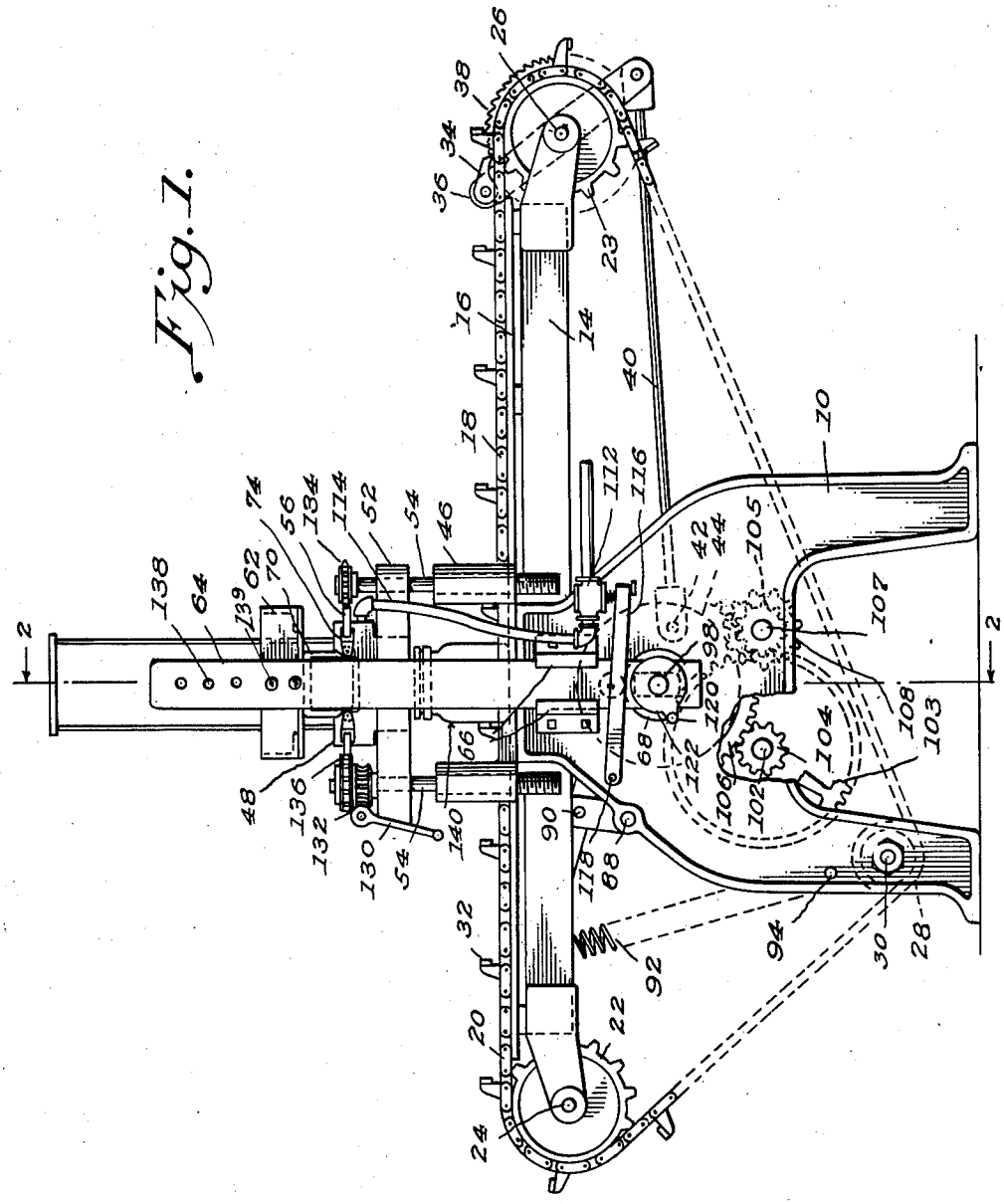
Nov. 23, 1943. G. GLOCKER 2,335,052

METHOD AND MACHINE FOR APPLYING CLOSURES AND SEALING JARS

Filed Dec. 20, 1941 4 Sheets-Sheet 1

Fig. 1.



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METHOD AND MACHINE FOR APPLYING CLOSURES AND SEALING JARS

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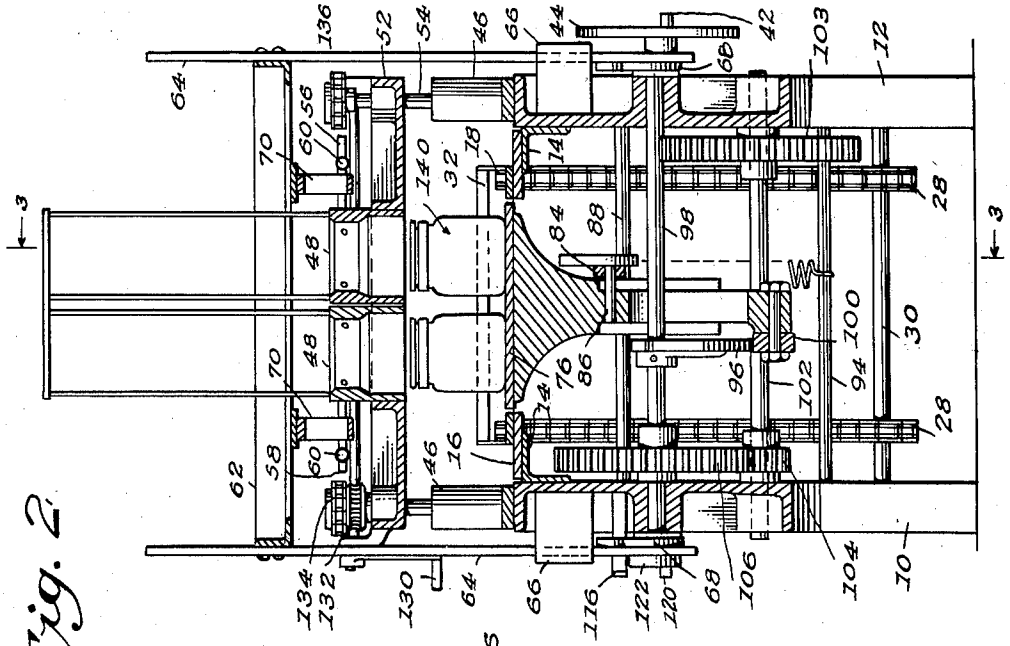


Fig. 2.

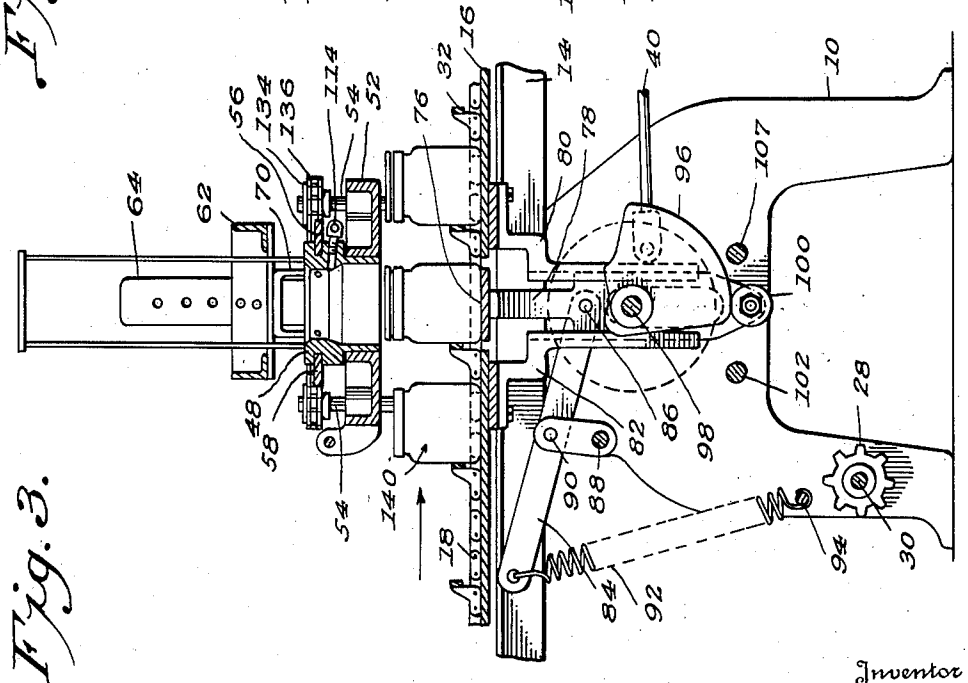


Fig. 3.

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METHOD AND MACHINE FOR APPLYING CLOSURES AND SEALING JARS

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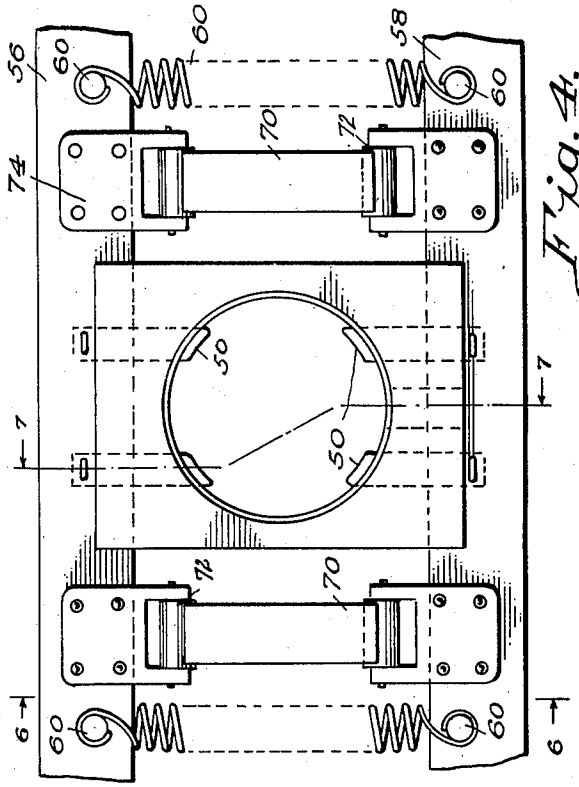


Fig. 4.

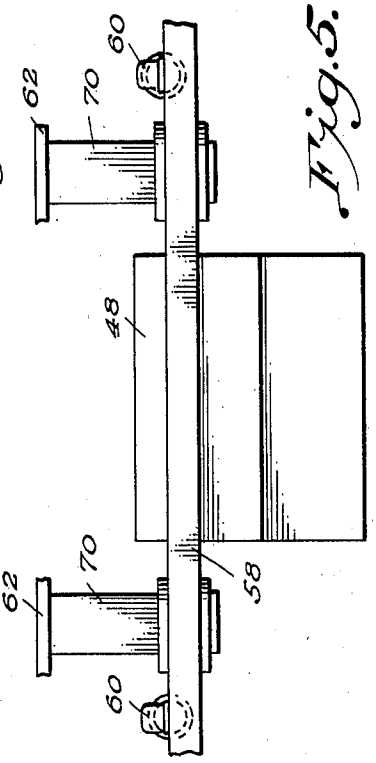


Fig. 5.

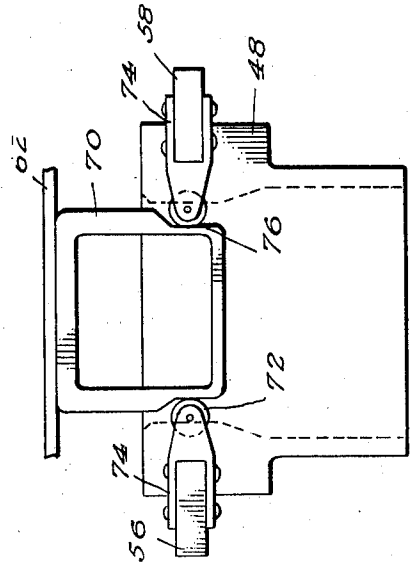


Fig. 6.

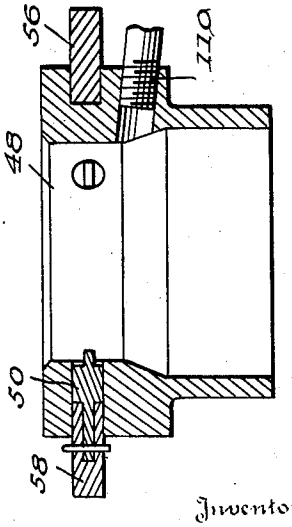


Fig. 7.

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METHOD AND MACHINE FOR APPLYING CLOSURES AND SEALING JARS

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Fig. 10.

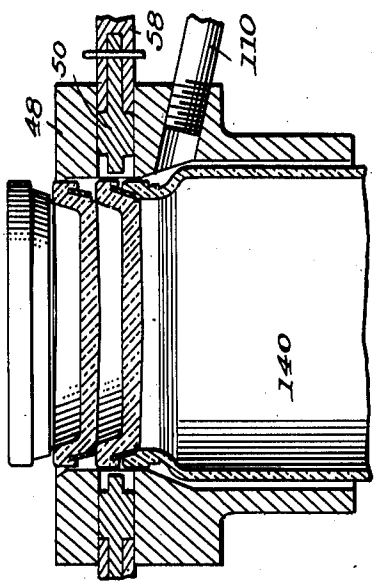


Fig. 11.

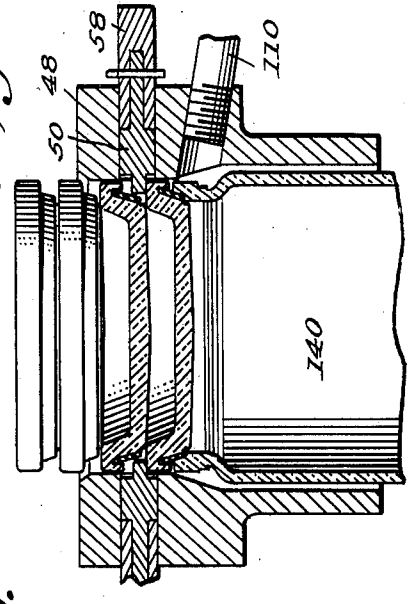


Fig. 8.

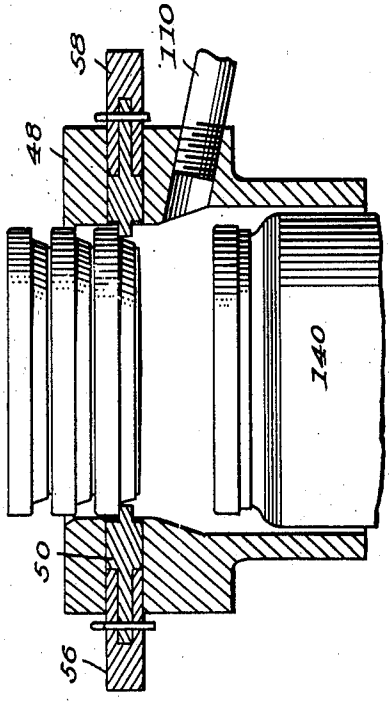
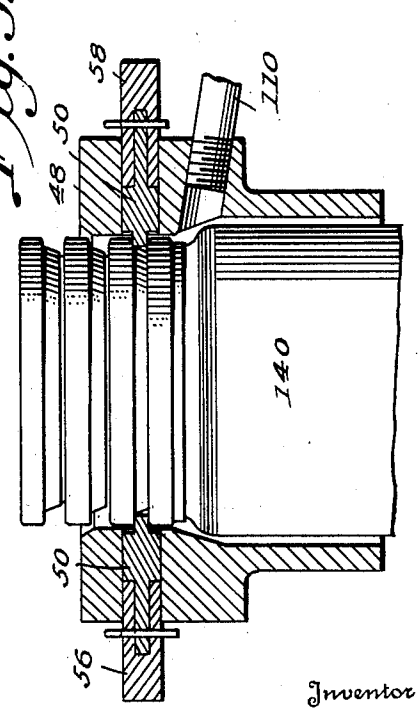


Fig. 9.



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2,335,052

UNITED STATES PATENT OFFICE

2,335,052

METHOD AND MACHINE FOR APPLYING CLOSURES AND SEALING JARS

Gustave Glocker, Washington, D. C.

Application December 20, 1941, Serial No. 423,832

4 Claims. (Cl. 226—80)

This invention relates to a method for applying closures and sealing jars and to a machine for performing the method. More particularly, the invention relates to a method and machine for hermetically sealing jars by admitting live steam into the head space of a jar just before the closure is applied.

Heretofore there have been in use methods and machines for hermetically sealing jars which have utilized a jet of steam or a body of steam for the purpose of creating a vacuum in the head space of the jar; the vacuum being caused by the condensation of the steam in the head space after the application of the closure. All such methods and the apparatus for performing such methods have provided for the use of a considerable amount of pressure on the closure during at least the period required for the condensation of the steam trapped in the jar. Other methods have required the use of external weight or pressure for even longer periods, extending in some instances throughout the time required to cool the jar and its contents. The machines available heretofore for performing such methods have made provision for the application of the required pressure to the closure for effecting a permanent seal and such machines because of these provisions have been relatively slow in their operation with the consequence that their capacity for sealing great quantities of jars in short periods of time has been greatly impaired.

In my Patent Number 2,280,070, granted April 21, 1942, I have disclosed a container and a closure therefor which provides such an effective seal between the closure and the container as to render it unnecessary to apply substantial pressures to effect the seal. The present invention is based on my discovery that effective hermetic seals can be secured with the sealing arrangement disclosed in my prior application by utilizing the weight of a plurality of closures, and in some instances that of a single closure, for pressing the lid carried sealing gasket into contact with the jar.

In accordance with the present invention the method for sealing jars is carried out by supporting a vertical stack of closures in dispensing position at a closure-applying station, intermittently moving jars into the closure-applying station, elevating the jars into contact with the bottom closure in the closure stack during the dwell in the intermittent movement, injecting steam into the head space of the jar during its movement toward the closure, releasing the stack to permit the weight of the closures therein to fall on the mouth of the jar to at least momentarily deform a closure-carried sealing gasket into sealing relation with adjacent surfaces of the jar; then withdrawing the jar and its attached closure while retaining the remaining closures in dispensing position.

The full nature of the method will be more fully understood from a description of the preferred form of machine which I have devised for its execution.

In the drawings forming a part of this application like reference numerals indicate like parts and:

Figure 1 is a side elevational view of the closure-applying and jar-sealing machine;

Figure 2 is a transverse cross sectional view on line 2—2 on Figure 1;

Figure 3 is a longitudinal cross sectional view on line 3—3 of Figure 2;

Figure 4 is a plan view of a fragment showing a closure feeding magazine and associated mechanism;

Figure 5 is a fragmentary side elevational view of the parts shown in Figure 4;

Figure 6 is a transverse sectional view taken on line 6—6 of Figure 4;

Figure 7 is a vertical cross sectional view taken on line 7—7 of Figure 4;

Figure 8 is a vertical sectional view of the throat of a closure magazine, showing the position of the parts as a jar is moved upwardly therein;

Figure 9 is similar to the view in Figure 8 but shows the position of a jar just prior to the release of the closures;

Figure 10 is a vertical sectional view of the throat of a closure magazine and shows the position of a jar just after the release of the closures; and,

Figure 11 is a vertical sectional view of the throat of a closure magazine and shows the position of a jar and its closure after the same have started to descend.

The machine illustrated in the drawings has a supporting frame consisting of spaced upright members 10 and 12 between which is fixed a horizontal frame 14 which supports a table 16 over which jars to be sealed are moved in step by step manner by means of an intermittently operated conveyor 18. The conveyor 18 consists of a set of sprocket chains 20 disposed at the parallel edges of the table 16. The chains 20 extend into contact with sprocket wheels 22 and 23 at the respective ends of the horizontal frame 14. The sprocket wheels 22 and 23 are mounted for rotation with sprocket shafts 24 and 26, respectively. The lower runs of the sprocket chains 20 are controlled by sprocket wheels 28 mounted for rotation with a shaft 30 extending between the support members 10 and 12. Jar engaging bars 32 are fixed for movement with the sprocket chains and constitute spaced means for engaging a jar and moving the same along the surface of the table 16.

The conveyor is given an intermittent movement by a pawl 34 which is pivoted to a rocker arm 36 and which engages a ratchet wheel 38 keyed to the shaft 26. The rocker arm 36 is supported by the shaft 26 for rocking movement thereon and the end remote from the pawl is attached to a connecting rod 40 through which the pawl and ratchet mechanism is operated to advance the conveyor along the surface of the table 16. The connecting rod 40 is supported on a pin 42 located eccentrically on a cam disc 44.

Screw threaded support columns 46 are fixed to the frames 10 and 12 and extend upwardly therefrom. These columns are internally threaded and form bearings for adjustable cross head supporting shafts 54. The closure magazines include a throat portion 48 on which a stack of closures are supported by a plurality of fingers 50 extending through the wall of the throat. The closure supporting fingers 50 normally lie within the throat space and engage under the edges of closures to be fed therethrough. The magazine throats 48 are fixed to a cross head 52 which extends between the screw threaded adjusting shafts 54. The adjusting shafts 54 are journaled for rotation in and with respect to the cross head 52.

The closure supporting fingers 50 are carried by parallel bars 56 and 58 disposed at opposite sides of the magazine 48. These bars are held in contact with the sides of the magazine 48 by means of interconnecting springs 60 and consequently the supporting fingers 50 are projected into the magazine throats to provide support for a stack of closures. The fingers 50 are withdrawn from their closure supporting position by spreading the bars 56 and 58 against the tension of the springs 60, in a manner more fully described hereafter.

A cam bridge 62 is adjustably supported on bridge supporting standards 64 which are guided for vertical movement in guide members 66 on the side frames 10 and 12. The lower ends of the vertical bridge supports 64 are slotted to accommodate cams 68 which are adapted to raise the cam bridge 62, the same being of sufficient weight to follow the cam surfaces in a downward direction of movement. The cam bridge 62 has fixed thereto for movement therewith cam members 70 adapted to spread the bars 56 and 58 and thereby withdraw the closure supporting fingers 50. The cams 70 lie in contact with rollers 72 carried in brackets 74 on each of the parallel bars 56 and 58. The reduced lower end 76 of the cams 70 permits the bars 56 and 58 to lie in contact with the closure magazines 48. Should, however, the cams 68 be rotated to permit the cam bridge 62 to fall, the enlarged portion of the cams 70 will bear against the rollers 72 and spread the bars 56 and 58, thereby withdrawing the supporting fingers 50 from the magazine throat.

The table 16 is provided with a transverse elevator section 76 located directly under the closure magazines 48. The elevator section 76 is supported on a yoke 78 which is guided in vertically disposed brackets 80 and 82. The elevator 76 is urged above the level of the table 16 by means of a lever 84 which is pivoted on the yoke, as at 86, and which is spring biased around intermediate pivot points 88 and 90 by means of a spring 92 which has one end thereof attached to the end of the lever and the other end thereof attached to a shaft 94 which extends between the frame members 10 and 12.

The elevator 76 is, however, retained in its normally depressed position in the plane of the table 16 by means of a cam 96 which is fixed to and rotated with a cam shaft 98. The cam 96 lies in contact with a cam roller 100 at the lower end of the yoke 78 to control the position of the yoke.

The cam shaft 98 is drven from a countershaft 102 through engagement of a countershaft pinion 104 with a cam shaft gear 106. The countershaft 102 has fixed thereto a drive gear 103 which receives power through a drive pinion 105 carried by a parallel drive shaft 107.

The lower ends of the magazine throats 48 constitute a steam chamber in each thereof which is connected with a source of live steam. The wall of the steam chamber may be provided with a plurality of steam jets 110 connected to a steam inlet valve 112 by means of a steam conduit 114. The steam valve 112 is normally closed and retained in closed position to block passage of steam through to the steam chamber of the magazine throats. A lever 116 has been provided for opening the steam valve 112 periodically and in timed relation with the upward movement of the elevator 76. One end 118 of the valve operating lever 116 is pivoted to the frame member 10 and the free end thereof lies adjacent the stem of the valve 112. The lever 116 overlies a projection 120 on a cam plate 122 secured to the cam shaft 98. The projection 120 is so located as to contact the valve operating lever 116 to operate the valve 112 and admit steam to the steam chambers in the magazine throats at proper intervals.

The magazine cross head 52 may be raised and lowered to accommodate the position of the same to jars of different heights by rotating the shafts 54 in the screw threaded supporting columns 46, the shafts 54 being journalled for rotation in the cross head 52 but being held against longitudinal movement of the shafts 54 therein. An equal simultaneous adjustment of each shaft 54 is secured by operating a hand crank 130 to rotate a spur gear carried thereby which gear lies in contact with a worm gear 132 that is keyed to one of the shafts 54. Each of the shafts has keyed to its upper free end a sprocket wheel 134 and each of said sprocket wheels are embraced by a sprocket chain 136 whereby each shaft 54 is rotated in the same direction and to an equal degree.

The cam bridge 62 can be adjusted to correspond to the adjustment of the magazine cross head 52 by locating the same along the standards 64 at any point of adjustment represented by passages 138 adapted to receive screws 139.

The cam disc 44, the cams 68, the cam 96 and the cam plate 122 are all constructed and adjusted to obtain the sequence of operations as hereinbelow described in connection with the practice of a closure-applying and jar-sealing method.

Assuming that a jar 140 is at the approach to the sealing station under the closure magazines, rotation of the cam shaft 98 will reciprocate the connecting rod 40 to operate the rock shaft 36 and the pawl and ratchet mechanism 34 and 38 to advance the conveyor 18 one position, this position corresponding generally to the distance between two transverse conveyor bars 32. The movement of the conveyor 18 will deposit the jar 140 on the elevator section 76. Mean-

while the cam 96 has been operative to depress the yoke 78 with the result that the elevator surface 76 has been in the plane of the table 16. Upon arrival of the jar 140 on the elevator section 76, the cam 96 will move away from the cam roller 100 to permit the elevator 76 to rise under the power of the spring 92. As the open mouth of the jar 140 enters the magazine throat 48 and more particularly the lower end of the magazine which constitutes the steam chamber, the projection 120 on the cam plate 122 will have moved to a position adjacent the valve operating lever 116. Continued movement of the cam shaft 98 will permit the continued elevation of the elevator 76 and the opening of the valve 112 to admit steam to the steam chamber through the jets 110. In its continued passage upwardly, the jar 140 will have the head space thereof filled with live steam and as the cam shaft 98 continues to rotate and as the elevator 78 continues to rise, the projection 120 on the cam plate 122 will release the lever 116 permitting the same to drop and permitting the valve 112 to close. However, at this time the cam members 68 which are in contact with the supporting surfaces of the cam bridge support 64 will have rotated to a point permitting the cam bridge 64 to drop sufficiently to bring the wide surface of the cams 70 into contact with the rollers 72 on the spaced bars 56 and 58, thus withdrawing the closure supporting fingers 50 and permitting the closures normally supported thereon to drop to the mouth of the jar approaching the stack of closures in the closure throat 46. It is to be noted particularly that the full weight of the stack of closures is now on the mouth of the jar within the magazine throat. The upward movement of the elevator 76 continues momentarily whereby the stack of closures is lifted and whereby the full weight thereof becomes effective to seal the closure at the bottom of the stack to the mouth of the open jar within the magazine throat 48. Continued movement of the cam shaft 98 will cause the elevator 76 to descend, but before the jar thereon has moved below the closure support fingers 50, the cams 68 become effective to raise the cam bridge 67 so that the springs 60 may again draw the bars 56 and 58 and their attached closure supporting fingers 50 inwardly to engage the closure next above the one which has been sealed to the mouth of the jar and thereby hold the entire stack of closures in dispensing position.

The cam 96 will now depress the elevator 76 to a point at which its upper surface lies in the plane of the table 16. At this point the extended surface of the cam 96 will remain in contact with the cam roller 100 for a sufficient length of time to permit a further movement of the conveyor mechanism 18, to initiate another sealing cycle.

While the practice of the invention has been described with regard to a particular machine which embodies certain novel features, it is to be understood that the machine may be modified in numerous respects without departing from the spirit of the invention and that in fact other machines may be used for the execution of the method of applying closures and sealing jars in accordance with the teaching herein so long as such machines make provision for the release of the closure stack so that the weight thereof may provide the pressure for executing the preliminary sealing contact between the closure carried sealing gasket and the adjacent surfaces of the jar.

I claim:

1. The method of applying closures to jars and the like which includes the steps of supporting a vertical stack of closures in dispensing position at a closure-applying station, moving a jar or the like under said closures at said station, elevating said jar into contact with the bottom closure in said stack, releasing said stack whereby the weight thereof is sustained on the mouth of the jar to effect a seal between the jar and the bottom closure, and withdrawing the jar and closure while retaining the remaining closures in dispensing position.

2. The method of sealing jars and the like which includes the steps of supporting a vertical stack of closures in dispensing position at a closure-applying station, moving a jar or the like under said closures at said station, elevating said jar into contact with the bottom closure in said stack, injecting steam into the head space of said jar during its movement toward said closure, releasing said stack whereby the weight thereof is sustained on the mouth of the jar to effect a seal between the jar and the bottom closure, and withdrawing the jar and closure while retaining the remaining closures in dispensing position.

3. A closure-applying machine comprising a table, means on said table for advancing jars to a closure-applying station, a closure magazine for holding a stack of closures positioned above said table at a point along the length thereof, a jar-elevating means at said closure-applying station and under said magazine, means for supporting closures in said magazine, operating means for raising said elevator to position a jar thereon at the mouth of said magazine, mechanism operatively timed with said elevator-raising means for withdrawing said closure support to deposit a stack of closures on the mouth of a jar, and means operatively timing said closure support with the lowering of a jar to retain stacked closures in said magazine while depositing a single closure on the mouth of a jar.

4. A closure-applying machine comprising a table, means on said table for advancing jars to a closure-applying station, a closure magazine for holding a stack of closures positioned above said table at a point along the length thereof, a steam chamber below said magazine and disposed with its steam space in alignment with said magazine, a valve for admitting steam to said chamber, a jar-elevating means under said magazine, means for supporting closures in said magazine, operating means for raising said elevator to move a jar thereon through said steam chamber and into contact with the mouth of said magazine, separate means operatively timed with said operating means for first actuating said valve to admit steam to said chamber during the upward travel of said elevator and for then withdrawing said closure support to release a stack of closures thereon during the continued upward travel of said elevator, and means operatively timing said closure support with the lowering of a jar to retain stacked closures in said magazine while depositing a single closure on the mouth of a jar.

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