J. C. MILLER.

BOTTLE HANDLING APPARATUS.

APPLICATION FILED APR. 16, 1917.

1,296,547.

Patented Mar. 4, 1919.

4 SHEETS—SHEET 1.

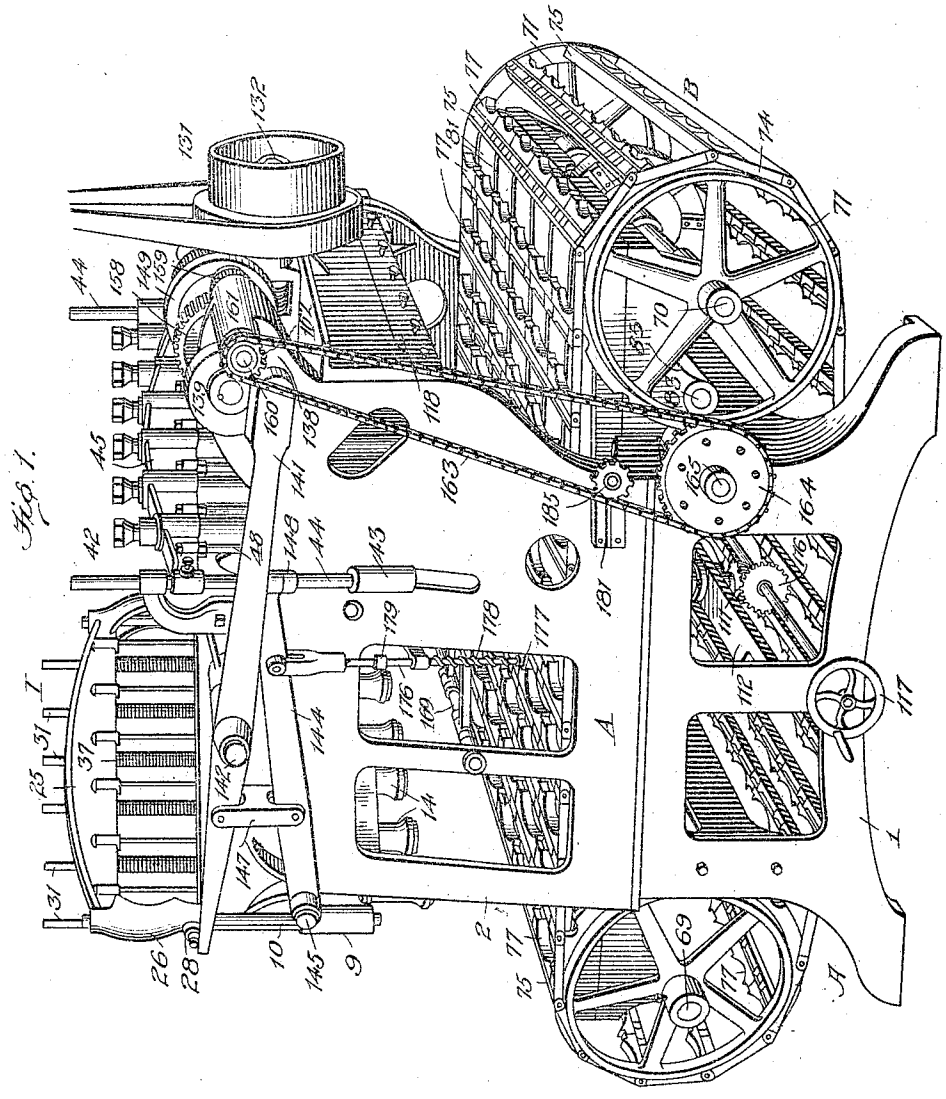


Fig. 1.

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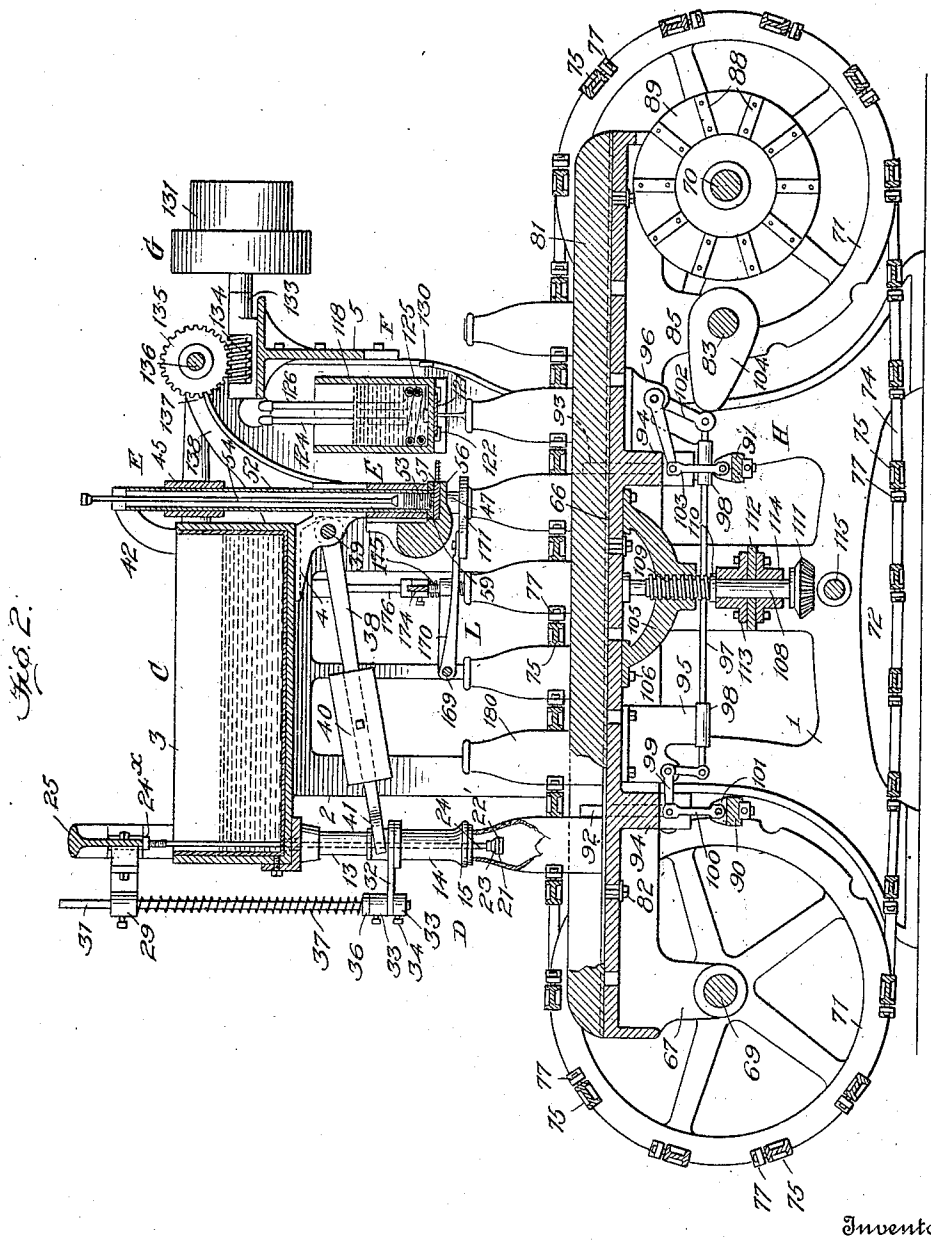
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4 SHEETS—SHEET 2.

Fig. 2.



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4 SHEETS—SHEET 3.

Fig. 3.

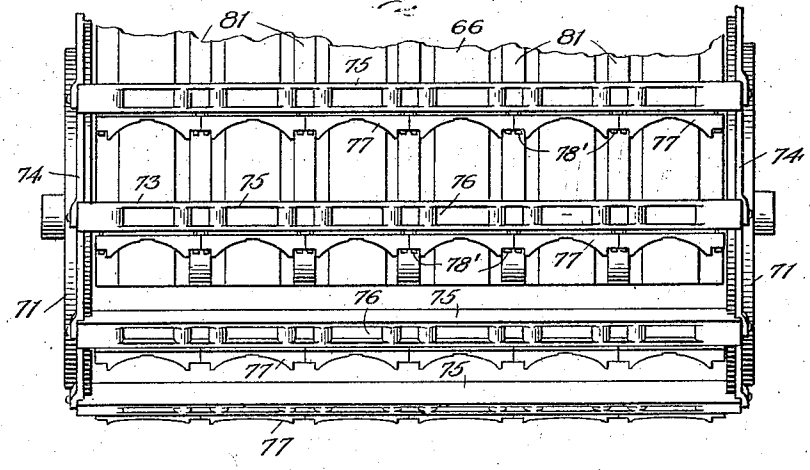


Fig. 4.

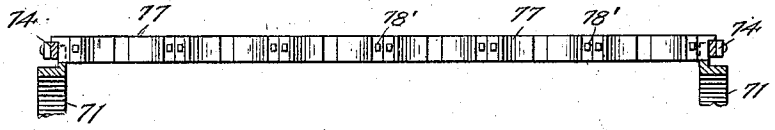


Fig. 5.

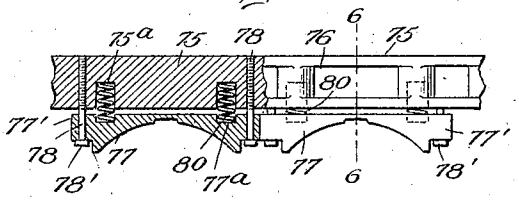
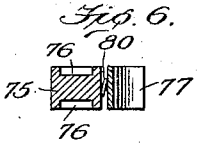


Fig. 6.



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4 SHEETS—SHEET 4.

Fig. 7.

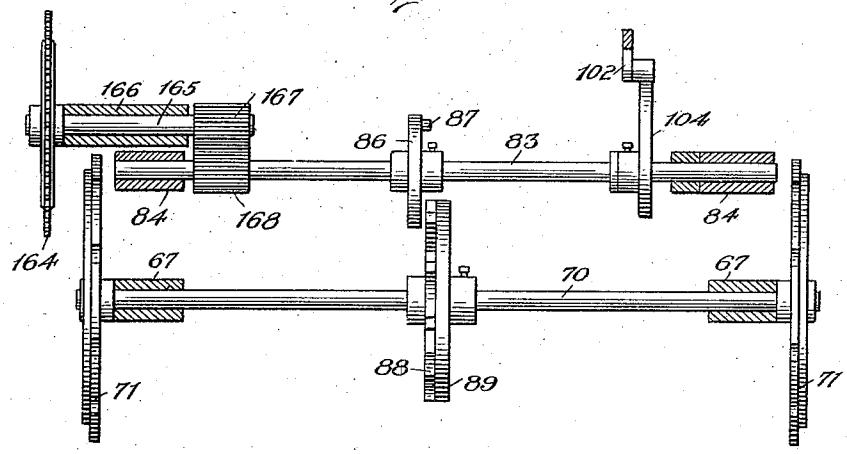


Fig. 8.

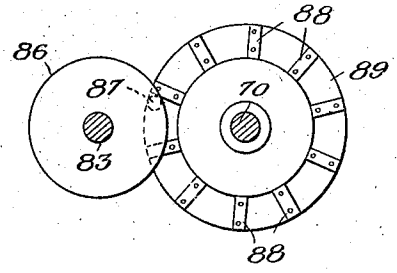
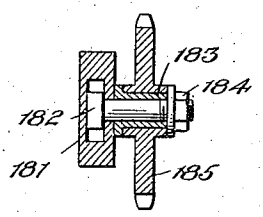


Fig. 9.



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UNITED STATES PATENT OFFICE.

JOHN C. MILLER, OF COVINGTON, KENTUCKY, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE MILLER PASTEURIZING MACHINE COMPANY, OF CANTON, OHIO, A CORPORATION OF OHIO.

BOTTLE-HANDLING APPARATUS.

1,296,547. Specification of Letters Patent. Patented Mar. 4, 1919.

Original application filed August 24, 1903, Serial No. 170,645. Divided and this application filed April 16, 1917. Serial No. 162,537.

To all whom it may concern:

Be it known that I, JOHN C. MILLER, a citizen of the United States, residing at Covington, in the county of Kenton and State of Kentucky, have invented certain new and useful Improvements in and Relating to Bottle-Handling Apparatus, of which the following is a specification.

This invention relates to apparatus for handling bottles or receptacles, more particularly apparatus for moving bottles to predetermined positions for various purposes such as filling, capping and sealing them.

This application is a division of my application filed August 24, 1903, Ser. No. 170,645.

One object of the invention is to provide improved means for moving bottles to a predetermined position or positions.

Another object of the invention is to provide in mechanism of this character improved devices which grip and hold the bottles while they are being moved.

With these and other objects in view the invention consists of the parts or combination of parts hereinafter described.

For the purpose of illustration I have, in the accompanying drawings, shown and herein described one form of apparatus embodying my invention.

Figure 1 is a perspective view of an apparatus embodying my invention.

Fig. 2 is a longitudinal section through the apparatus.

Fig. 3 is a fragmentary plan view of the conveyer mechanism.

Figs. 4, 5 and 6 are detail views.

Figs. 7, 8 and 9 are fragmentary views of certain of the driving elements.

In the drawings A represents the framework as a whole, B the conveyer for the bottles, C the liquid receptacle or tank, D the filling devices as an entirety, E the capping devices as an entirety and F the sealing mechanism as an entirety. The main or primary driving mechanism is indicated by G and the driving mechanism for the conveyer and for the stop devices by H, while I designates the mechanism for regulating the feed of the liquid as a whole.

The frame A preferably consists of a metal base 1 upon which are secured the side plates 2. 3 is a material holding receptacle secured to the side plates. At the rear said side plates are joined by a T-shaped bracket 5 upon which some of the driving parts are mounted. The lower front end of the receptacle 3 is formed with openings through which the liquid escapes. 9 indicates projections or bosses arranged at opposite sides of the machine and adapted to rigidly support guide rods 10.

13 indicates tubes for directing the liquid from the escape ducts or openings to the bottles. To each of these tubes is fitted a sleeve 14 which at its lower end is enlarged, as shown at 15, and adapted to receive the mouth of a bottle and also preferably flared to direct the mouth of the bottle into the groove.

The liquid releasing mechanism consists of valves 21 and valve rods 24 which extend up through the liquid escape ducts and upward through the tank 3 are secured to the cross head 25 in any suitable manner, preferably by screw thread connections and lock nuts, as shown at 24^{x}. This cross head is provided at its ends with shoulders or bosses 26 through which the rods 10 are passed, said rods serving to guide the cross head vertically. 28 are anti-friction rollers mounted at either side of said cross head for a purpose to be hereinafter described.

31 are rods slidably mounted at their upper ends preferably in brackets 29, each of which is carried by the cross head 25. At their lower ends the rods 31 carry plates 32 for depressing the sleeves 14. Said plates 32 are secured to the rods 31 between two adjustable collars 33 which are adapted to be locked to the rods by the set screws 34. 36 is a loose collar mounted on each rod 31. The collar 36 serves as an abutment for a spring 37 which extends between said collar 36 and the adjacent bracket 29 and tends to move the adjacent plate 32 downwardly.

The depression plates 32 bear upon and cause the sleeves to move downward. 38 is a lever arm pivotally mounted on a shaft 39 which is mounted in the bracket 4, and provided at 40 with a longitudinally adjustable weight. The outer end 41 of the arm is bifurcated to partially surround the adjacent sleeve 14 and to bear upon the depression plate 32.

Of the capping devices E, 42, 43, are guide sleeves adapted to guide slide rods 44. 45 is a cross head secured to the rods 44 and adapted to be moved up and down thereby. 47 are hollow plungers movably mounted in vertical legs of the brackets 4, each arranged in the longitudinal plane of a filling head and connected by a rod 48 in any well known manner to the cross head 45. Secured in the horizontal legs of the brackets 4 and equally spaced from the plungers are feed hoppers or magazines 52 for the closures or disks 53. The hoppers 52 preferably pass up through and loosely fit suitable openings in the cross head 45. The upper ends of the hoppers 52 are preferably opened to permit ready filling with disks 53. 54 is a weight rod shaped to bear upon and cause the downward feed of the disks in the magazine.

56 are shoulders or lugs which project out under the magazines 52, and support a transversely arranged plate 57, and in close proximity to the bottom of the magazines. The plate is formed with apertures adapted to register with the grooves in the mouths of the bottles to be capped. Mounted on said plate 57 is the endwise reciprocatable valve or disk advancing plate 59, which feeds the caps or disks from the magazines to positions above the apertures in the plate 57.

118 indicates a paraffin tank preferably supported by the sides 2. The tank 118 is adapted to hold melted paraffin. In its bottom are formed apertures through which the paraffin flows to the tops of the bottles after they have been capped, for the purpose of sealing them. 121 is an endwise reciprocating valve plate supported adjacent to the bottom of the tank. This plate is provided with apertures which register at predetermined intervals with the apertures in the bottom of the tank to control the escape of sufficient paraffin to properly seal the bottle closures. 124 is a pipe for steam or hot water leading to the heating coil 125 in the bottom of the tank which is adapted to keep the paraffin in a molten condition. 126 is a discharge pipe for the water. Above each aperture in the tank may be arranged a throttle valve consisting preferably of a disk having an aperture therethrough adapted to register with the aperture in the tank below it. This disk is provided with a stem which extends through and, by means of a screw thread, adjustably engages with one side wall of the tank, being provided at its outer end with a thumb piece 130. The flow of paraffin through any one or all of the apertures may thus be quickly regulated by adjusting said throttle valves.

The bottle advancing and conveying mechanism preferably consists of a table 66 which extends from end to end of the frame 1 in a plane below the filling mechanism D, the capping devices E and the sealing mechanism F. At each end the table 66 is provided with a pair of downwardly extending projections 67. In those bearings are rotatably mounted the shafts 69, 70. 71 represent sprocket wheels secured to said shafts 69, 70, and adapted to engage and drive the conveyer 72. This conveyer is of peculiar and novel construction. As illustrated, it consists of a series of parallel cross carriers 73 connected together by links 74, each cross carrier having distinct and separate receiving compartments for as many bottles as the machine is adapted to fill at one time. Each cross carrier consists preferably of a bar 75 recessed as shown at 76 for the purpose of lightening the parts. 78 indicates pairs of pins or guide devices the inner ends of which may be secured in any desired manner to the front face of each bar 75. 77 indicates a plurality of jaws, one for each bottle. At its opposite ends each jaw 77 is provided with lugs or projecting end walls 77′ formed with openings through which a pair of pins 78 extend to support the jaw on the adjacent bar 75. At their outer ends the pins 78 are provided with heads 78′ which serve as stops to prevent the adjacent jaw from sliding off of the pins. The pairs of pins 78 project from the front face of each bar 75 a distance greater than the thickness of the end walls 77′ to permit the jaws to move toward and from the front face of the adjacent bar 75. 75ª indicates one or more recesses formed in the front face or wall of each bar 75 adjacent to each of the jaws 77 and 77ª indicates a recess or recesses formed in the rear wall of each jaw 77 in alinement with each of the recesses 75ª. 80 indicates a spring, preferably of the compression type, mounted in each two alined recesses in the bar 75 and adjacent jaw 77. One end of the spring 80 bears against the bottom of the recess 75ª in which it is mounted and its opposite end bears against the bottom of the alined recess in the adjacent jaw 77 and normally tends to move the latter outwardly. I preferably provide a pair of springs between each jaw 77 and the adjacent bar 75 and arrange them relatively close to the guiding and supporting pins 78 so as to overcome bending tendencies between the jaw 77 and pins 78; also, due to the concaved shape of each jaw to conform to the contour of the bottles, the jaw walls are thicker near their opposite ends and thus permit a relatively deep recess 77ª to be formed therein. This arrangement is advantageous in that it permits the use of relatively thin jaws which tend to materially reduce the weight of the conveyer as a whole.

The bars 75 are spaced from each other

a distance which permit the bottles 180 to be placed between the concaved walls of the jaws 77 and the rear walls of the bars in front thereof and be gripped therebetween. The bottles 180 rest on and slide over the table 66, but being gripped between the jaws 77 and bar 75, they are steadied and maintained upright while being moved by the conveyer forwardly.

81 indicates ribs mounted on and extending longitudinally of the table 66 in parallel relationship. The ribs 81 are preferably secured to the table 66 by bolts 82. The ribs 81 are uniformly spaced from each other a sufficient distance to receive between them a bottle but to permit the bottle to freely slide or move between them over the table. The ribs 81 extend upwardly a considerable distance and thus serve not only to brace the bottles at their bottoms, but to coöperate with the gripping jaws 77 to steady the bottles and prevent bodily or tilting movements thereof laterally. The upper edges of the ribs 81 are disposed in a plane coinciding with the plane in which the lower faces of the bars 75 are supported. By this arrangement the bars 75, intermediate their opposite ends, are supported by and ride on the ribs 81. This prevents sagging of the bars 75 and also insures the engagement of the jaws 77 with the bottles 180 at or near their centers of gravity.

Motion is preferably imparted to the conveyer 72 through the shaft 83 mounted in bearings 84 (see Fig. 7) in the downward projections 85 of the table. The transmission of power is obtained through a wheel 86 secured to said shaft and provided near its periphery with a lug 87 projecting at right angles to its face, said lug being adapted to engage with the radially arranged clips 88 on the face of a wheel 89 rigidly secured to the shaft 70. By these devices a step by step motion is imparted to the conveyer, the movements depending on the rotation of the shaft 83, to insure that the bottles shall be positioned properly at the points where they are to be filled, capped and sealed.

I preferably provide automatically actuated stop devices for each of the bottles adapted to limit the advance of the same beyond a certain point during each step by step movement of the conveyer. The parts of these stop devices are illustrated in Fig. 2. 90, 91, are horizontal cross bars arranged beneath the table 66. Secured thereto and extending vertically upward therefrom are the pins of stop bars 92, 93, which pass through the bosses or guides 94 on the table and are adapted to be projected into the pathways of the bottles at their points of filling and capping, as shown. 95, 96, are brackets secured to the bottom of the table and adapted to support the cross bars 90, 91, and their operative parts. 97 is a longitudinally reciprocating rod fitted into the guides 98 on the said brackets and adapted for slight vertical play therein. At its front end the said rod is pivoted to one arm of a bell crank lever 99 which is pivotally mounted in a projection on the bracket 95. The other arm of said lever is pivoted to one end of the link 100 the opposite end of which is pivoted to a lug 101 on the bar 90.

At its rear end the rod 97 is pivotally connected to one arm of a bell crank lever 102 which is likewise pivotally mounted in a projection on the bracket 96 and the other arm of which is pivotally connected to one end of a link 103 the opposite end of which is likewise pivoted to a lug on the bar 91. It will be noted that the bell crank levers are mounted in such a manner that the weight of the parts supported by them will tend normally to throw the rod 97 rearward and withdraw the stop bars 92, 93, from the path of the bottles.

104 is a cam secured to the shaft 83. Its edges engage with the rear end of the rod 97 and are constructed and timed to cause the gradual forward movement thereon of the rod 97 so that the stop bars 92, 93, will be projected into the paths of the bottles as they approach the filling and capping points, and the cam will, furthermore, permit the gradual withdrawal of said stop bars on the return throw of the return rod 97.

It is very essential in machines of this description that quick and efficient means be provided for the adjustment of the bottle supports or table relative to the filling and capping parts or vice versa, so as to readily accommodate the machine for the filling and capping of bottles of different lengths. For this purpose I have mounted and balanced the table centrally upon a support or bracket 105, free to be vertically adjusted relative to the filling and capping mechanisms. 106 are bolts for securing the table to the support 105. 108 is a vertically arranged shaft provided at its upper end with a screw threaded part 109 which is adapted to be screwed into the body of the support. At the lower end of the screw there is a bearing plate and the lower end of the shaft preferably carries the bevel gear 111. 112 is a cross plate secured at its ends to the sides of the base 1 and serves as the supporting member for the table 66. 113, 114, indicate bearing pieces secured to opposite sides of the plate 112. The shaft 108 passes centrally through an opening in the plate 112 and bearing pieces 113, 114. The collar 110 bears upon the upper end of the hub 113. 115 is a horizontal shaft arranged directly below the vertical shaft 108 and having its ends mounted in the framework 1. It is provided with a bevel gear 116 adapted to

mesh with and drive the bevel gear 111. The shaft 115 may project beyond one side of the base of the machine and be provided with a hand wheel 117 through which power may be applied to turn the shaft, thereby raising or lowering the table 66 and its attached parts as desired.

The power for driving all the operative parts of the apparatus is preferably applied through the pulleys 131 on the shaft 132 which is mounted longitudinally of the machine in bearings 133, preferably formed integral with the cross plate or bracket 5. The shaft is provided between said bearings with a worm 134 adapted to mesh with and drive a worm gear 135 secured to the transverse shaft 136 which is rotatably mounted in bearings 137 on the upwardly extending arms 138 of the sides of the frame. Power for operating the filling and capping mechanism is applied as follows: At its extremities this transverse shaft 136 carries cranks or cam-like devices 139, having projecting lugs, which engage with and operate the levers 141 fulcrumed on the side plates 2. The other ends of said levers 141 engage with the anti-friction rollers 28 on the cross head 25. A second pair of levers 144 are pivoted at their front ends to shaft 145 extending from the upper front corner of the side plates 2. Said levers 144 are preferably connected to the levers 141 by means of pivoted links 147 and are also connected between collars 148 on the slide rods 44 of the rear cross head 45.

149 is the cam through which motion is preferably transmitted, by mechanism (not shown) to the reciprocating valve plates 59 and 121. The cam is secured to the shaft 136 at any convenient point.

The power transmitting devices for the conveyer comprise a gear 158 rigidly secured to the shaft 136 and adapted to mesh with a pinion 159 on a shaft 160 mounted in a bearing 161 at the upper end of the frame arm 138. On the outer end of the shaft 160 is secured a sprocket wheel 162 belted by a chain 163 to a sprocket wheel 164. The sprocket wheel 164 is secured to a counter shaft 165 which is mounted in a bearing 166 carried by the table 66. On the inner end of said shaft 165 is secured a gear 167 which meshes with a gear 168 on the shaft 83.

L indicates as an entirety means for centering the mouths of the bottles so that the inserting device for the closures will register exactly with the groove or opening in the mouths thereof. These means consist of a transverse bar 169 secured in the side plates of the frame. Pivoted to said bar are a series of parallel arms or bars 170, each provided with an apertured plate 171. The walls of the apertures in the plate 171 are flared for the purpose of engaging the mouths of the bottles and causing their openings to register with the apertures, thus insuring that the closures 53 will be properly directed into the mouths of the bottles. 174 is a transverse bar arranged above but connected to the arms 170 by rods 175. At its ends said bar is mounted on the rods 176 pivotally suspended from the levers 144 and guided at their lower ends in brackets 177 secured to the sides of the frame. Springs 178 mounted on the rods between the said brackets and the bar 174 exert an upward pressure on the bar, thus holding the centering arms normally above the bottles. 179 are collars rigidly secured to the rods 176 above the bar 174. Their function is to depress said bar against the pressure of the said springs as the lever 144 rocks downward, causing the centering arms to engage the mouths of the bottles and center them just prior to the insertion therein of the closure.

The operation of the apparatus may be described as follows: Starting then with the cross member 25 at the upper end of its stroke, the power is applied through the pulley 131 and transmitted through shaft 132 to the shaft 136 simultaneously imparting motion to all of the driven parts. The lugs on the disks 139, which are at this time at the lowest points in their anti-clockwise paths of rotation, begin to rise thereby swinging the levers 141 on their pivots 142 and causing their front ends to descend and at the same time causing the descent of the levers 144 under pressure applied to them through the links 147, whereby the rear cross head 45 carrying the plungers 47 also begins its descent. The power transmitted to the conveyer mechanism has in the meantime caused the advance of the conveyer, and the projecting of the stop devices 92, 93, into the pathway of the bottles at the points of filling and capping, so that the bottles are now properly positioned under the respective devices.

The forward advance of the conveyer sections is then interrupted and the heads 15 engage with the mouths of the empty bottles, the collars 179 on the rods 176 contact with and depress the bar 174 and cause the centering arms 170 to engage and center the mouths of the bottles under the capping mechanisms.

The further downward movement of the forward ends of the levers 141 permits the cross head 25 carrying the valve rods 24 to unseat the escape valves 21 against the resistance of the springs 37 and thereby permit the flow of liquid from the tank 3 to the bottles. Just before the front ends of the levers 141 reach the lower end of their stroke the cam 149 operates the valve plates 59 and 121, the former transfers the disks 53 from the magazines 52 to the apertures above the bottles, depositing them upon supporting wings

(not shown); while the valve plate 121 opens the escape ducts to permit the flow of paraffin from its tank to the closures on the bottles beneath it.

The further downward movement of the levers 141, acting through the levers 144, causes the plungers 47 to drive the closures 53 into the mouths of the bottles. By this time the lugs on the disks 139 have reached the uppermost point in their circular course and now begin to descend, thereby causing the outer ends of the levers 141 to swing upward carrying therewith the cross heads 25 and 45.

The cam 104 on the shaft 83 now permits the withdrawal of the stop elements 92, 93, from the paths of the bottles. The cam 149 shifts the valve plates 59 and 121, causing the apertures in the former to register with the apertures in the magazines 52; the shifting of the latter valve cutting off the flow of paraffin from its tank. The escape valves 21 are reseated, cutting off the flow of liquid to the bottles and the filling heads 15 are lifted above the mouths of the same.

The lug 87 carried by the wheel 86 on the shaft 83 now engages with a cleat 88 on the wheel 89 and the conveyer moves forward advancing all the bottles one step. In the meantime a row of bottles to be filled has been placed in the conveyer sections at the forward end of the table.

The machine shown is adapted to fill and cap bottles of two capacities. For this purpose I prefer to regulate the quantity of liquid delivered to the bottles by changing the speed of rotation of the shaft 132. The driving pulley, not shown, is of fixed diameter and rotated at a certain uniform speed, while the pulley 131 is provided with two belt engaging portions each of which is so proportioned that it will cause the valves 21 in the filling heads 15 to be unseated for a fixed period of time necessary to permit the flow through the tubes 13 into the bottles of a predetermined quantity of liquid.

If the belt is placed upon the part of the pulley 131 of largest diameter the valve 21 will be opened for one period of time; on the other hand, if the belt is placed upon the part of the pulley of smaller diameter, the operation of the parts of the machine will be more rapid than in the first instance, and therefore a smaller quantity of liquid will be permitted to escape past the valve 21. It will thus be understood that by changing the speed of rotation of the shaft 132, the machine may be adapted to fill bottles of different capacity.

When the table is adjusted vertically it is necessary that some form of compensating device be provided for either lengthening or shortening the chain 163, according to the direction of adjustment of the table. In the drawings I have shown a slotted or grooved plate 181 secured to the framework of the machine. 182 is a bolt, the head of which is adapted to engage with the inner walls of the said groove. This bolt extends outwardly from the frame and is provided with a tubing or sleeve 183 and a nut 184. A sprocket idler 185 is loosely mounted on the said sleeve, as shown. When the table is raised or lowered, it is merely necessary to loosen the nut 184 and move the bolt 182 longitudinally of the stationary plate 181 until the idler gives the desired tautness in the chain; then the bolt can be secured in position by tightening the nut.

To those skilled in the art of making apparatus of the class described, many alterations in construction and widely differing embodiments and applications of my invention will suggest themselves, without departing from the spirit and scope thereof. My disclosures and the description herein are purely illustrative and are not intended to be in any sense limiting.

What I claim is:

1. In apparatus of the class described, the combination of a support, a plurality of transverse bars for moving the bottles over said support, a plurality of members connected to one side of each bar and movable relative thereto independently of each other, each said member being recessed to engage a bottle, and a pair of springs interposed between the opposite ends of each said member and the adjacent transverse bar and tending to move the member therefrom, whereby said member may engage one wall of a bottle and hold it in engagement with the opposing wall of the other bar while moving it over said support.

2. In apparatus of the class described, the combination of a support, means for moving the bottles over said support, said means including a plurality of transverse bars, a plurality of members connected to one side of each bar and movable relative thereto independently of each other, and a spring interposed between each said member and the adjacent transverse bar and tending to move the member therefrom, whereby said member may engage one wall of a bottle and hold it in engagement with the opposing wall of the other bar while moving it over said support, and guides fixed to said support and engaging the walls of the bottle to prevent lateral movement thereof as it is moved over said support.

3. In apparatus of the class described, the combination of a support, and means for moving bottles over said support, said means including pairs of transverse bars, pairs of pins projecting horizontally from one side wall of each bar, a jaw slidably mounted at its opposite ends on each pair of said pins and adapted to engage a bottle, and a spring normally tending to move the

jaw away from the adjacent bar to maintain the bottle against the opposing wall of the other bar.

4. In apparatus of the class described, the combination of a support, and means for moving bottles over said support, said means including pairs of transverse bars, pairs of pins projecting horizontally from one side wall of each bar, a jaw slidably mounted at its opposite ends on each pair of said pins, the bottle engaging wall of each jaw being concaved between the pins upon which it is mounted and adapted to engage a bottle, and a spring normally tending to move the jaw away from the adjacent bar to maintain the bottle against the opposing wall of the other bar.

5. In apparatus of the class described, the combination of a support, means for moving bottles over said support, said means including pairs of transverse bars, pairs of pins adjustably connected to and projecting horizontally from one side wall of each bar, a jaw slidably mounted at its opposite ends on each pair of said pins and adapted to engage a bottle, and a spring normally tending to move the jaw outwardly or away from the adjacent bar to maintain the bottle against the opposing wall of the other bar, and means for limiting the movement of each jaw outwardly.

In testimony whereof I have hereunto signed my name.

JOHN C. MILLER.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents. Washington, D. C."