Oct. 15, 1940. A. S. JACKSON 2,218,452

BOTTLE CAPPING MECHANISM

Filed April 12, 1939 4 Sheets-Sheet 1

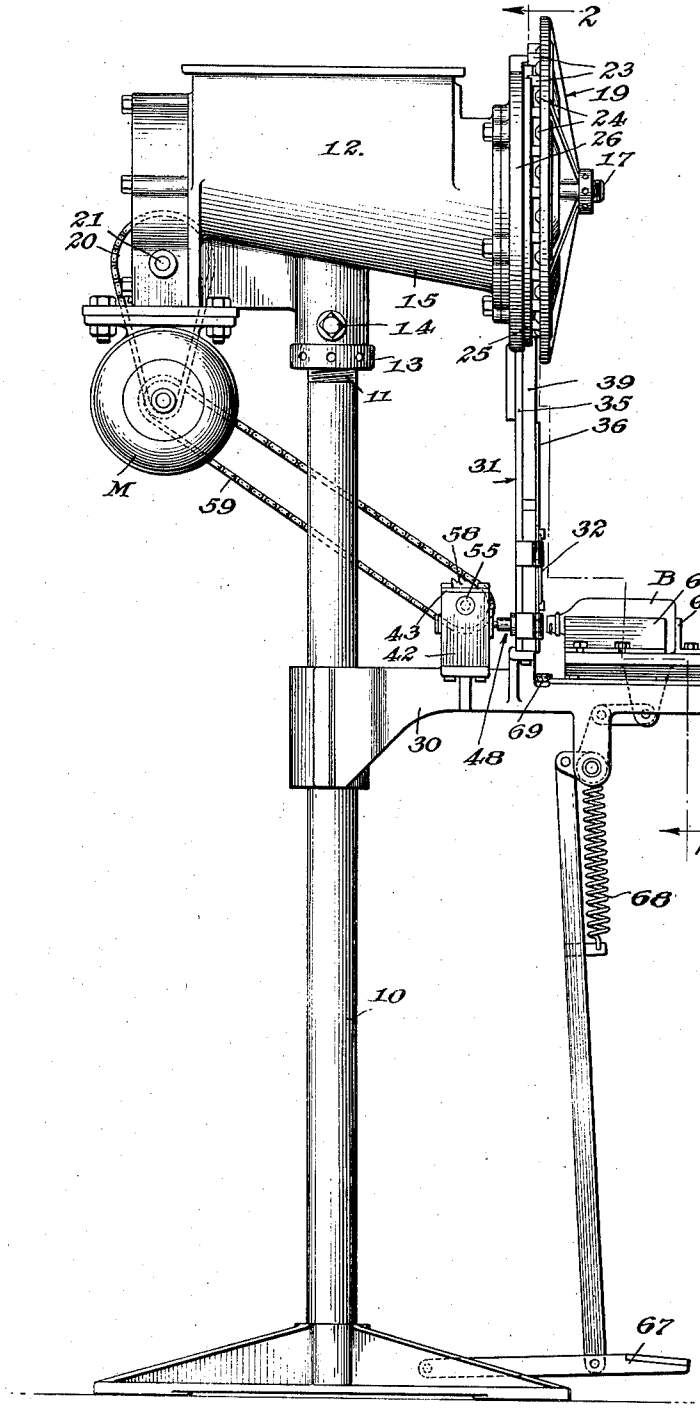


Fig. 1.

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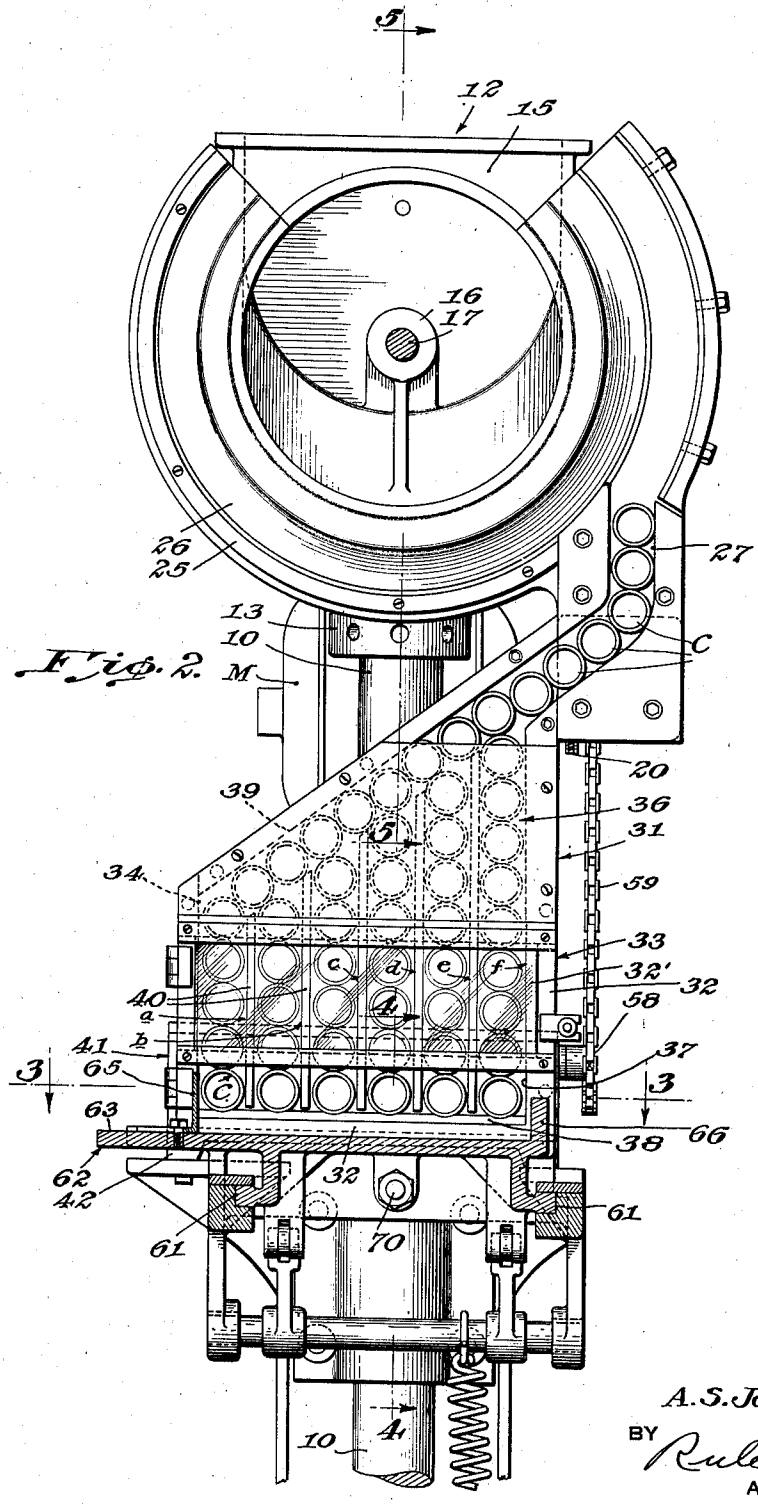


Fig. 2.

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BOTTLE CAPPING MECHANISM

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Fig. 3.

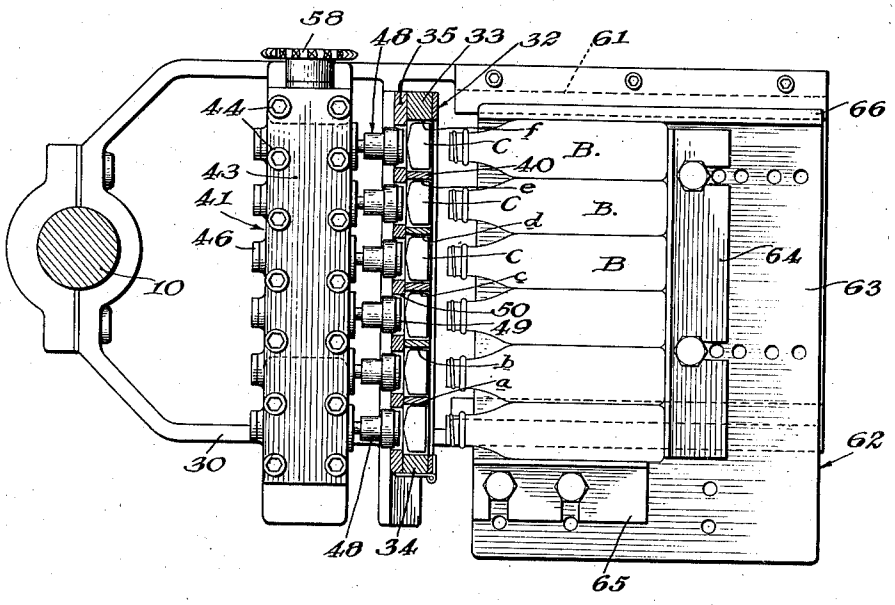
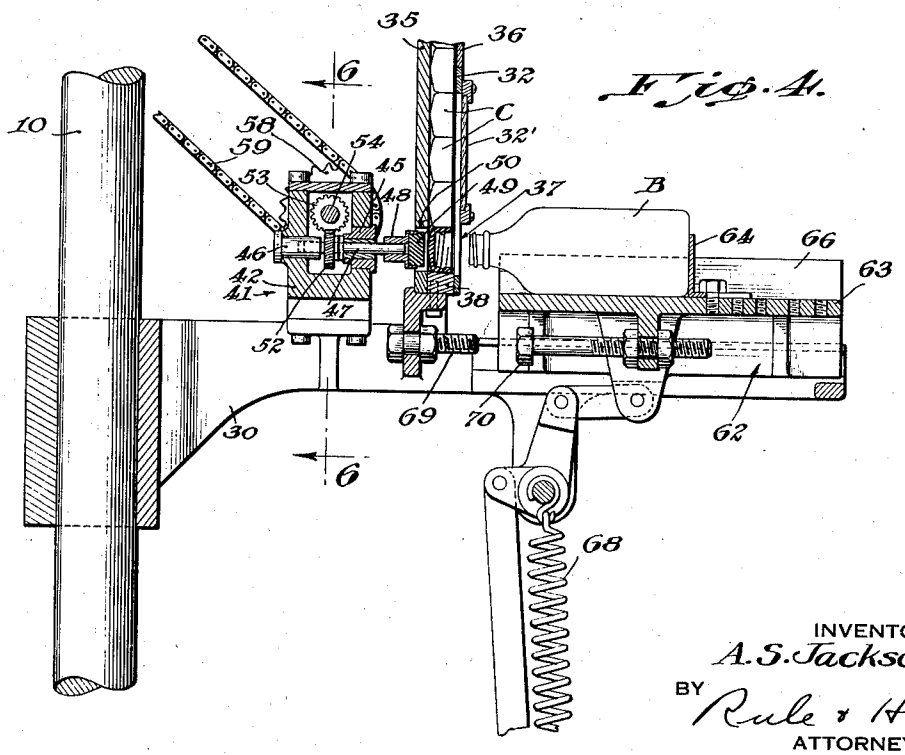


Fig. 4.



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Fig. 5.

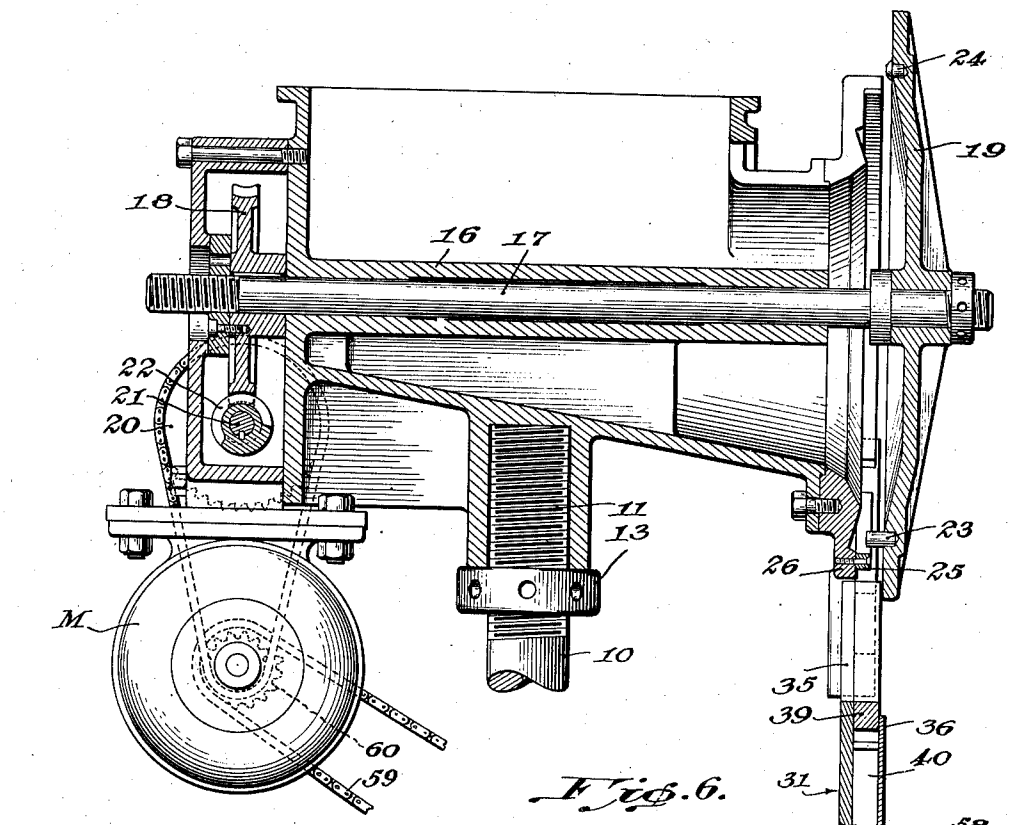
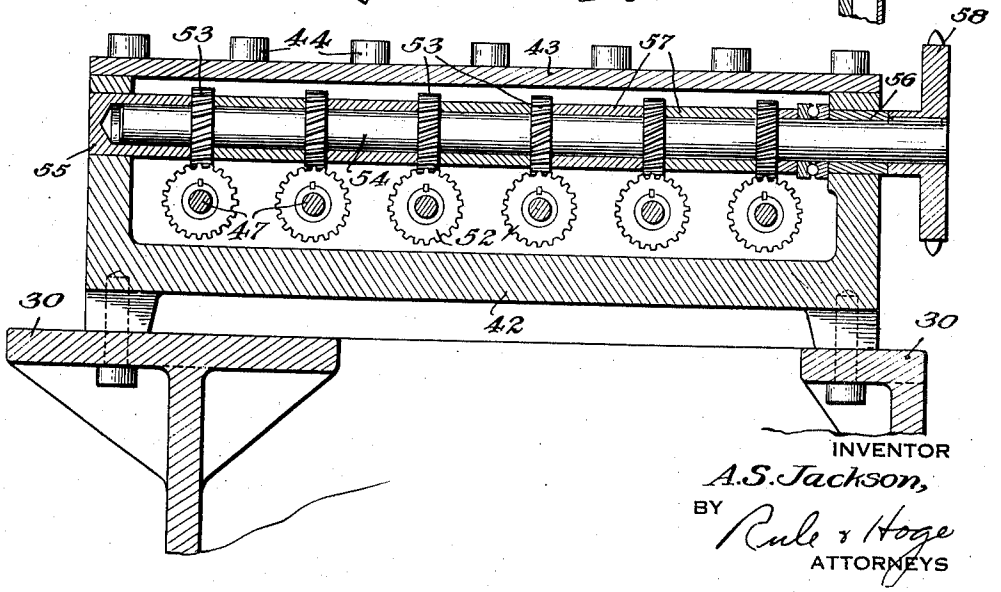


Fig. 6.



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UNITED STATES PATENT OFFICE

2,218,452

BOTTLE CAPPING MECHANISM

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Application April 12, 1939, Serial No. 267,408

5 Claims. (Cl. 226—88)

The present invention relates to bottle capping machines designed for use in applying threaded plastic or other bottle caps to the threaded necks of bottles during the selecting and packing thereof.

The principal object of the invention is to provide a bottle capping machine which will apply the caps to the bottle necks with a uniform degree of pressure that may be regulated at will, to accommodate bottles requiring caps of varying size or varying thread characteristics.

Another object of the invention is to provide such a bottle capping machine which will apply the caps to the bottles in a more economical manner than has heretofore been possible with the hand method at present employed.

A still further object of the invention is to provide such a machine which will effectively apply a plurality of caps to a series of bottles simultaneously, thus materially increasing the speed at which the bottles may be packed.

Other objects and advantages of the invention will become readily apparent as the following description ensues.

In the accompanying drawings:

Fig. 1 is a side elevational view of a bottle capping machine constructed in accordance with the principles of the present invention;

Fig. 2 is a sectional view taken substantially along the line 2—2 of Fig. 1;

Fig. 3 is a sectional view taken substantially along the line 3—3 of Fig. 2;

Fig. 4 is a sectional view taken substantially along the line 4—4 of Fig. 2;

Fig. 5 is a sectional view taken substantially along the line 5—5 of Fig. 2; and

Fig. 6 is a sectional view taken substantially along the line 6—6 of Fig. 4.

Referring now to Figs. 1 and 2, the bottle capping machine involves in its general organization a footed column 10, the upper end of which is threaded as at 11, and which adjustably receives thereon a conventional type of cap selecting mechanism 12, a spanner nut 13 being employed to adjust the elevation of the mechanism 12 and a set screw 14 being provided to lock the mechanism 12 in any desired adjusted position.

The conventional cap selecting mechanism 12 includes a hopper 15 (Fig. 5) for the bottle caps C, through which there extends a tubular sleeve 16 in which there is rotatably mounted, a shaft 17 having a worm gear 18 mounted on the rear end thereof and a cap selecting disk 19 on the other end thereof. An electric motor M suspended from the hopper casing, operates through a chain and sprocket mechanism 20 to drive a horizontal worm shaft 21 having a worm 22 thereon meshing with the worm gear 18.

Upon rotation of the shaft 17 and disk 19, the latter operates in a well known manner by means of a circular series of relatively long pins 23 which are spaced apart in such a manner that only one cap may pass between adjacent pins. Interposed between each adjacent pair of the pins 23, is a short pin 24 which must register with the cap opening of any particular cap before the latter may pass between the adjacent long pins. Such caps as are permitteed by the short pins 24 to enter between the adjacent long pins 23 are supported upon a curved guideway 25 secured to a ring 26 mounted on the outlet end of the hopper 15. Such caps as find their way into the space existing between adjacent long pins 23 are ultimately discharged by gravity into a chute 27 (Fig. 2) by means of which they are conducted to the bottle capping machine proper.

The arrangement of parts associated with the cap selecting mechanism 12 is purely conventional and no claim is made herein to any novelty associated therewith. While it is a desirable adjunct to the bottle capping machine proper, the novelty of this application resides solely in the construction and arrangement of the latter which will now be described in detail.

Referring now to Figs. 1, 2, and 4, the bottle capping machine proper includes a supporting arm 30 or bracket, to which there is bolted or otherwise secured, a magazine 31 provided with a hinged frame 32 or door at the front thereof. A glass panel 32' extends across the upper portion of the frame while the lower portion thereof is open as at 37. The magazine 31 includes a relatively long end post 33 and a relatively short end post 34 across which posts there extends a rear wall 35 and a front wall 36, the latter wall terminating above the upper edge of the frame 32.

A cap support 38 extends across the posts 33 and 34 at the bottom of the magazine. An inclined bar 39 extends from the short post 34 to the chute 27 and closes the upper end of the magazine.

The distance between the front wall 36 and the rear wall 35 is slightly greater than the height of the individual caps C and a plurality of partitions or dividing walls 40 of progressively increasing height, extend in spaced relationship across the magazine, spanning the front and rear wall thereof in such a manner as to provide a series of cap rows which are arranged vertically

in the magazine. The cap rows are designated at *a*, *b*, *c*, *d*, *e*, and *f* and are of progressively increasing capacity. The upper ends of the partitions **40** terminate in alignment a distance below the inclined bar **39** equal to substantially the diameter of the individual caps C and thus, when the magazine is filled, an inclined row of caps underlies the bar **39** and the individual caps thereof rest, either on the uppermost caps in the cap rows or upon the upper ends of the partitions **40** as shown in Fig. 2.

Referring now to Figs. 1, 4, and 6, a cap spinning assembly **41** is mounted on the supporting arm **30** behind the magazine **31** and consists of an elongated box-like housing **42**, the upper end of which is closed by means of a plate **43** which is secured in position by means of cap screws **44** that extend into the side walls of the housing. Journalled in front and rear bearings **45** and **46** respectively, and extending across the side walls of the housing **42** is a plurality of rotatable shafts **47** corresponding in number to the number of cap rows provided in the magazine **31**. The shafts **47** extend completely through one side wall of the housing and the outer end of each shaft has mounted thereon, a cap spinning unit **48** including a rubber or other resilient cap-engaging pad **49**. The rear wall **35** of the magazine **31** is provided with an opening **50** adjacent the bottom of the magazine and the cap spinning units **48** extend into this opening and occupy respective positions directly behind the bottle caps C resting on the cap support **38** at the bottom of each of the cap rows *a*, *b*, *c*, *d*, *e*, and *f*.

Means is provided for continuously rotating the cap spinning units **48** in unison and accordingly, each shaft **47** has mounted thereon a spiral gear **52** which meshes with a similar gear **53** mounted on a shaft **54** that extends the length of the housing **42** and which is journalled in bearings **55** and **56** in the end walls of the former. Spacing sleeves **57** maintain the gears **53** spaced and in register with the respective gears **52**.

The shaft **54** extends through one end wall of the housing **42** and the outer end thereof has mounted thereon a sprocket **58**. A chain **59** passes over the sprocket **58** and also over a sprocket **60** carried on the driving shaft of the motor M and thus the motor M is utilized for driving both the cap selecting disk **19** and the cap spinning units **48**.

Referring now to Figs. 1, 2, 3, and 4, the supportion arm **30** is formed with slideways **61** on which there is slidable toward and away from the magazine **31**, a bottle support **62** including a table portion **63**. A pair of bottle confining members **64** and **65** respectively, are adjustable on the table portion **63** and cooperate with a fixed confining member **66** to provide a rack designed to hold a number of bottles B corresponding to the number of cap rows in the magazine **31**. A treadle **67** serves to move the bottle support **62** toward the magazine and a spring **68** serves to return the support to its initial position.

When the bottles are placed in the bottle rack provided by the confining members **64**, **65** and **66**, as shown in Fig. 3, movement of the bottle support **62** toward the magazine, by means of the treadle **67**, causes the threaded finishes of the various bottles to engage the lowermost bottle caps C in the cap rows *a*, *b*, *c*, *d*, *e*, and *f*, and continued movement of the support causes these caps to be forced against the rotating cap spinning units **48**. The degree of pressure with which the caps C engage the cap spinning units **48** may be adjusted by means of a pair of limit stops **69** and **70** secured to the supports **30** and **62** respectively. The limit stops **69** and **70** are in the form of adjusting screws either of which may be turned to effect the desired pressure adjustment.

After the caps have been threaded upon the respective bottle finishes by frictional engagement of the caps with the cap spinning units **48**, the units **48** continue to rotate and the resilient pads **49** slip on the surface of the caps. The treadle **67** is then released and the bottles are withdrawn. Upon withdrawal of the bottles, the caps C at the bottom of each cap row, are withdrawn and the next adjacent cap falls into registry with its respective cap spinning unit **48**. The rows *a*, *b*, *c*, *d*, *e*, and *f* are supplied from the inclined row of caps existing at the top of the magazine. The caps in this latter inclined row are continuously replenished from the chute **27** leading from the cap selecting mechanism **12**.

It is to be noted that the upper surface of the cap support **38** is inclined and also that the central axes of the bottles on the bottle support **62**, is slightly elevated from the central axes of the respective bottle caps on the cap support **38**. Thus, during the actual spinning operation, the caps are slightly elevated from the cap support so that the sides of the caps, which frequently are knurled, will clear the support and not be marred or otherwise damaged.

Modifications may be resorted to within the spirit and scope of the appended claims.

I claim:

1. In a bottle capping apparatus, a cap support adapted to receive thereon a threaded bottle cap with the outer side wall of the cap resting on the support, a cap spinning member mounted for rotation about an axis substantially coinciding with the axis of the cap on the support and in close proximity to the cap, a bottle support adapted to receive thereon a bottle with the axis of the bottle substantially coinciding with the axis of the cap on the support, said bottle support being movable toward and away from the cap support, a limit stop for limiting the movement of the bottle support toward the cap support, and means for adjusting the position of the limit stop.

2. In a bottle capping apparatus, a magazine for bottle caps including means for confining the caps in a stack with the axes thereof extending in parallelism, and a cap support for the lowermost cap in the stack, a cap spinning member positioned adjacent the bottom of the stack and designed for engagement with the lowermost cap in the stack, a bottle support adapted to receive thereon a bottle with the axis of the bottle finish extending in substantial coincidence with the axis of the lowermost cap in the stack, said bottle support being movable from an outer position wherein the finish of the bottle thereon is out of contact with said lowermost cap to an innermost position wherein the same is in contact therewith, a limit stop in the path of movement of the support for determining the innermost position of the support, means for moving the support, and means for rotating the cap spinning member.

3. In a bottle capping apparatus, a magazine for bottle caps including means for confining the caps in a plurality of stacks with the axes thereof extending in parallelism, a cap support common to all of the stacks and positioned therebeneath for supporting the lowermost caps in the stacks,

a rotatable cap spinning member positioned adjacent the bottom of each stack and designed for frictional engagement with the lowermost cap in the stack, a bottle support adapted to receive thereon a plurality of bottles with the axes of the respective bottle finishes extending in substantial coincidence with the axes of the lowermost caps in the respective stacks, means for moving the bottle support toward and away from the magazine, means for rotating the cap spinning members in unison, and means for supplying bottle caps to the magazine.

4. In a bottle capping apparatus, a cap support adapted to receive thereon a threaded bottle cap with the outer side wall of the cap resting on the support, a cap spinning member mounted for rotation about an axis substantially coinciding with the axis of the cap on the support and in close proximity to the cap, a bottle support adapted to receive thereon a bottle with the axis of the bottle substantially coinciding with the axis of the cap on the support, said bottle support being movable toward and away from the cap support, and a limit stop for limiting the movement of the bottle support toward the cap support.

5. In a bottle capping apparatus, a magazine for bottle caps including means for confining the caps in a plurality of stacks with the axes thereof extending in parallelism, a cap support common to all of the stacks and positioned therebeneath for supporting the lowermost caps in the stacks, a rotatable cap spinning member positioned adjacent the bottom of each stack and designed for frictional engagement with the lowermost cap in the stack, a bottle support adapted to receive thereon a plurality of bottles with the axes of the respective bottle finishes extending in substantial coincidence with the axes of the lowermost caps in the respective stacks, means for moving the bottle support toward and away from the magazine, means for rotating the cap spinning members in unison, and means for supplying bottle caps to the magazine, said means for rotating the cap spinning members including a horizontal shaft disposed in proximity to the lower end of the stacks and driving connection between said shaft and each of the spinning members.

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