Dec. 15, 1959 A. E. WHITECAR 2,916,811

MACHINE FOR ASSEMBLING A TUBE INTO A PLUG

Filed Jan. 26, 1954 4 Sheets-Sheet 1

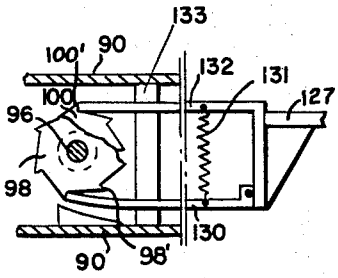


FIG. 6.

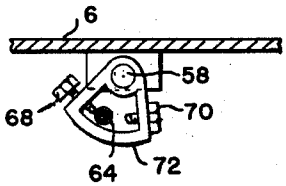


FIG. 7.

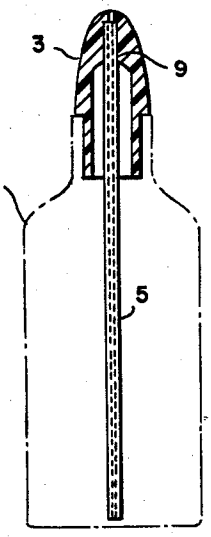


FIG. 5.

FIG. 1.

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MACHINE FOR ASSEMBLING A TUBE INTO A PLUG

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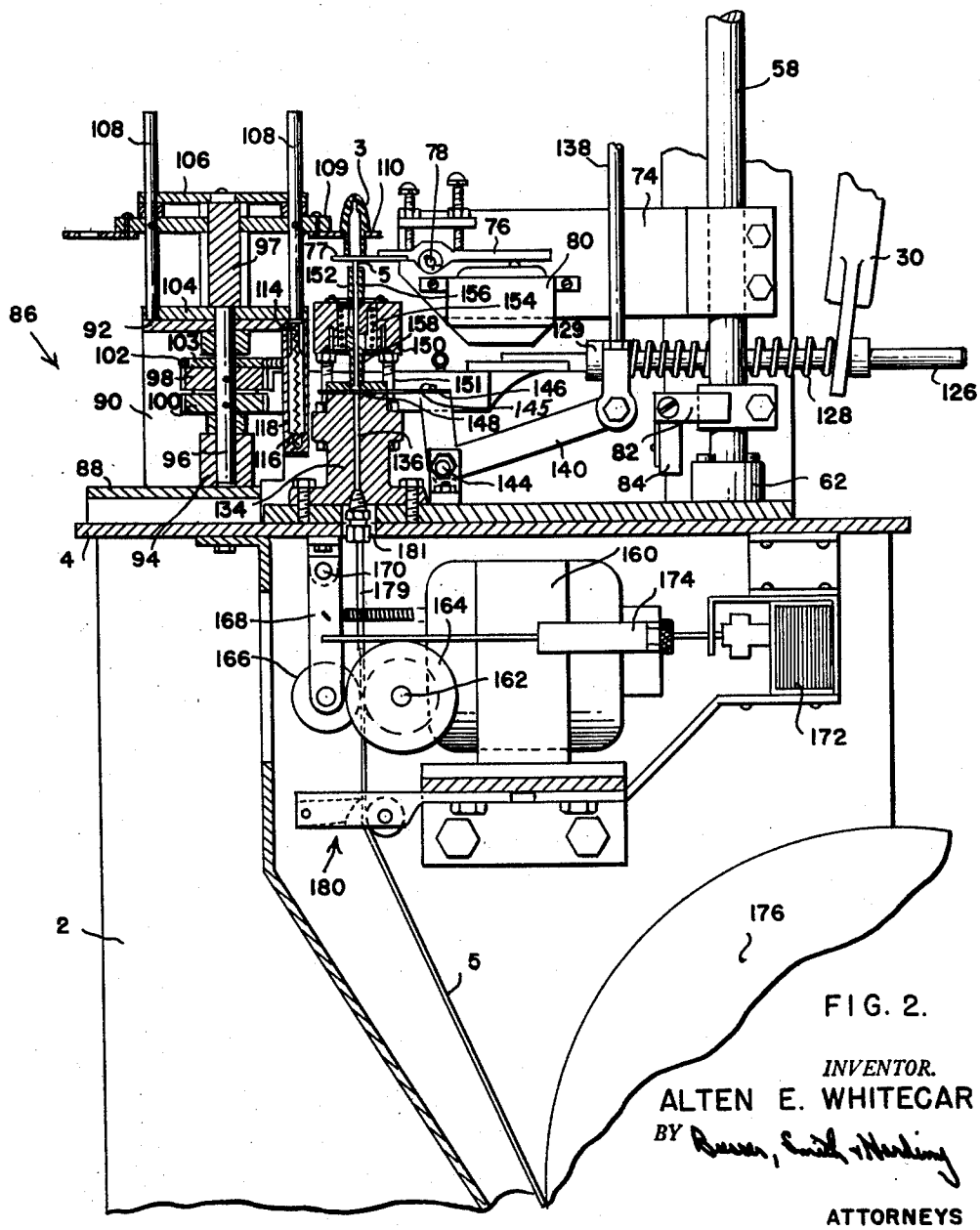


FIG. 2.

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MACHINE FOR ASSEMBLING A TUBE INTO A PLUG

Filed Jan. 26, 1954 4 Sheets-Sheet 3

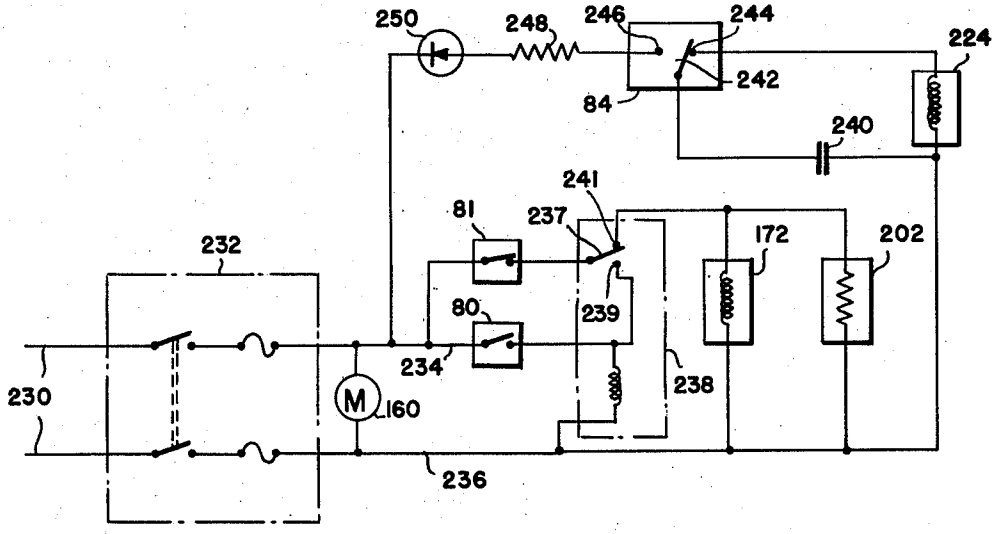


FIG. 4.

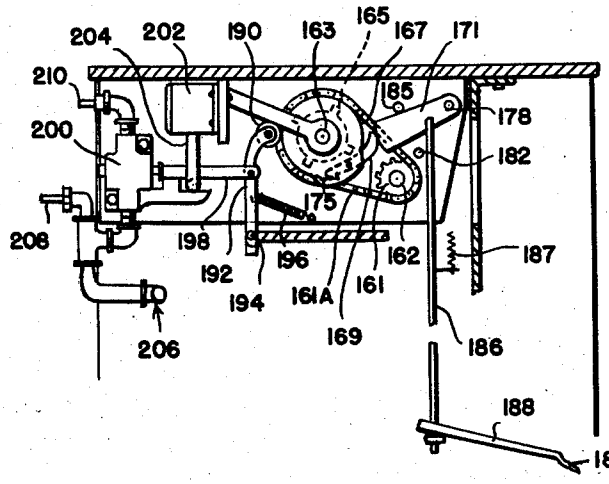


FIG. 3.

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MACHINE FOR ASSEMBLING A TUBE INTO A PLUG

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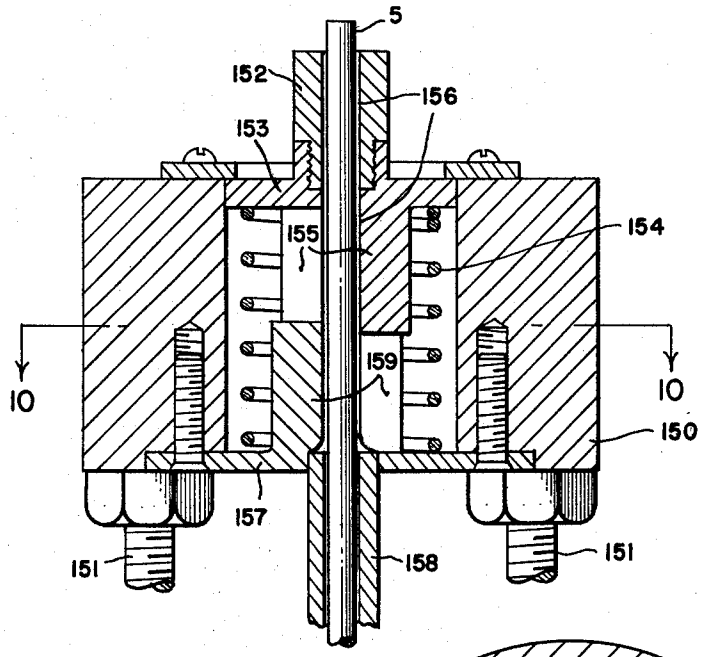


FIG. 9.

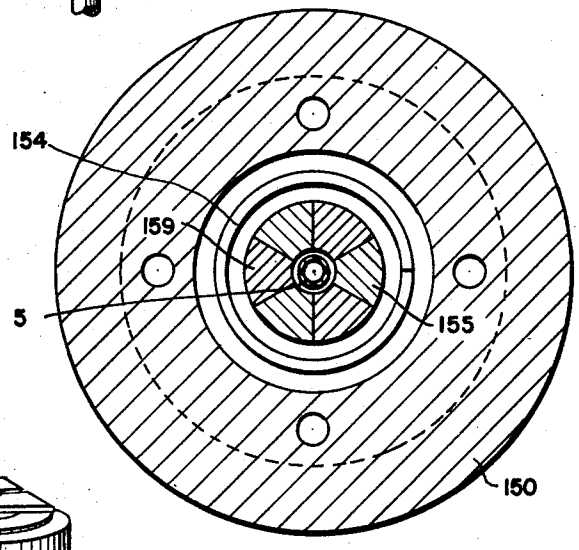


FIG. 10

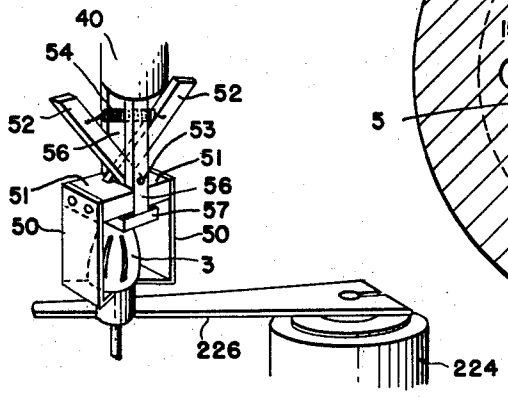


FIG. 8.

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United States Patent Office 2,916,811 Patented Dec. 15, 1959

2,916,811

MACHINE FOR ASSEMBLING A TUBE INTO A PLUG

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Application January 26, 1954, Serial No. 406,140

1 Claim. (Cl. 29—208)

This invention relates to inserting apparatus and, more particularly, to apparatus for inserting a tube into a plug which is adapted to fit in the open end of a flexible container of the type adapted to be squeezed in order to discharge a spray of material therefrom. The tube is inserted into the plug in order that material may be carried through the tube from the bottom of the container to the plug and delivered from the container through a bore in the plug when the container is held in a plug upward position and the walls thereof compressed.

Broadly, it is the object of this invention to provide automatic apparatus which will insert measured lengths of an elongated member into successive elements and thereafter discharge each successive element and its associated elongated member from the machine.

It is a further object of the invention to provide inserting apparatus which may be operated by a single operator and which merely requires the positioning of elements or plugs by the operator in suitable feed apparatus.

These and other objects of the invention will become apparent from the following description when read in conjunction with the accompanying drawings in which:

Figure 1 is a side elevation of the upper portion of the apparatus;

Figure 2 is a sectional elevation of a portion of the apparatus as viewed from the same side thereof as Figure 1;

Figure 3 is a vertical section through the lower portion of the apparatus as viewed from the opposite side from that of Figure 2;

Figure 4 is a wiring diagram showing the electrical connections within the apparatus;

Figure 5 shows an assembled plug and tube in position in a flexible container;

Figure 6 is a plan view of the ratchet mechanism and is taken on the line indicated by the numeral 6 in Figure 1;

Figure 7 is a plan view of the quadrant taken on the line indicated by the numeral 7 in Figure 1;

Figure 8 is a perspective view of a fragmentary portion of the apparatus shown in Figure 1;

Figure 9 is an enlarged fragmentary portion of Figure 2;

Figure 10 is a transverse section through Figure 9 taken on the trace 10—10.

In Figure 5 there is shown a flexible container 7 adapted to receive a plug 3 having a central bore including at its lower end an enlarged portion 9 adapted to receive the upper end of a flexible plastic tube 5. The apparatus for inserting predetermined lengths of tubing into plugs will now be described.

Referring to Figures 1–3, the apparatus includes a pair of side plates 2 which support a horizontal bed plate 4. A vertically extending mounting plate 6 is mounted on the bed plate 4. A bracket 8 extending upwardly from the mounting plate 6 supports a double acting air cylinder 10. The air cylinder is provided with conventional air connections as indicated at 12 and 14.

A piston rod 16 extending downwardly from the double acting cylinder 10 mounts a horizontally extending pin 18 which actuates an arm 20 which is pivotally mounted on pivot 22 to the vertical mounting plate 6. The arm 20 at its right-hand end, as viewed in Figure 1, supports a downwardly extending plate 24 on which there are mounted two rollers 26 and 28.

A depending arm 30 is pivotally mounted at its upper end at 32 to a bracket member 34 affixed to the vertical mounting plate 6. Two cams 36 and 38 are mounted on opposite sides of the depending arm 30 and are adapted to be engaged by the rollers 26 and 28, respectively, providing cam followers therefor.

A vertically positioned rod 40 is slidably mounted in guide brackets 42 and 44 affixed to the vertical mounting plate 6. The pin 18 actuated by the piston rod 16 enters the rod 40 and serves to position the rod within the guide brackets 42 and 44. A screw 46 is mounted on a plate 47 affixed to a bracket 48 attached to the lower end of the rod 40. As is more clearly shown in Figure 8, two depending members 56 are attached to the lower end of the rod 40 and support a transversely extending plate 57 which is attached to their lower ends. Two opposing clamp members 50 are attached to blocks 51 each of which has an upstanding arm 52 connected thereto. The arms 52 cross and have their upper ends drawn together by a spring 54. A pin 53 extends through the depending members 56 and through the arms 52 serving as a hinge pin for the arms 52. It will be evident that the spring will draw the upper ends of the arms 52 together to the degree permitted by the engagement of the blocks 51 with the depending members 56. At this position the clamp members 50 have their inwardly turned lower end portions sufficiently closely spaced to engage the undersurface of the head portion of a plug 3.

A rotatable rod 58 is mounted in brackets 60 and 62 affixed to the vertical mounting plate 6 and the bed plate 4, respectively. A pin 64 carried by an angle bracket 66 affixed to the pivoted arm 20 is adapted to selectively engage the ends of pins 68 and 70 mounted in a quadrant member 72 which is attached to the upper end of the rod 58, the pins 68 and 70 being offset from rod 58 so that contact of pin 64 with either pin 68 or 70 will act to rotate rod 58.

From the foregoing it will be evident that, as the piston rod 16 is moved downwardly and upwardly by action of air in the double acting cylinder 10, the pivoted arm 20 will oscillate about the pivot 22 and the pin 64 will oscillate through an arc below the pivot 22. Oscillation of the pin 64 will cause the quadrant member 72 to oscillate and thus cause the rod 58 to oscillate. Additionally, the oscillation of the arm 20 will, as a result of the interaction of the plates 36 and 38 and the rollers 26 and 28 bearing thereon, cause the depending arm 30 to oscillate about its upper end pivot 32.

A plate 74 is affixed to the rod 58 and extends outwardly horizontally therefrom. A member 76 is pivoted at 78 and its right-hand end, as viewed in Figure 1, is adapted to engage the operating member of a limit switch 80 which is mounted on the plate 74.

A member 82 affixed to the lower end of the rod 58 is adapted to engage the operating member of a limit switch 84 mounted on the vertical mounting plate 6 when the rod 58 is at the limit of an oscillation with the left end of the arm 20 as viewed in Figure 1 in an uppermost position. When the arm 20 is in this position, it is in engagement with the operating member of a limit switch 81 mounted on the plate 6.

A turret assembly, shown generally at 86 in Figure 1 and shown in section in Figure 2, is mounted above the bed plate 4. The turret assembly includes a bottom plate 88, side plates 90 and a top plate 92. A bearing

94 mounted on the bottom plate 88 supports the lower end of a shaft 96 which extends upwardly through the top plate 92. Two ratchet wheels 98 and 100 are fixed to the shaft 96 immediately above the bearing 94. A brake band 102 has its ends affixed to the side plate 90 and is in engagement with a groove in a member 103 mounted on the shaft 96.

A rotatable plate 104 is affixed to the shaft 96 and rests upon the top plate 92. A second rotatable plate 106 is affixed to the upper end of the shaft 96. A plurality of vertically extending rods 108 pass through aligning bores in the rotatable plates 104 and 106 and mount brackets 109 supporting blades 110 which are adapted to support plugs 3. The innermost portion of each of the brackets 109 is adapted to ride in axially extending grooves provided in the enlarged upper end portion 97 of the shaft 96. It will be evident that this arrangement prevents the brackets and blades from rotating around the axes of their mounting rods 108. One of the blades 110 and its associated rod 108 is in position above a bore 114 in the top plate 92. A spring 116 mounted under a cap slidable within a retainer 118 prevents the rod 108 above the bore 114 from dropping downwardly as a result of its own weight.

A horizontally extending rod 126 passes through a bore in the lower end of the depending arm 30. A coil spring 128 is positioned around the rod 126 between the arm 30 and a collar 129 on the rod 126. A member 127 is rigidly connected to the left-hand end of rod 126 as viewed in Figure 1. An arm 132 is rigidly connected to the member 127 and extends to the left therefrom as shown in Figures 1 and 6. A second arm 130 is pivotally mounted to the member 127 and also extends to the left therefrom. A spring 131 extends between the arms 130 and 132 and urges the left-hand ends of the arms together into engagement with ratchet wheels 98 and 100, respectively, on opposite sides of the shaft 96.

A block 134 is mounted on the horizontal bed plate 4 and is provided with a vertically extending central bore 136. The bore 136 is in alignment with the axis of a plug receiving bore in the blade 110 which is in the operative position, i.e., having its rod 108 positioned above the bore 114 in the plate 92. The bore 136 is adapted to receive tubing which is fed thereto from apparatus below the horizontal bed plate 4 which will be hereinafter described.

Tubing passing upwardly through the bore 136 is cut off in predetermined lengths by cutting apparatus which will now be described. The upper end of a depending rod 138 is pivotally connected to the lever 20 at 139. The lower end of the rod 138 is pivoted to one end of a bell crank lever 140 which is mounted on a pivot at 144. The other end of the bell crank lever 140 mounts a pin 145 which extends through a bore in a cutting blade 146 which extends through a horizontal slot in the member 134. The blade is provided with a slot 148 through which the tube may pass and, when the left end of the lever 20 is moved downwardly, the blade is moved to the right, as viewed in Figure 2, and the edge of the slot therein serves to cut the tube.

A block 150 is mounted above the member 134 on vertically extending studs 151. A guide member 152 is mounted in a floating member 153 positioned within a bore in the block 150 which is supported therein by a spring 154. The guide member 152 and the floating member 153 are provided with aligned central bores 156 through which the tube 5 is adapted to pass. The floating member 153 is formed with three spaced depending portions 155. A bottom plate 157 mounted on the block 150 is provided with three upwardly extending portions 159 which are in inter-spaced relation with the three depending portions 155 of the floating member 153. The arrangement of depending and upwardly extending portions 155 and 159 provide continuous guiding for the tube 5 regardless of the degree of depression of the floating member 153 from the position thereof shown in Figure 9. A length of metal tubing 158 extends between the block 150 and the member 134 and serves to guide the plastic tubing 5 in its passage therebetween. The left-hand end 77 of the member 76, previously described, is adapted at one point in the operative cycle of the plate 74 to be in a position immediately above the bore in the guide member 152 and serves to arrest upward travel of the plastic tubing therethrough as will be more fully described.

A motor 160 is mounted below the horizontal bed plate 4 and drives through suitable gearing a transversely extending shaft 162. A grooved pulley 164 is mounted on the shaft 162. A second grooved pulley 166 is rotatably mounted in a hanger 168 and is adapted to enter the groove in the pulley 164. The hanger 168 is pivoted from below the horizontal bed plate 4 at 170. A solenoid 172 is mounted at the rear of the underside of the plate 4 and is connected through an adjustable rod 174 to the hanger 168. When the solenoid 172 is energized, it will move the rod 174 to the right, as viewed in Figure 2, and draw the pulley 166 into engagement with the tube 5 pressing it against the pulley 164.

A spool 176 is rotatably supported on a suitable transversely extending shaft, not shown, which is supported by the machine side plates 2. The spool 176 carries a long length of the plastic tubing 5 which is fed upwardly from the spool through a detent guide mechanism indicated at 180 and through the space existing between the grooved pulleys 164 and 166. The pulley grooves are so positioned with respect to the diameter of the tubing that, when the solenoid 172 is energized drawing the pulley 166 against the pulley 164, the tube 5 will be fed upwardly thereby through a tube 179 extending through a bore in the bed plate 4 and supported by a fitting 181 in the bottom of the member 134 and through the aligning central bores in the member 134 and the guide member 152 previously described.

The shaft 162 extends transversely of the machine and adjacent to the right-hand side of the machine it carries a sprocket 161 which, in turn, drives a chain 161A running over a second sprocket mounted on a shaft 163. Four fixed dogs 165 are mounted on a side face of the second sprocket. A cam 167 is rotatably mounted on the shaft 163 adjacent to the second sprocket and carries a pivotally mounted latch member 169. The right-hand end of the latch member 169, as viewed in Figure 3, normally engages the left-hand end of a pivoted blade 171. The upper end of a downwardly extending rod 186 is pivotally connected to the blade 171 and is urged upwardly by a spring 187. A stop member 185 limits the upward motion of the blade 171. An operator control pedal 188 is pivoted at 189 and is provided with a bore through which the lower end of the rod 186 passes. Depression of the pedal 188 by the operator will result in the blade 171 being drawn downwardly in a counterclockwise direction around the pivot 178 against the urging of the spring 187 until motion is arrested by a stop 182. When the blade 171 is in its lowermost position, the latch 169 is rotated in response to urging of spring 175 about its pivot on the cam 167 in a clockwise direction as viewed in Figure 3 and the left-hand end thereof will engage one of the dogs 165 of the rotating sprocket driven to rotate in a counterclockwise direction by the chain 161A whereupon the cam 167 will be rotated in a counterclockwise direction until the pedal 188 is released and the right-hand end portion of latch member 168, as viewed in Figure 3, again engages the blade 171 and is thereby released from the dog 165 with which it has been engaged.

A cam follower 190 is mounted on an arm 192 pivoted at 194 and held in engagement with the surface of the cam 167 by means of a spring 196. A bar 198 has its right-hand end pivoted to the lever 192 and its left-hand

end adapted to engage the operating plunger of an air control valve 200. A solenoid 202 has the lower end of its plunger 204 formed with a hook passing under the bar 198. The parts are so arranged that when the solenoid is energized the bar 198 is raised upwardly and actuation of the bar 198 by the cam 167 will not result in operation of the air valve 200.

Pipe line 206 is adapted to be connected to a suitable supply of compressed air and serves to deliver air to the air valve 200 and through the line 208 to the center portion of the double acting cylinder 10. Air supply through the valve 200 is delivered through line 210 to the upper end of the double acting cylinder 10. The cylinder is of the type having operative pistons of different diameters so that air pressure is constantly maintained between the pistons and intermittently applied to the upper side of the upper piston to cause the piston rod to move downwardly intermittently. This structure is conventional and need not be described in detail.

A bracket 220 is adjustably mounted on the plate 6 and supports at its lower end a rotary solenoid 224 which actuates an arm 226 causing the arm to rotate in a horizontal plane and about a vertical axis through the solenoid 224. When the piston rod 16 has returned to its uppermost position, the clamp members 50 will carry upwardly therewith the plug 3 into which a length of tubing has been inserted. When the clamp members 50 are in this uppermost position, they are immediately above the plane in which the arm 226 rotates and the arm 226 is so positioned that, upon actuation of the solenoid 224, the arm 226 will engage the lower portion of the plug 3 carried by the clamp members 50 with sufficient force to cam the clamp members 50 apart against the urging of spring 54 and thus serve to dislodge the plug and stem assembly from the clamp members 50 and knock the plug assembly into a suitable receiver not shown.

The electrical circuit of the machine is shown in Figure 4 and includes a conventional disconnect switch and fuse assembly indicated at 232 which is connected to a suitable source of power through conductors 230. A pair of conductors 234 and 236 is connected to the switch 232 and the motor 160, previously described, receives power therefrom. A relay 238 has its coil connected across the conductors 234 and 236 through the contact of the limit switch 80. The relay 238 includes a single pole double throw switch the common terminal 237 of which is connected through the contact of the limit switch 81 to the conductor 234 on the disconnect switch side of the limit switch 80. One side 239 of the relay switch is connected in series with one side of the relay coil and the other side 241 of the relay switch is connected to one side of a parallel arrangement of the coils of the solenoid 172 and 202. The other sides of the solenoid coils are connected to the conductor 236.

When the apparatus is at rest, the limit switch 81 is closed, the relay 238 is deenergized and the solenoid coils 172 and 202 are energized through the relay switch contacts 237 and 241 and the limit switch 81. When the tubing engages the end of the lever 76 and closes the limit switch 80, the relay 238 is energized through the limit switch 80. When the coil of relay 238 is energized, the solenoid coils 172 and 202 are deenergized and the relay is sealed in through contacts 237 and 239 and the limit switch 81. When the arm 20 begins to move downwardly as a result of operation of the air cylinder, the limit switch 81 opens and remains open until the end of a cycle of operation of the machine at which time the arm 20 has returned to its uppermost position. While the limit switch 81 is open, solenoid coils 172 and 202 remain deenergized. When the arm 20 has returned to its uppermost position, the limit switch 81 is closed and the solenoid coils 172 and 202 are energized. The coil of the relay 238 remains deenergized until a new length of tubing has been fed upwardly and the limit switch 80 is again closed thereby.

The ejection solenoid 224 is adapted to be connected in series with a condenser 240 through contacts 242 and 244 of the single pole double throw limit switch 84 when the arm 20 and the rod 58 are in their at rest positions. A rectifier 250 is connected in series with a resistor 248 between the conductor 234 and the contact 246 of the limit switch 84. During an operative cycle of the apparatus, initial movement of the rod 58 actuates the limit switch 84 moving the contact 242 into engagement with the contact 246. Thus during a cycle of operation of the apparatus, the condenser 240 is charged and, at the termination of cycle of operation when the parts return to the at rest position shown, the condenser 240 is discharged through the coil of the ejection solenoid 224 causing the solenoid to make one operation. It should be noted that, when the parts of the machine are at rest, the switch arm 242 is in engagement with the contact 244 and thus there is no load upon the rectifier 250 and no current passing through the solenoid 224 after the condenser 240 is discharged.

In operation of the apparatus, the parts will normally be at rest in the position shown in the drawings. The operator will load plugs into the receiving bores in the annular array of blades 110 and depress the operating pedal 188. Depression of the pedal 188 permits the latch member 169 to engage one of the dogs 165 if the motor is running and cause the cam follower 190 to be actuated by the cam 167. Normally, the solenoid 202 is energized. Thus the bar 198 is raised from the position shown in Figure 3 and oscillation of the bar 198 will not actuate the air valve 200 to cause the piston rod 16, the rod 40 and the plug clamp 50 to descend. During this period, however, with the motor in operation, solenoid 172 is energized and tubing is fed upwardly through the guide member 152.

When the machine is in this position, the end 77 of the pivoted member 76 will be above the guide member 152. Upward movement of tubing through the guide member 152 is arrested as a result of contact by the tubing with the member 77 which actuates the limit switch 80 and thereby denergizes the solenoids 172 and 202. When the solenoid 172 is deenergized, the feed of tubing is interrupted. When the solenoid 202 is deenergized, the bar 198 is dropped and, upon the further rotation of the cam 167, the air valve 200 is operated causing the piston rod 16 to be moved downwardly.

Downward movement of the piston rod 16 serves to oscillate the arm 20 and open limit switch 81 as previously described. This oscillation rotates the rod 58 and the plate 74 thereby moving the member 76 to the side and exposing the upper end of the tubing within the guide member 152. The oscillation of the arm 20 actuates the knife blade 146 serving to sever a predetermined length of tubing and to supply a rigid support under the severed length of tubing. Downward movement of the rod 16 causes a downward movement of the rod 40 which carries the clamp members 50 and the plate 57 downwardly into engagement with a plug 3 supported by the blade 110 which is in the operative position. The stop screw 46 is positioned to engage the top of the rod 108 which is in the operative position previously described and to force the rod 108 downwardly compressing the spring 116. The stop screw 46 is adjusted to engage the rod 108 before the fingers 50 engage the blade 110 and before the plate 57 engages the upper end of the plug 3 seated on the blade 110. Thus the screw 46 does all the work of depressing the spring 116 and the plate 57 does not engage the top of the plug 3 until the plug is lifted up from the blade 110 by the tubing 5. This lifting which occurs at the lower end of the stroke provides sufficient clearance between the shoulder of the plug 3 and the blade 110 that the fingers 50 are free to move under the shoulder of the plug 3 without engaging the blade 110. When the plate 57 between the clamp

members 50 engages the top of the plug 3, it forces the plug over the fixed length of tubing extending upwardly through the guide member 152 which, as previously noted, is also depressible. As the plate 57 is being moved downwardly, the knife blade 146 which has previously severed a length of tubing will be in a position preventing downward movement of the severed length of tubing 5 and thus the upper end of the severed length of tubing will be forced into a receiving cavity 9 within the plug 3.

The period of dwell provided by the rise of the cam 167 and by air flow rate control valves is sufficient to provide the necessary time required for the rod 40 and the plate 57 between the clamp members 50 to move downwardly and force a plug over the uppermost end of a severed length of tubing. Further rotation of the cam 167 will permit the spring 196 to withdraw the bar 198 thereby permitting the air valve 200 to close whereupon the piston rod 16 will rise and return all of the parts of the apparatus to the at rest position as shown in the drawings. As the rod 40 raises, the inwardly turned lower end portions of the clamp member 50 will move under the shoulder of the head portion of the plug 3 and carry the plug upwardly therewith to the position shown in Figure 8 at which position action of the solenoid 224 and its arm 226 will serve to dislodge the assembled plug and tube from within the clamp members 50. When the piston rod 16 has returned to its uppermost position, limit switch 81 will be closed by the arm 20 to energize solenoid coils 172 and 202 and the limit switch 84 will be actuated by the member 82. At this time the plate 74 will have rotated with the rod 58 and returned the end 77 of the pivoted member 76 above the upper end of the guide member 152. Solenoid 172 being reenergized, tubing is again fed upwardly until it engages the end 77 of the pivoted member 76.

During each cycle of the apparatus, the arm 30, as previously described, will swing first to the right and then to the left as viewed in Figure 1. This operation of the arm 30 oscillates the horizontally extending rod 126 and the two horizontally extending bars 130 and 132. The left ends of these bars are formed to engage the ratchet teeth of the ratchet wheels 98 and 100 repectively affixed to the shaft 96. The teeth of the two ratchet wheels and the dogs on the bars 130 and 132 are so arranged with respect to each other that during the downstroke of arm 20 the bar 130 moves to the right from the position shown in Figures 1 and 3 and rides over and comes to rest behind the next tooth 98' of its associated ratchet wheel 98 without rotating the ratchet wheel. At the end of the downstroke of arm 20, the bar 132 has been moved back away from wheel 100. Upon the latter portion of the upward motion of the clamp members 50 and as rod 126 moves to the left as viewed in Figure 1, the rod 130 engages the tooth 98' and the shaft 96, ratchet wheels 98 and 100, and the turret arrangement including the vertically extending rods 108 is rotated a distance equal to the angle subtended by adjacent rods 108 by the action of the bar 130 on ratchet wheel 98. As the arm 132 moves to the left, as viewed in Figure 6, the ratchet tooth 100' rotates a sufficient distance before the arm 132 approaches the position shown in Figure 6 so as to clear the end of the arm and thus does not engage the end of the arm and prevent rotation of the cam 100 and the shaft 96 in response to the action of the arm 130. At the completion of the left-hand stroke of the rod 126, the arm 130 will have advanced the two ratchet wheels to a point where the next successive tooth on the ratchet wheel 100 will engage the end of the arm 132 and thus serve to arrest further rotation of the ratchet wheel and the shaft 96. As previously noted, the action of the two arms 130 and 132 in the position shown in Figure 6 is such as to rigidly lock the shaft 96 and the turret arrangement so as to position a plug 3 in alignment with the tube 5 positioned in the guide member 152. Rotation of the turret commences after the major portion of the stem attached to the plug being carried upwardly by the clamp members 50 has passed through the blade 110 by which the plug was supported.

From the foregoing it will be evident that the apparatus provides means whereby an operator need merely load plugs into the receiving bores in the rotary arrangement of blades 110 and that the machine will proceed to insert predetermined lengths of tubing in each of the plugs and discharge the plugs. The operation of the machine is controlled by the operator depressing the pedal 188 and at any time that the operator desires to arrest the operation of the machine, he may do so by removing his foot from the pedal.

While the apparatus has been described in conjunction with the insertion of a length of tubing into a plug of the type adapted to fit into a flexible container, it will be evident that the apparatus may equally be well employed in conjunction with the insertion of any elongated member into a receiving element having a suitable receiving bore therein.

It will be also evident that various modifications may be made to the embodiment of the invention disclosed herein without departing from the scope of the invention as set forth in the following claim.

What is claimed is:

Apparatus for inserting elongated members into plugs comprising: means for supporting successive elongated members in a fixed substantially vertical position, a turret assembly for mounting said plugs and successively advancing each of said plugs to a position in alignment with the upper end of an elongated member, said turret having a vertically movable mounting member for the support of each plug, spring means to bias said mounting member upwardly, a substantially vertical plunger including a ram to reciprocate said plunger and index said turret in timed relationship, a member secured to said plunger and adapted to engage and depress said mounting member to lower a plug into engagement with an elongated member on the lowering of the plunger, and a plug engaging member secured to said plunger to urge said plug towards said elongated member and to lift the plug and elongated member on the raising of the plunger, air supply means to supply air under pressure to said ram, an air valve between said air supply means and said ram, a pivoted plunger to operate said valve, a solenoid connected to said pivoted plunger, switch means responsive to engagement by said elongated member to position the solenoid to pivot said pivoted plunger into position to operate said valve and means to reciprocate said pivoted plunger means.

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