised to compress the spring 49 so that when the upward pressure on spindle 12 by the bottle 22 is removed, the spindle 12 and shaft 43 are again urged in a downwards direction.

The gear wheel 34 is arranged to be driven from an electric motor 53 by means of a belt 54 and gear 55 in mesh with gear 34.

In operation, the motor 53 is arranged to run continuously to effect rotation of the gear wheel 34, which thus drives the driving collar 26. Rotation of the driving collar 26 effects rotation of the collar 13, by connection of the toggle arms 17 so that the rollers 19 which have swung inwards on upward presentation of the bottle, as above described, spin the flange 20 of the cap 21 about the neck of the bottle.

To remove the spinning unit 11, the bracket 29 is swung about pillar 30 by releasing collar 31 and the lower end of the collar 13 is gripped by the hand, around the rollers 19, whereby the toggle arms rotate about their pivots 18 and free the roller pins 23a from the lips 25 thus enabling the whole spinning unit with shaft 43 and spindle 12 to be removed from the driving collar 26.

Figures 2 and 3 show the application of the invention to a multiple spinning unit which in this embodiment effects spinning of three bottle caps substantially simultaneously.

The bottles are fed on a suitable conveying device 60 to a bottle-holding member 61, which contains bottle-receiving recesses 62 and is arranged to be continuously rotated about its shaft 63.

In this embodiment the spinning heads 11, which are similar to those described in connection with Figure 1, are associated with a shell 64 through which their extensions 28 of the drive collars 26 pass. The shell 64 is mounted for rotation about a shaft 66 fixed against rotation relatively to the framework 81.

The drive pinions 34 are driven through an internally toothed shell 65 so that all the spinning units rotate simultaneously and the shell 65 is integral with a gear drive 67. The shell 64 has a cover member 68 having a lower annular plate 69 arranged to support a gear cluster 70, 71 for rotation, the gear 71 being in mesh with gear 72 fast on the shaft 66. The shell 64 is driven from the holding device 61 by the dowel rods 74. Thus, upon rotation of device 61, the shell 64 rotates about shaft 66, whereby gear 71 rotates as it travels around gear 72. Gear 70 being integral with gear 71 also rotates to drive gear 67 and thus toothed shell 65 to effect rotation of the spinning heads 11.

Thus, the spinning units 11 are continuously driven with, but faster than, the holding device 61. In a device constructed according to the invention, the holding device was rotated at 33 R. P. M. and the step-up gearing rotated the spinning heads at 350 R. P. M.

When the bottles reach the holding device 61 from the guide 60, they alight upon a plunger 75 working in a suitable recess in the holding device 61 and after the bottle has arrived on its plunger 75, the lower end of the plunger 75 rides up the inclined surface 76 of a stationary cam 77 to effect presentation of a bottle to a spinning unit 11.

During presentation and spinning, the plunger 75 is located on a flat 78 of the cam 77 and on further rotation of the member 61, the plungers 75 contact the downwardly-inclined surface 79 to lower the plungers and therewith the bottle with its cap sealed over its shoulder or neck. Upon further movement, as illustrated more particularly in Figure 3, the bottle contacts a plate 80 so

that it may be ejected from the device on further rotation.

The upper end of shaft 66 is screwed at 84 and passes through a frame 81. A handwheel 83 operating on screw 84 is used for raising and lowering the multiple unit to suit the height of the bottles being capped. The adjustment can be locked by nut 85 which screws a bolt transversely across the threads of screw 84.

To remove a spinning head 11, the nut 86 is undone to release frame 81 from pillar 82, when the frame 81 may be swung by collar 87 about the pillar 88, the heads then being released as described above in connection with Fig. 1.

We claim:

1. Apparatus for spinning a flanged cap over a shoulder of a substantially cylindrical object such as a bottle, comprising a rotatable driving means, a spinning collar, means for guiding said spinning collar within said driving means, a plurality of toggle arms pivoted about substantially horizontal axes to said spinning collar, a roller pivoted by a shaft to the upper end of each of said toggle arms, a plurality of forked lips at the lower end of said driving means and spaced around the periphery thereof, means for engaging said pivot shafts each within one of said forked lips to obtain driving relationship between said driving means and said spinning collar, and means for releasing said shafts out of engagement with said forked lip for removal of said spinning collar from said driving means.

2. Apparatus for spinning a flanged cap over a shoulder of a substantially cylindrical object such as a bottle, comprising a rotatable driving means, a plurality of upwardly-diverging conical cam surfaces on said driving means, a spinning collar, means for guiding said spinning collar within said driving means, a plurality of toggle arms pivoted about substantially horizontal axes to said spinning collar, rollers pivoted by shafts to the upper ends of said toggle arms, a plurality of forked lips at the lower end of said driving means and spaced around the periphery thereof, means for engaging said pivot shafts each within one of said forked lips to obtain driving relationship between said driving means and said spinning collar, a spinning roller at the lower end of each of said toggle arms, means for presenting an object to be capped between said spinning rollers, means for urging said object upwards and for thereby causing upward movement of said spinning collar relative to said driving means and thus for moving the upper toggle arm rollers along said cam surfaces for inward movement of said toggle arms about their pivots to effect spinning of the cap on said object, means for withdrawing said object after the spinning operation, and means for releasing said shafts out of engagement with said forked lips for removal of said spinning collar from said driving means.

3. Apparatus for spinning a flanged cap over a shoulder of a substantially cylindrical object such as a bottle, comprising a rotatable driving means, a spinning collar, means for guiding said spinning collar within said driving means, a plurality of toggle arms pivoted about substantially horizontal axes to said spinning collar, rollers pivoted by shafts to the upper ends of said toggle arms, a plurality of forked lips at the lower end of said driving means and spaced around the periphery thereof, and means for engaging said pivot shafts each within one of said forked lips to obtain driving relationship between said driving means and said spinning collar, the lower ends of said toggle arms being movable inwards about their axes in the stationary state of the apparatus for releasing said shafts out of engagement with said forked lips for removal of said spinning collar from said driving means.

4. Apparatus for spinning flanged caps over shoulders of substantially cylindrical objects such as bottles, comprising a driving unit, means for rotating said unit, a plurality of driving collars projecting downwardly from said unit and being rotatable thereby, a plurality of spinning collars, means for guiding said spinning collars

5

one within each of said driving collars, a plurality of toggle arms pivoted about substantially horizontal axes to each of said spinning collars, a roller pivoted by a shaft to the upper end of each of said toggle arms, a plurality of forked lips at the lower end of each of said driving collars and spaced around the periphery thereof, means for engaging said pivot shafts each within one of said forked lips to obtain driving relationship between each of said driving collars and said spinning collars, and means for releasing said shafts out of engagement with said forked lips for removal of said spinning collars from said driving collar.

5. Apparatus as claimed in claim 4, in which said driving unit is a substantially cylindrical enclosed shell and in which said rotation means drives said shell continuously.

6

6. Apparatus as claimed in claim 5, comprising further a device for holding a plurality of objects to be capped, means for continuously moving said holding device and means for driving said driving unit from said holding device through step-up gearing.

References Cited in the file of this patent

UNITED STATES PATENTS

964,925	Marshall	July 19, 1910
1,149,520	Humphreys	Aug. 10, 1915
1,167,349	Brenzinger	Jan. 4, 1916
1,249,399	Hood	Dec. 11, 1917
1,440,983	Hammer	Jan. 2, 1923
1,452,410	Boucher	Apr. 17, 1923
1,749,347	Jaeger	Mar. 4, 1930