May 8, 1928. 1,668,922

A. PODEL

ASSEMBLY MACHINE

Filed Feb. 9, 1926 9 Sheets-Sheet 1

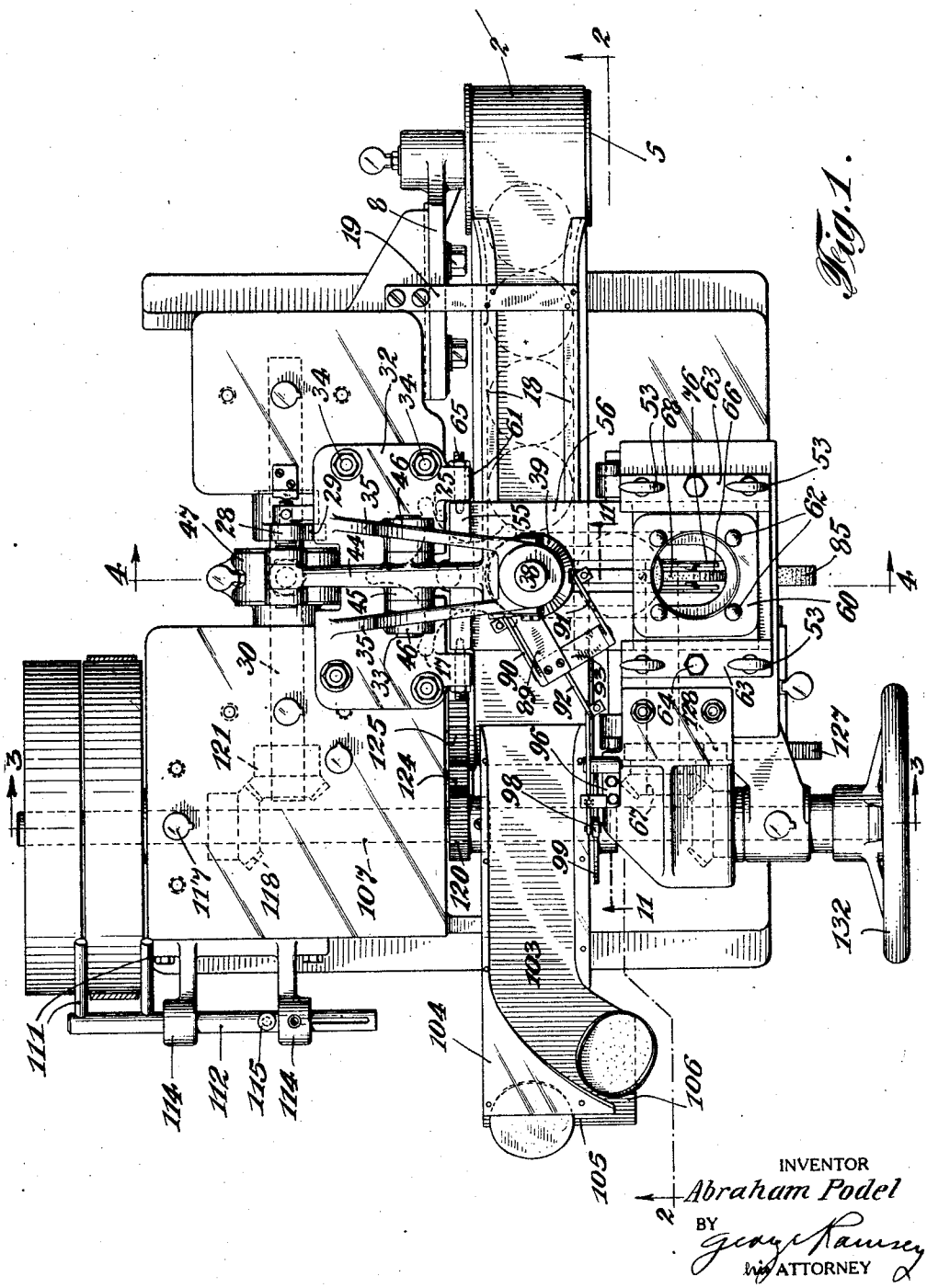


Fig. 1.

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A. PODEL

ASSEMBLY MACHINE

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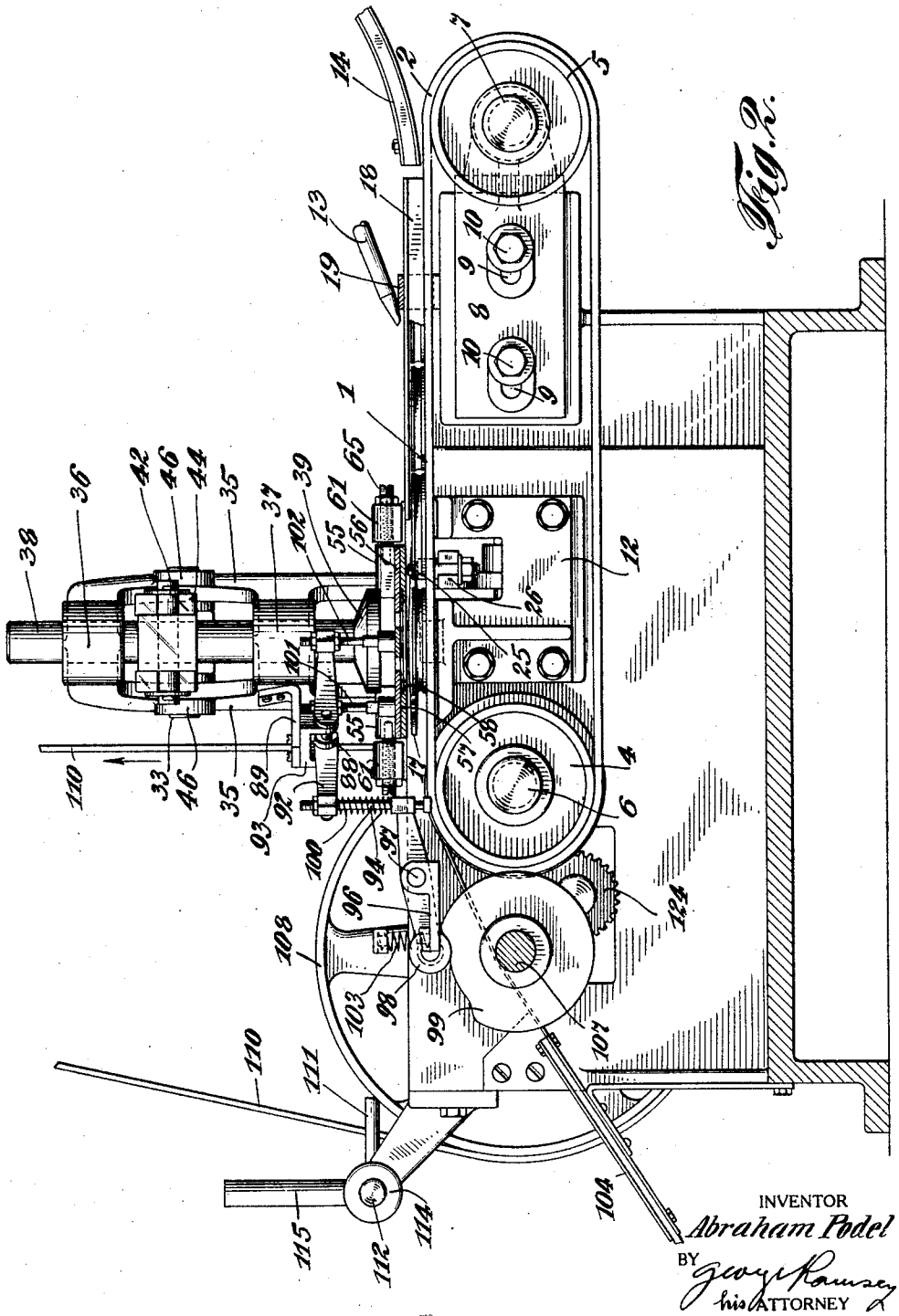


Fig. 2.

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A. PODEL

ASSEMBLY MACHINE

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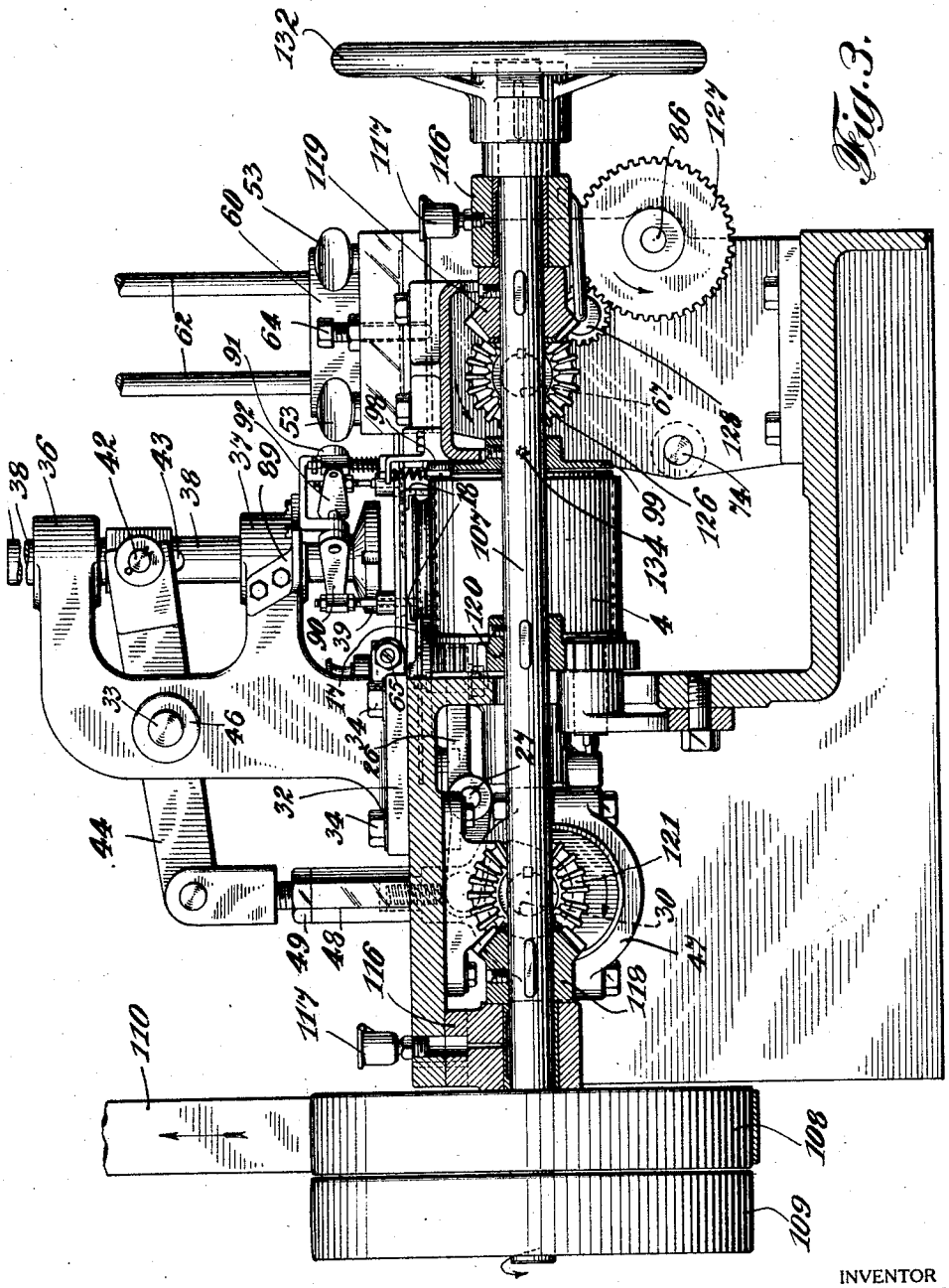


Fig. 3.

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A. PODEL

ASSEMBLY MACHINE

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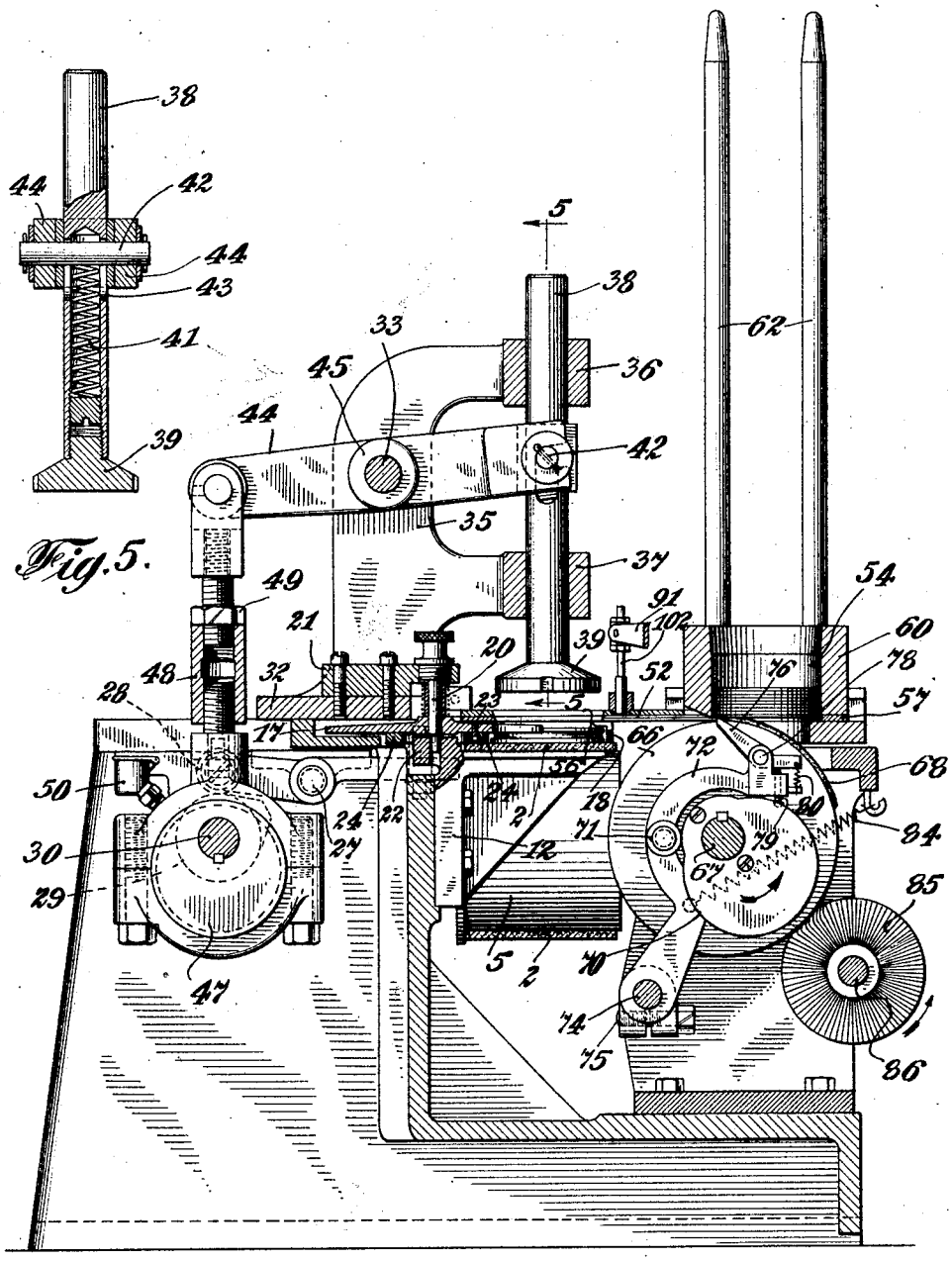


Fig. 4.

Fig. 5.

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May 8, 1928. 1,668,922

A. PODEL

ASSEMBLY MACHINE

Filed Feb. 9, 1926 9 Sheets-Sheet 5

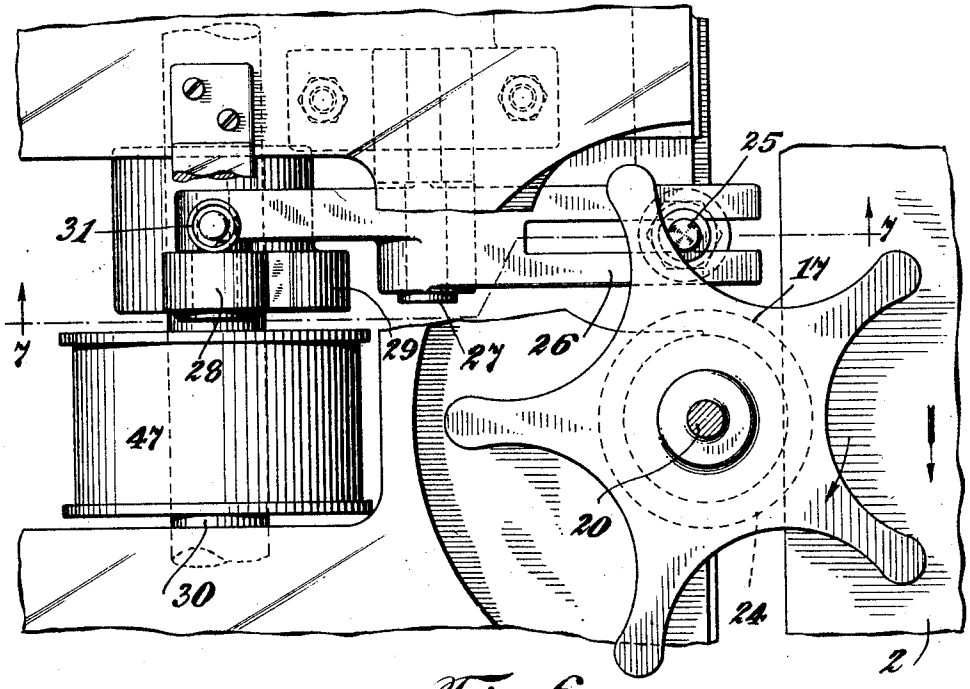


Fig. 6.

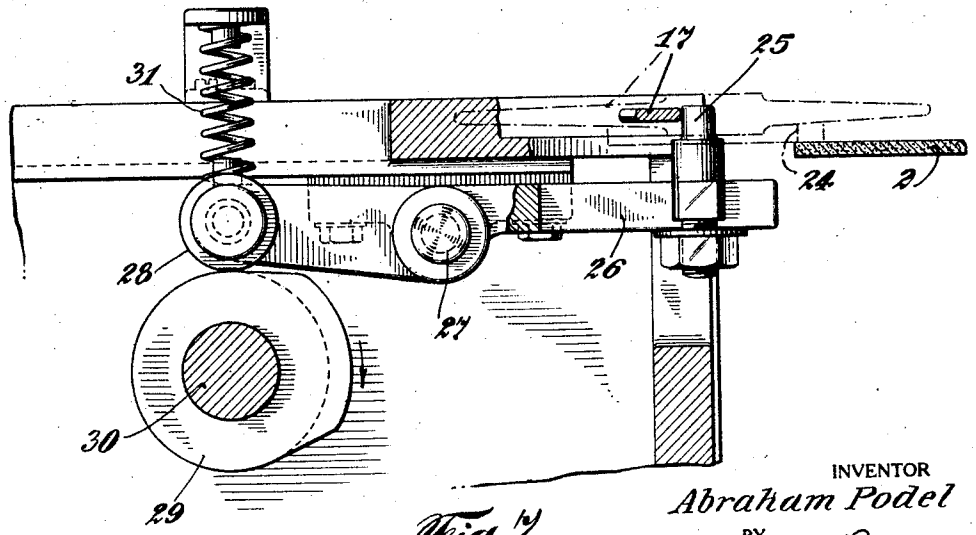


Fig. 7.

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A. PODEL

ASSEMBLY MACHINE

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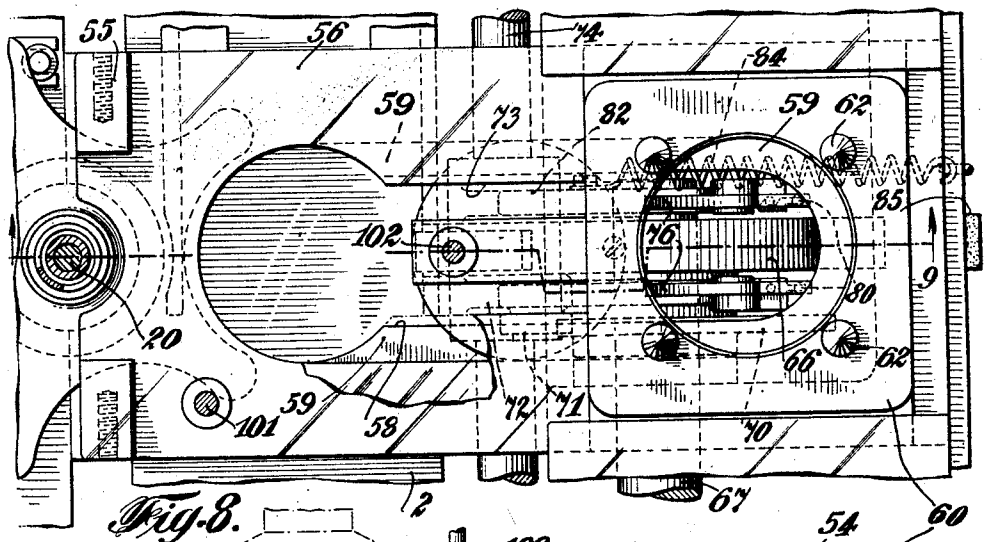


Fig. 8.

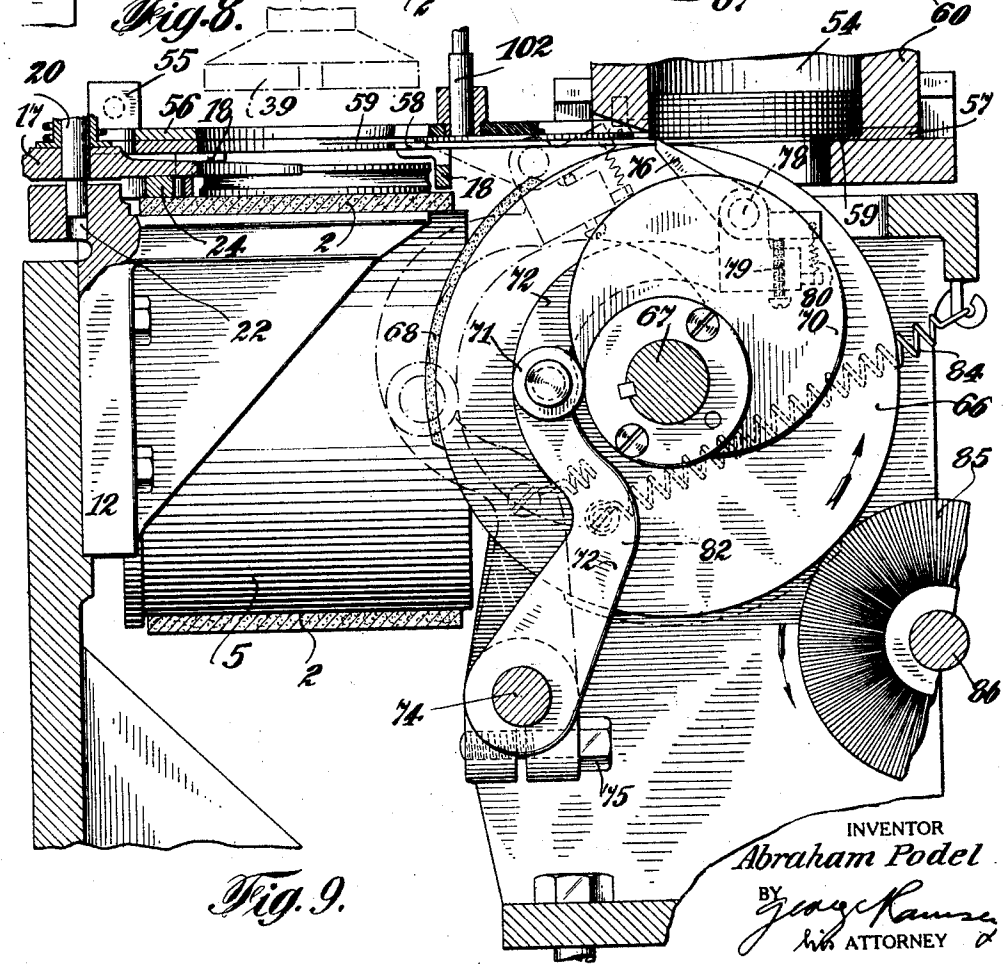


Fig. 9.

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A. PODEL

ASSEMBLY MACHINE

Filed Feb. 9, 1926 9 Sheets-Sheet 7

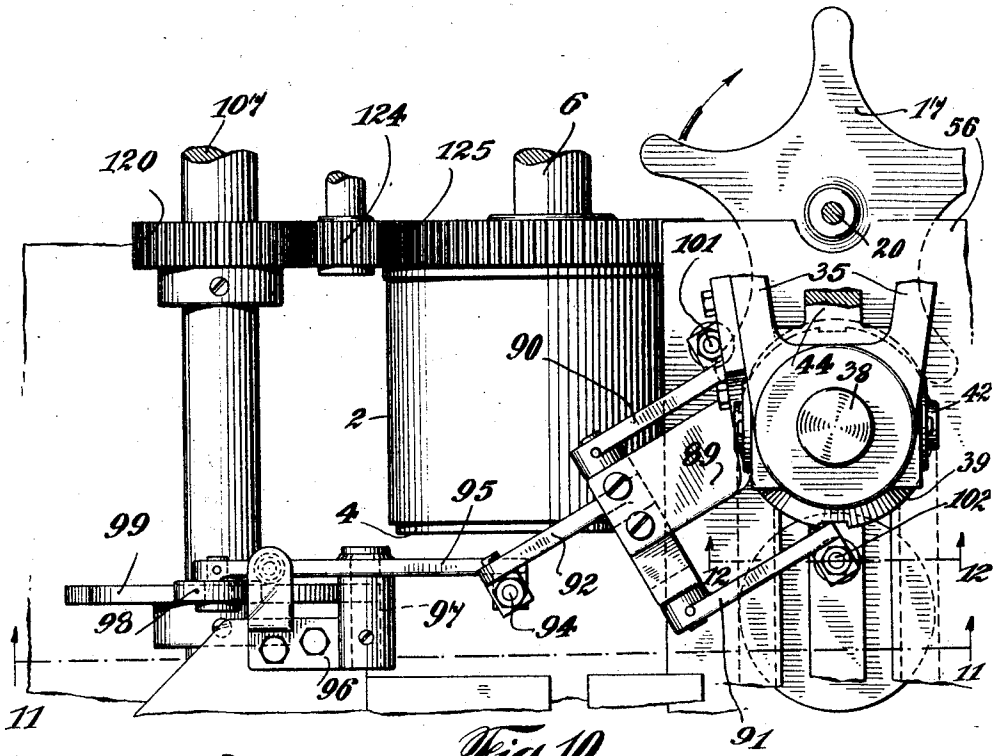


Fig. 10.

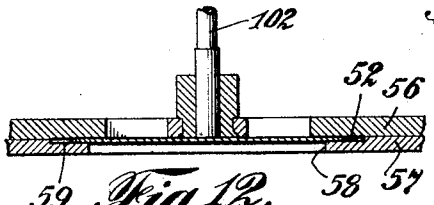


Fig. 12.

Fig. 11.

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A. PODEL

ASSEMBLY MACHINE

Filed Feb. 9, 1926 9 Sheets-Sheet 8

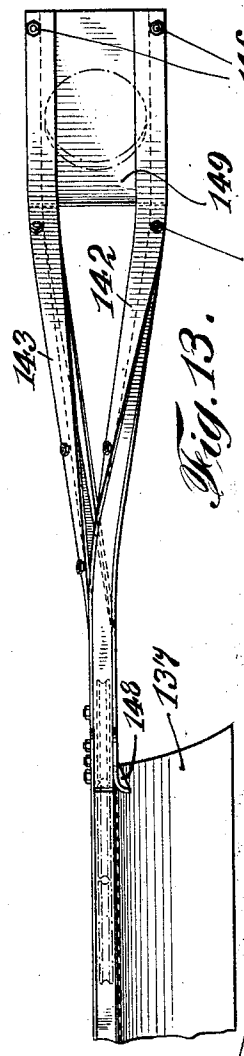


Fig. 13.

Fig. 14.

Fig. 17.

Fig. 16.

Fig. 15.

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May 8, 1928. 1,668,922

A. PODEL

ASSEMBLY MACHINE

Filed Feb. 9, 1926 9 Sheets-Sheet 9

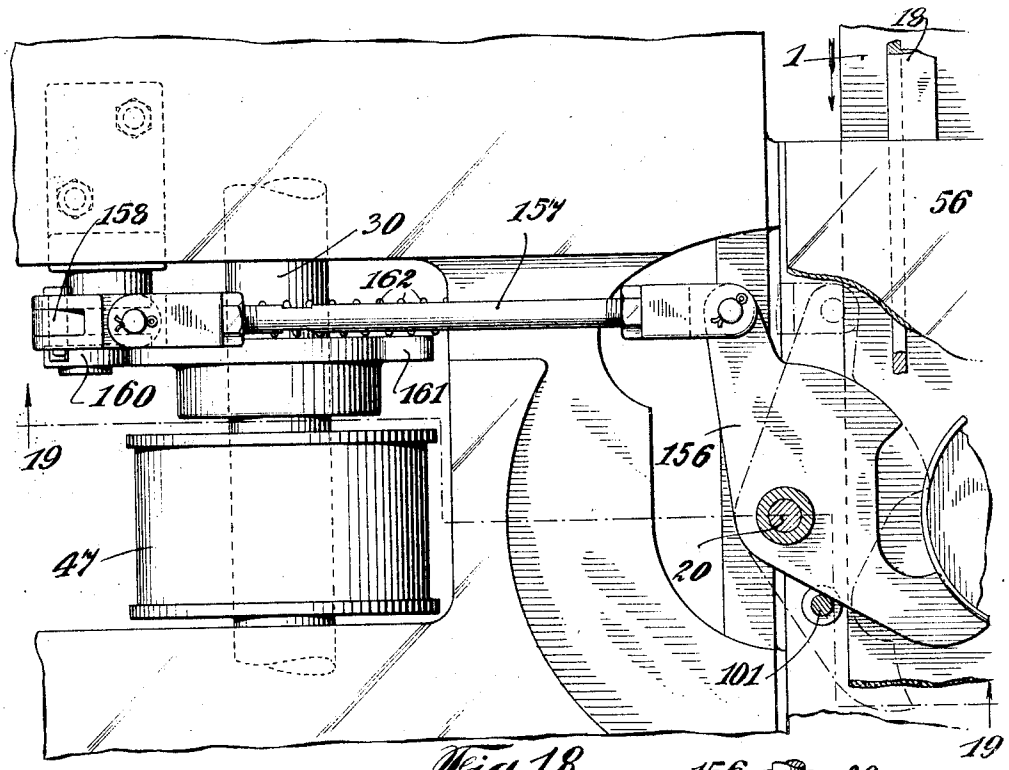


Fig. 18.

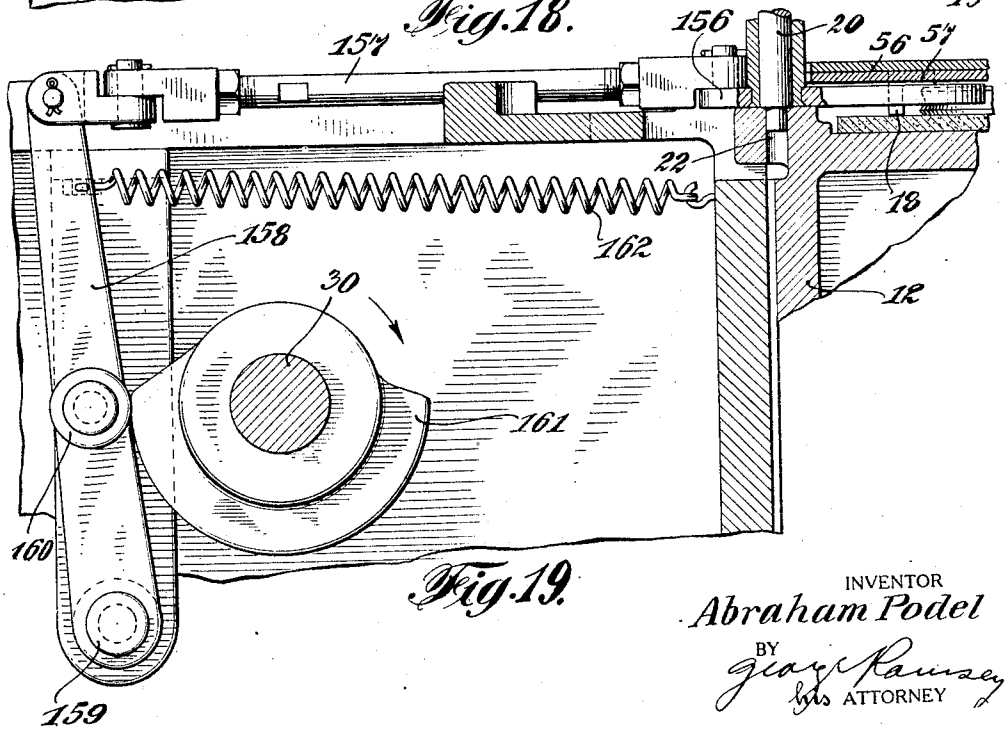


Fig. 19.

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UNITED STATES PATENT OFFICE.

ABRAHAM PODEL, OF LONG ISLAND CITY, NEW YORK, ASSIGNOR TO ANCHOR CAP AND CLOSURE CORPORATION, OF LONG ISLAND CITY, NEW YORK, A CORPORATION OF NEW YORK.

ASSEMBLY MACHINE.

Application filed February 9, 1926. Serial No. 86,987.

The present invention relates generally to assembling machines, and more particularly to a machine for assembling closure caps and liners therefor.

In packaging jellies, jams, and the like, caps are applied to the glass containers more for sanitary purposes and for the exclusion of dust than to preserve the contents of the package, and in such cases hermetic seals are neither necessary nor advisable. The great quantity of such articles consumed renders it necessary to economize as much as possible in the cost of packaging by utilizing a glass jar provided with an inexpensive tin cover which frictionally engages the side wall thereof to prevent accidental removal. The appearance of such a cover and its utility are bettered by lining the inner cover portion with a waxed paper or a fibrous disk suitably impregnated with paraffin or the like. Also, in forming end seals on jars and vessels in which preserved fruits are packed, requiring hermetic seals for proper protection and preservation, such paper or fibrous disks may be increased in thickness sufficiently to form the desired seal between the edge of the vessel and the cover portion of the cap. Such disks are now commonly used for both sealing and protective purposes, and are generally termed "liners" or "sealing wafers". The present invention contemplates an improved machine designed particularly for the application of such liners to caps, although many of its features are applicable to the assembly of any type of cap with any type of liners or gasket.

Machines have been designed heretofore for the application of cork gaskets to crown cork caps or the like where the gaskets are relatively thick. In such machines, individual gaskets are separated from a stack by means of a sliding member of predetermined thickness which passes under the stack and engages the edge of the bottom gasket and removes it therefrom in a single operation to its proper position. Such a machine cannot be used commercially with thin liners of paper or fibrous wafers because the sliding member if it engages the liner will probably remove several or mutilate the one engaged. Furthermore, such fine adjustments as are required for the proper engagement of thin wafers necessitates frequent shut-downs and slows up production generally. For these reasons, manufacturers in the past have resorted to manual insertion of thin liners by girls or others, whose labor could be obtained at a minimum price; but even with cheap labor a considerable percentage of the cost of the assembled caps and liners was occasioned by the labor required to insert the liners.

The present invention contemplates a machine in which the above difficulties are eliminated by engaging the lower surface of the liner in the stack to pull it therefrom rather than engaging the edge to push it out of its position. Other features of the machine contemplate the automatic feeding of a cap for each liner fed, the separation of any liners which fail to be assembled with the caps and liners and the elimination of the necessity of adjustments for different types or thicknesses of the liners used thereby making the machine applicable to all types of liners and caps.

An object of the invention is to provide a machine which will apply liners to closure caps and the like effectively and efficiently with a minimum of time and labor.

Another object of the invention is to provide such a machine applicable to any type of liner, irrespective of the thickness thereof, without adjustment, and adapted further to automatically take care of any irregularity in the operation of any of the various mechanisms without shutting down the machine.

Another object of the invention is an improved liner feeding mechanism wherein the liners are frictionally engaged on their plain surfaces and moved from the main supply to a guideway in one operation and are then moved along the guideway to the caps with which they are to be assembled in a second operation.

A more specific object is the provision of a rotating disk beneath a stack of liners, said disk having a resilient protuberance thereon adapted to engage the surface of the bottom liner and to remove it from the stack.

Another object of the invention is the pro-

vision of a turnstile adjacent the cap conveyor which is locked in position at predetermined intervals, and through which the caps must pass, to position the respective caps for the assembly operation.

Other objects of the invention contemplate a compact machine with its various mechanisms properly positioned to effectively and efficiently perform their various functions, said mechanisms being of rugged construction to withstand the usage to which a device of this character is ordinarily subjected.

Described generally, the present invention comprises a cap conveyor for moving caps under a reciprocating head which is adapted to press the liners into the respective caps as they pass. A cap positioning device is mounted adjacent the conveyor and preferably comprises a turnstile which is stopped periodically to retain the caps in predetermined positions in opposition to frictional forces applied by a moving conveyor, until the assembly operation is completed. A magazine for a stack of liners is mounted adjacent the conveyor and has its lower portion opening into a guideway leading to a position between the turnstile and the reciprocating assembly head. Mounted below the magazine is a rotating disk having a rubber protuberance adapted to engage the lower surface of the bottom liner in the magazine to move it into the guideway, where it is engaged by a pair of cam actuated fingers which push it along the guideway until it is directly above the cap into which it is to be inserted. The operations of these mechanisms are correlated so that a cap is properly positioned on the conveyor and a liner is positioned above it before the reciprocating head moves downwardly to assemble the two. To prevent the release of caps by the turnstile when liners have not been inserted therein an automatic device is provided which engages the respective liners as they pass along the guideway and locks the turnstile in position when a liner fails to be fed to the cap in the turnstile.

A preferred form of the invention has been chosen for the purpose of illustration and description and is shown in the accompanying drawings, wherein like characters refer to like parts throughout:

Fig. 1 is a top plan view of the machine illustrating the path of the caps therethrough;

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

Fig. 3 is a sectional view along the line 3—3 of Fig. 1;

Fig. 4 is a transverse sectional view taken along the line 4—4 of Fig. 1;

Fig. 5 is a sectional view of the assembly head, taken on line 5—5 of Fig. 4, showing the construction thereof;

Fig. 6 is a plan view of a portion of the machine illustrating the operation of the turnstile;

Fig. 7 is a sectional view along the line 7—7 of Fig. 6;

Fig. 8 is a top plan view of a portion of the machine showing the gasket feeding mechanism;

Fig. 9 is a sectional view along the line 9—9 of Fig. 8 illustrating in detail the gasket feeding mechanism in two positions;

Fig. 10 is a top plan view of a portion of the machine showing the automatic cap feed control;

Fig. 11 is a sectional view along the line 11—11 in Figs. 1 and 10 showing details of the automatic cap feed control;

Fig. 12 is a sectional view along the line 12—12 of Fig. 10 showing the guideway for liners in section;

Fig. 13 is a detail top plan view of the chute for delivering caps to the conveyor;

Fig. 14 is a side elevational view of the cap chute;

Figs. 15, 16, and 17 are sectional views along lines 15—15, 16—16, 17—17, respectively of Fig. 14;

Fig. 18 is a top plan view of another form of cap positioning device; and

Fig. 19 is a sectional view of the positioning device shown in Fig. 18 taken along the line 19—19 thereof.

Referring to the drawings, there is shown a conveyor 1 comprising an endless belt 2 mounted upon a pair of pulleys 4 and 5 on the shafts 6 and 7 respectively. The shaft 7 is adjustably mounted on the framework of the machine by a plate 8 slotted at 9 to receive bolts 10 which permit the tension of the belt to be varied within limited ranges. The central portion of the belt 2 adjacent the point where the caps and liners are assembled is rigidly supported by means of the angle member 12 bolted to the framework of the machine with a portion extending outwardly under the belt.

Caps are presented by any suitable means, such as the chute 14 described hereinafter, to the belt 2 with their cover portions downward and are moved by the belt toward a turnstile 17. A pair of guides 18 at the respective edges of the belt, supported by a bracket 19 on the framework of the machine, retain the caps in line as they move along the conveyor. Compressed air may be admitted through the tube 13 to facilitate the movement of the caps through the turnstile. The turnstile 17 is mounted on a vertical pin 20 extending from a bracket 21 through the turnstile, with its lower end fitted into a bearing 22. The turnstile frictionally engages the belt 2 by means of an annular ring 24 secured to the lower surface thereof by screws 23 and rotates continuously unless prevented by some external means.

Since one of the functions of the turnstile is to position the respective caps as they pass therethrough for the operation of the assembly head, there is provided a locking pin 25 adjustably mounted at the bifurcated end of a lever 26 pivoted at its center 27 to the framework and having a cam roller 28 on its opposite end engaging the cam 29. Shaft 30 rotates cam 29, and oscillates the lever 26 in opposition to a spring 31 to raise pin 25 into engagement with an arm of the turnstile to lock it in its respective positions for predetermined periods, thereby positioning successive caps under the assembly head irrespective of the motion of the conveyor. By properly adjusting the pin on the end of the lever 26, the position of the caps on the conveyor may be varied as desired to secure correct operation of the various mechanisms.

Mounted above the turnstile is a casting 32 bolted to the framework of the machine at 34 and having vertical members 35 thereon with a pair of horizontal arms extending from each of said members and joined at their respective ends to permit the formation of vertically aligned bearings 36 and 37 which receive the rod 38 having the assembling head 39 threaded into its lower end. The rod 38 is hollowed to receive a spring 41 which engages a pin 42 extending through a slot 43 in the central portion of the rod to form a resilient connection therebetween. The respective ends of the pin 42 extend through and are secure in the bifurcated ends of a lever 44 which is pivoted by a shaft 33 extending through a bearing 45 at the central portion of the lever and having its respective ends mounted in bearings 46 formed in the members 35. The other end of the lever 44 is connected to an eccentric 47 on shaft 30 to reciprocate the rod 38 in a vertical direction and to cause it to press liners firmly into the caps positioned by the turnstile 17. The connection between the end of the lever 44 and the eccentric 47 is made through a sleeve 48 which is adapted to adjust the length of the connection so that the head 39 descends once during each revolution of the shaft 30 sufficiently far to properly insert the liners in the caps. A lock nut 49 retains the sleeve in its adjusted position and a suitable oil cup 50 supplies a lubricant to the eccentric 47.

For the purpose of feeding liners to the respective caps, there is provided a guideway 52, leading from the magazine 54 to a point above the positioned cap. The guideway is formed by a pair of plates 56 and 57, the lower one having a slot 58 extending longitudinally thereof, the width of which is slightly less than the diameter of a liner. The upper surface of the lower plate 57 adjacent the slot is cut away at 59 to a depth slightly greater than the thickness of a liner so that a liner placed therein will fit over and be supported by the edges of the slot and will have its upper surface flush with the upper surface of the plate 57 to permit the upper plate 56 to be mounted thereon to form the guideway 52 therebetween. The slot in the lower plate has its respective ends in the form of semi-circles so that the magazine 54 may be mounted at one end thereof to permit its bottom gasket to rest in one end of the guideway. The other end of the slot is adapted to permit the reciprocating head 39 to pass therethrough. The magazine 54 comprises a base 60 in which a stack of liners is placed and four rods 62 extending upwardly therefrom to sustain the stack in proper position. The base of the magazine and also the end of the plate 57 under the magazine are retained in position by the members 63 secured to the framework by the bolts 64. The opposite end of the plate 57 may be correctly positioned to permit the reciprocating head 39 to pass through the aperture therein by means of the set screws 65 passing through extensions 61 in the plate 32 and engaging other extensions 55 on the plate 56 and by means of the thumb screws 53 which may be loosened to permit the plate to be rotated slightly or moved longitudinally. The slot 58 in the lower plate permits free engagement of the lower surfaces of liners to move them along the guideway. The upper plate 56 extends from the base of the magazine to the turnstile and has a circular aperture to accommodate the assembly head 39; it may also be slotted as shown at 73 to facilitate dislodgment by the operator of liners which may for any reason become caught in the guideway.

To remove the liners from the magazine 54, there is provided a disk 66 mounted on a shaft 67 beneath the magazine and having a rubber protuberance 68 which is adapted to engage the bottom liner in the magazine once during each revolution of the disk. The frictional forces established by this engagement are sufficient to remove the bottom liner from the magazine along the guideway 52 a slight distance as shown in Fig. 9. A cam 70 also keyed to the shaft 67 is adapted to engage a cam roller 71 on the arm 72, which is rigidly mounted on a shaft 74 by means of the bolt 75. The upper end of the arm 72 has a finger 76 mounted thereon rotatable about a pin 78. A set screw 79 cooperates with a spring 80 to determine the upper limit of the end of the finger so that it will properly engage a liner which has been moved into the guideway 52 by the disk 66. A second arm 82 is also mounted on the shaft 74 and is similar to the arm 72 excepting that it does not have a cam roller, but is oscillated by means of its rigid connection to the shaft 74. A spring 84 is attached to the framework of

the machine and to the arm 82 to retain the cam roller 71 against the cam 70. The fingers 76 are oscillated about the shaft 74 by means of the cam 70 and are adapted to engage the liner moved into the guideway immediately after the disengagement of the rubber protuberance 68 therewith and to move it along the guideway as shown by the dot-dash position of the parts in Fig. 9 until it is directly below the assembly head 39 and directly above a cap positioned by the turnstile. The operation of the arms 72 and 82 and the disk 66 and their timed relation is shown in Figs. 4 and 9 wherein the rubber protuberance 68 is shown in engagement with the bottom gasket in Fig. 4 and is shown just after disengagement therewith in Fig. 9, the dot-dash position in Fig. 9 showing the location of the fingers after the liner has been moved to the end of the guideway. To prevent foreign matter from accumulating on the protuberance 68, a rotary brush 85 is provided on shaft 86 which rotates in the opposite direction from the disk 66 and is in continuous engagement therewith.

The mechanism described above is adapted to position caps, supply liners thereto, and assemble them. However, should the liner feeding mechanism fail to present a liner at the desired time, the turnstile would be released by the pin 25 according to its usual operation and a cap without a liner would be delivered. This is very undesirable since considerable labor would be required to remove such caps from the assembled caps and liners. To prevent this, there is provided a bracket 89 to support an inverted U-shaped member 93 having bearings in the legs thereof to accommodate a spindle 88 having a pair of arms 90 and 91 rigidly attached to its ends and extending respectively over the turnstile 17 and over the guideway 52. An arm 92 rigidly connected to the central portion of the spindle 88 slidably engages the upper end of a bolt 94 at its outer extremity. Lever 95 slidably engages the lower end of the bolt 94 and is pivoted to the bracket 96 at its center 97 and has a cam roller 98 on its other end held in engagement with the cam 99 by a spring 103. A spring 100 on the bolt 94 retains the arm 92 and the lever 95 at the extremities of the bolt whereby when the cam 99 rotates, oscillating the lever 95, the spindle 88 attached to arm 92 is rocked resiliently to raise and lower the arms 90 and 91. On the ends of these arms 90 and 91, there are pins 101 and 102 adapted to engage respectively the turnstile 17 and a liner in the guideway 52. The lengths of these pins may be adjusted by suitable nuts and are such that if the pin 102 engages a gasket in the guideway 52 as shown in Figs. 10 and 12, the spring 100 is compressed and the arm 90 and pin 101 are not lowered as far as they would be if the pin 102 should fail to engage a liner, and, therefore, the pin 101 fails to engage the turnstile; but if a liner is not in position, there is nothing to stop the pin 102, and the spindle 88 under the action of the spring 100 rocks sufficiently to cause the pin 101 to engage and lock the turnstile in position and to prevent it from rotating when released by the locking pin 25. Hence, the cap is prevented from being delivered by the machine until a liner is presented and inserted therein.

If the cap feeding mechanism fails to function for any reason, the unassembled liners will be delivered to the chute 103 and when they reach the end thereof will slide under the metal plate 104 and be delivered as shown at 105, whereas the skirts of caps moving along the chute will engage the curved portion of the plate and be delivered as shown at 106, thereby separating the unassembled liners from the assembled articles.

The power for operating the machine is supplied to the shaft 107 by means of fast and loose pulleys 108 and 109 and belt 110, which may be connected to any suitable source of power. The belt may be shifted from one pulley to the other for effective and ineffective positions by means of the belt shifter comprising a pair of arms 111 adapted to engage the belt and adapted to be shifted in a horizontal direction by means of shaft 112 mounted in bearings 114 and having a handle 115. The shaft 107 is mounted in suitable bearings 116 on the respective sides of the machine having suitable oil cups 117 for the lubrication thereof. There are a pair of bevelled gears 118 and 119 adjacent the ends of the shaft and another gear 120 at the center of the shaft, all keyed thereto for driving the various mechanisms associated therewith. The bevelled gear 118 meshes with a bevelled gear 121 on shaft 30 to operate the eccentric 47 thereby reciprocating the pressing head 39 for applying liners to the caps. The rotation of the shaft 30 also operates the cam 29, lever 26 and stop 25 for controlling the turnstile 17. The gear 120 at the center of the shaft meshes with an idling gear 124 to rotate gear 125 on shaft 6, upon which the belt driving pulley 4 is mounted for conveying caps as described hereinbefore. The bevelled gear 119 on shaft 107 meshes with bevelled gear 126 on shaft 67 for driving the liner feeding mechanisms. The rotating brush 85 on shaft 86 is connected to the shaft 67 through gear 127 on shaft 86, idling gear 128 and a gear on shaft 67. The cam 99 adapted to operate the automatic cap feeding device, which locks the turnstile in position when a liner fails to be fed to a positioned cap, is rigidly mounted on the shaft 107 as shown at 134. In this manner, all

the mechanisms of the machine are driven from a single shaft extending transversely of the machine facilitating the arrangement of the parts and decreasing the cost of the machine. For convenience in rotating the shaft 107 for the adjustment of parts and the like, a hand wheel 132 is mounted at one end thereof.

The unassembled caps may be supplied to the machine by means of the chute 14 referred to hereinbefore. Preferably, the chute leads from a supply table 136 of suitable height having a curved metallic portion 137 fitting over one edge of the table with a vertical side portion 138 spaced from the bottom of the curved portion by means of the bar 139 and attached thereto by the bolts 140 to form a channel 141 into which an operator may place the caps. The channel is inclined to the horizontal so that the caps therein will roll on the bar 139 into the chute 14 which comprises upper and lower guideways 142 and 143, each formed by a pair of narrow strips of metal 144 attached to the opposite sides of suitable bars 145 by bolts 146. The guideways may be twisted through an angle of substantially ninety degrees so that a cap placed in the channel 141 in a vertical position will, during its movement along the chute 14, be turned to its horizontal position and delivered to the conveyor with the cover portion downward as shown in Figs. 2 and 13 to 17. At the upper end of the chute an end of one of the metal strips 144 is bent outwardly at 148 to facilitate the entry of the upper edge of the cap into the guideway 142. The rigidity of the construction may be increased by the plate 149 attached to the free ends of the guideways 142 and 143.

In the operation of the machine, the belt 110 is moved from the idling pulley to the one rigidly attached to the shaft 107 to rotate the shafts 30 and 67 extending longitudinally of the machine which operate the liner feeding and inserting mechanism respectively. A gear 120 at the center of shaft 107 operates the conveyor mechanism. As the caps are delivered to the conveyor 1 by the chute 14 and are moved along the guide rails 18, each cap passes through the turnstile 17, which is stopped periodically by means of the locking pin 25 to position the respective caps under the reciprocating head 39. While each cap remains in its predetermined position, the liner feeding mechanism by means of the disk 66 and the rubber protuberance thereon, removes the bottom liner from the stack in the magazine and positions it so that it may be engaged by the fingers 76 and moved along the guideway 52 until it reaches a position directly over the cap in the turnstile 17, whereupon the eccentric 47 moves the pressing head 39 downwardly to insert the liner into the cap below it. In some instances, the liner feeding mechanism may fail to present a liner at the desired time, in which case a cap will be delivered without a liner therein unless otherwise prevented. To effect this, an automatic control is provided for the turnstile 17 which comprises a pin or feeler 102 adapted to engage the liner in the guideway and prevent the pin 101 from moving downwardly to engage the turnstile under the pressure exerted by the spring 100 actuated by cam 99 and lever 95, in which case, the turnstile delivers a cap without interference, but if the feeler 102 should not engage a liner in the guideway, the spring 100 will tip the lever 92 sufficiently far to cause the pin 101 to engage the turnstile and prevent its rotation under the influence of the frictional engagement with the belt 2, thereby preventing the delivery of the cap in which a liner has not been inserted. Such a mechanism is automatic in all of its features and applies liners automatically to closure caps, eliminating manual labor excepting that required to place the liners in their magazine and to maintain a supply of caps for the conveyor.

In Figs. 18 and 19, there is shown another form of cap positioning mechanism which may be used instead of the turnstile described hereinbefore. This form of positioning mechanism operates independently of the conveyor mechanism and comprises an oscillatory member 156 mounted on the pin 20 and having one end extending between the conveyor 1 and the plate 57 to engage the caps as they pass along the guideways 18 at the edges of the conveyor and retain them in a predetermined position. The other end of the positioning member 156 is attached by means of a rod 157 to a cam lever 158, pivoted at 159 and having a cam roller 160 thereon adapted to engage the cam 161 on shaft 30. The cam 161 may be positioned on the shaft 30 adjacent the eccentric 47 just as the cam 29, described hereinbefore for the operation of the pin 25 is positioned. A spring 162 attached to the cam lever 138 and the framework of the machine retains the cam roller 160 in engagement with the cam 161, and tends to hold the positioning member 156 out of the path of the caps. The cam 161 positively determines the position of the member 156 and the cap held thereby. The outer end of the positioning member is shaped so that it will engage the pin 101 to render the spring 162 ineffective and prevent the delivery of a cap when the liner has not been inserted therein as described hereinbefore with reference to the automatic control for the turnstile 17.

It will be seen that the invention described above is inexpensive in construction, simple in operation and applicable to insert liners of any thickness into closure caps. Further, by inserting different plates having guide-

ways of the desired size, liners of any description may be used. The various automatic features prevent the delivery of either caps or liners in their unassembled state and the construction of the machine, in general, is such as to facilitate rapid operation with slight attention by the operator.

Since various changes may be made in the preferred embodiment without departing from the spirit of the invention, the description herein is to be taken as illustrative and not in a limiting sense.

Having thus described my invention, what I claim is:—

1. In a machine of the class described, the combination of a reciprocating head, means for presenting caps and the like adjacent said head consecutively, a pair of fingers for positioning liners between said caps and said head while said cap is under said head, and means for separating and presenting individual liners to said fingers.

2. In a machine of the class described, the combination of a head, means for presenting caps and the like adjacent said head successively, a pair of fingers for positioning liners between said caps and said head while said cap is under said head, and a disk adapted to be rotated to engage, separate, and present individual liners from a group of liners to said fingers.

3. In a machine of the class described, the combination of a reciprocating head, means for presenting caps or the like adjacent said head successively, devices for placing a liner between said caps and said head, and a disk having a resilient protuberance thereon for engaging and presenting liners to said devices.

4. In a machine of the class described, the combination of a stationary reciprocating head, means for conveying caps and the like adjacent said head, a turnstile adapted to position successive caps with relation to said head without stopping said conveying means, and means for presenting liners to be inserted in said caps.

5. In a machine of the class described, a belt to convey caps and the like having a guideway associated therewith, a reciprocating head mounted adjacent said belt, a turnstile adapted to engage and position successive caps on said belt adjacent said reciprocating head, and means for feeding liners to said caps as they pass through said turnstile.

6. In a machine of the class described, the combination of a conveyor adapted to convey caps, a reciprocating head mounted above said conveyor, a turnstile projecting over said conveyor to engage and position caps with respect to said head, and means for presenting liners above said caps to be inserted therein by said head.

7. In a machine of the class described, the combination of a belt adapted to convey caps and the like past a reciprocating head, a turnstile adjacent said belt in frictional engagement therewith to be rotated thereby, and means for stopping said turnstile in opposition to the forces exerted by said belt to position a cap under said reciprocating head.

8. In a machine of the class described, the combination of a conveyor for caps and the like, a turnstile mounted adjacent said conveyor and having an annular ring mounted on the lower surface thereof adapted to engage said conveyor for the rotation of the turnstile, and means for locking said turnstile in predetermined positions to position caps on said conveyors.

9. In a machine of the class described, the combination of a conveyor for caps and the like, a reciprocating head mounted above said conveyor, a turnstile for engaging and positioning a cup on said conveyor under said head, and means for presenting a liner to be pressed into said cap by said head.

10. In a machine of the class described, the combination of a continuously moving belt adapted to convey caps and the like, a pressing head mounted above said belt and means adapted to engage a cap on said belt to position it under said head on said belt and to hold it in opposition to the frictional forces tending to move it on said belt, devices for presenting a liner, and means for pressing said head downwardly to insert said liner in said cap.

11. In a machine of the class described, the combination of a conveyor for caps and the like, a reciprocating head mounted above said conveyor, and means for positioning successive caps on said conveyor under said head and for holding said caps in position in opposition to the frictional forces exerted by said conveyor, devices for separating individual liners from a stack thereof, and mechanism for engaging said separated liners and positioning them over said caps to be pressed therein by means of said head.

12. In a machine of the class described, the combination of a conveyor for caps and the like, a pressing head mounted above said conveyor, a turnstile on one side of said conveyor for positioning caps successively under said pressing head, and mechanism on the other side of said conveyor for positioning liners above said caps to be pressed therein by said pressing head.

13. In a machine of the class described, the combination of a conveyor for caps and the like, a pressing head mounted above said conveyor, means for positioning successive caps under said head, a disk having a rubber protuberance thereon adapted to engage a stack of liners to separate a liner there-

from, and a pair of fingers adapted to position said liner above a cap to be pressed therein by said pressing head.

14. In a machine of the class described, the combination of a magazine for holding a plurality of liners, a disk mounted beneath said magazine having a resilient protuberance thereon adapted to engage and remove the lowermost liner in said magazine, and means to engage said liner to position it with respect to a cap.

15. In a machine of the class described, the combination of a magazine adapted to hold a stack of liners, a disk mounted adjacent said magazine having a rubber protuberance thereon adapted to engage and remove the lowermost liner in said magazine, and a pair of fingers adapted to engage said removed liner and place it in a predetermined position.

16. In a machine of the class described, the combination of a magazine adapted to hold a plurality of liners, a guideway communicating with the lower portion of said magazine, a disc adapted to engage the lowermost liner in said magazine and move it along said guideway, and a pair of fingers adapted to engage said removed liner and move it to a predetermined position in said guideway.

17. In a machine of the class described, the combination of a magazine adapted to retain a plurality of liners, a disc having a resilient protuberance thereon mounted below said magazine and adapted to remove the lowermost liner therefrom, and a brush adapted to engage said protuberance to prevent matter from accumulating thereon.

18. In a machine of the class described, automatic means for controlling the feeding of caps comprising a member having a pair of arms thereon, means for reciprocating said arms in an upwardly and downwardly direction, one of said arms being adapted to engage a liner prior to its entry into a cap, the other of said arms being adapted to control the feeding of caps, said first arm being designed to render said second arm ineffective when said first arm engages a liner.

19. In a machine of the class described, the combination of a turnstile adapted to permit caps to move therethrough, a pivoted member having a pair of arms thereon, means for oscillating said arms through the intermediation of a spring, one of said arms being adapted to engage a liner to prevent the extreme movement of said second arm, in which position said arm engages and stops said turnstile.

20. In a machine of the class described, the combination of a turnstile adapted to position caps, a guideway to feed liners to said turnstile, means for feeding liners to said guideway and a member having a pair of arms thereon, one of said arms being adapted to engage a liner in said guideway to prevent said other arm from engaging said turnstile.

21. In a machine of the class described, the combination of a conveyor for caps and the like, means for positioning said caps on said conveyor, a head mounted above said positioned caps, a magazine adapted to retain a plurality of liners, a guideway leading from said magazine to a point adjacent said head, means for removing a single liner from said magazine into said guideway and independent means for moving said liner along said guideway to a point between said head and said positioned cap.

22. In a machine of the class described, a conveyor for caps and the like, means for positioning said caps on said conveyor, a head mounted above said positioned cap, a magazine adapted to retain a plurality of liners, a guideway leading from said magazine to a point adjacent said head, means for removing a single liner from said magazine into said guideway, a pair of arms for moving said liner along said guideway and means for oscillating said arms in timed relation to said removing means.

23. In a machine of the class described, the combination of a conveyor for caps and the like, a guideway leading from said conveyor to a suitable supply of liners, means for moving a single liner from said supply into said guideway, a pair of arms pivotally mounted having fingers thereon resiliently retained in position to engage said liner and move it along said guideway, and means for oscillating said arms in timed relation to said feeding means.

24. In a machine of the class described, the combination of a conveyor for feeding caps and the like, means for feeding liners and the like to a point above said conveyor, a feeler responsive to the feeding of liners adapted to prevent the movement of caps by said conveyor when a liner fails to be fed.

25. In a machine of the class described, in combination a conveyor for feeding caps and the like, a guideway through which liners are adapted to pass on their way to said caps, and means for preventing the movement of caps on said conveyor when no liner is in said guideway.

26. In a machine of the class described, the combination of a conveyor for feeding caps and the like, a guideway through which liners are adapted to pass on their way to said caps, and a reciprocating pin operatively connected to prevent the movement of caps by said conveyor when it fails to engage a liner in said guideway.

27. In a machine of the class described, the combination of a cap positioning device, a guideway leading to said positioning device, means for feeding a liner into said guideway, and means for preventing the

operation of said positioning device to remove said cap until a liner passes along said guideway.

28. In a machine of the class described, the combination of a cap positioning device, means for feeding a liner to the said cap while it is in a predetermined position, and means adapted to engage said liner while it is moving toward said cap to prevent the discharge of said cap prior to a liner being fed thereto.

29. In a machine of the class described, the combination of a rotatable cap positioning device, means for conveying a liner to said positioning device, means having a pair of fingers thereon, one of said fingers being adapted to engage a liner prior to its entry to a cap to prevent said other finger from engaging said positioning devices.

30. In a machine of the class described, the combination of a cap positioning device, means for feeding liners to said cap positioning device, mechanism comprising a pair of arms with pins in the end of each, said mechanism being adapted to be oscillated so that one of said pins may engage a liner when in proper position and the other may engage and stop said positioning devices when said first arm fails to engage a liner.

31. In a machine of the class described, the combination of a plate having a guideway therein adapted to receive liners, said plate having an aperture at one end thereof, a reciprocating head adapted to pass through said aperture, and set screws for adjusting said plate so that said aperture is under said head.

32. In a machine of the class described, the combination of a plate having a guideway therein adapted to receive liners, said plate having an aperture at one end thereof, a reciprocating head adapted to pass through said aperture, set screws at one end for adjusting said plate so that said aperture is under said head, and thumb screws at the other end of the plate to facilitate said adjustment.

33. In a machine of the class described, the combination of a plate having a longitudinal slot therein with the edges adjacent said slot cut away to form a guideway for liners and the like, a liner magazine mounted at one end of said guideway with the lowermost liner resting in said guideway, and means for engaging the lower surface of said liner to move it along said guideway.

34. In a machine of the class described, the combination of a plate having a guideway therein adapted to receive liners and the like and having an aperture at one end of the guideway to receive a reciprocating head for ejecting the liners, and a pair of clamps rotatably mounted for securing one end of said plate and set screws for securing the other end thereof whereby said plate may be rotatably adjusted to position said aperture under said reciprocating head.

35. In a machine of the class described, the combination of a plate having a guideway therein adapted to receive liners, and having an aperture at one end of the guideway to receive a reciprocating head for ejecting the liners, a magazine mounted on the other end of said plate to furnish liners therefor, a pair of clamps rotatably mounted for securing one end of said plate and said magazine in position, and set screws for securing the other end thereof whereby said plate may be rotatably adjusted to position said aperture under said reciprocating head without affecting the relation of the guideway to the magazine.

ABRAHAM PODEL.