

Sept. 15, 1942.

H. ANDERSON

2,296,079

GLUING HEAD

Original Filed Jan. 23, 1939

3 Sheets-Sheet 1

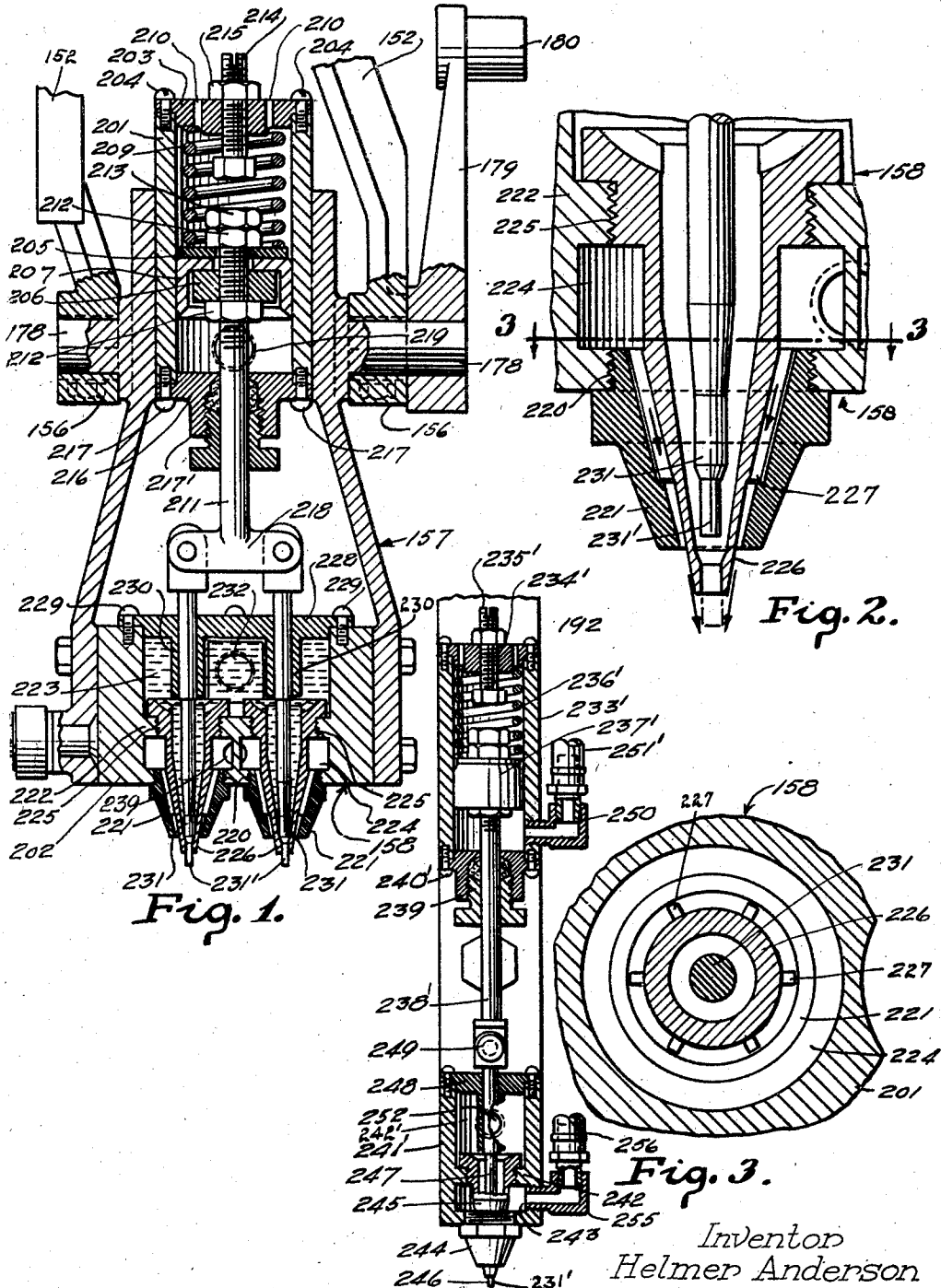


Fig. 1.

Fig. 2.

Fig. 3.

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Fig. 4 By *Arthur R. Lytle*
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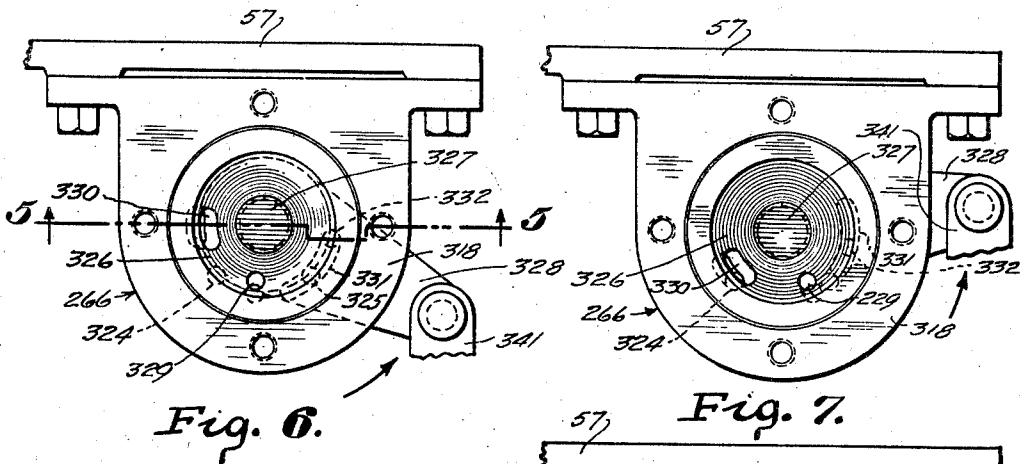


Fig. 6.

Fig. 7.

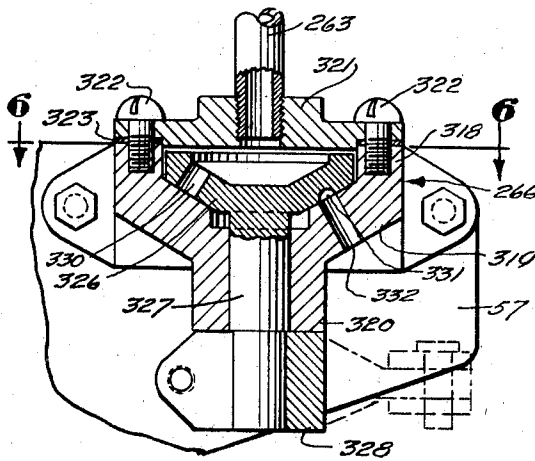


Fig. 5.

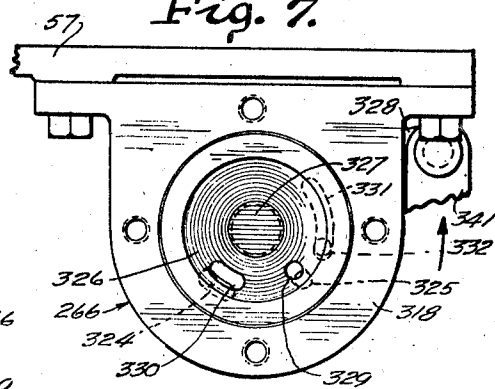


Fig. 8.

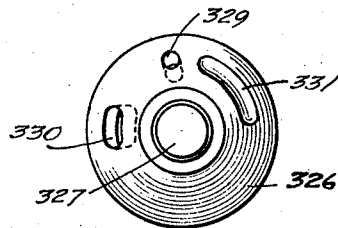


Fig. 10.

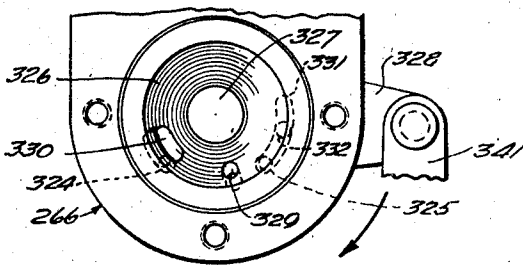


Fig. 9.

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3 Sheets-Sheet 3

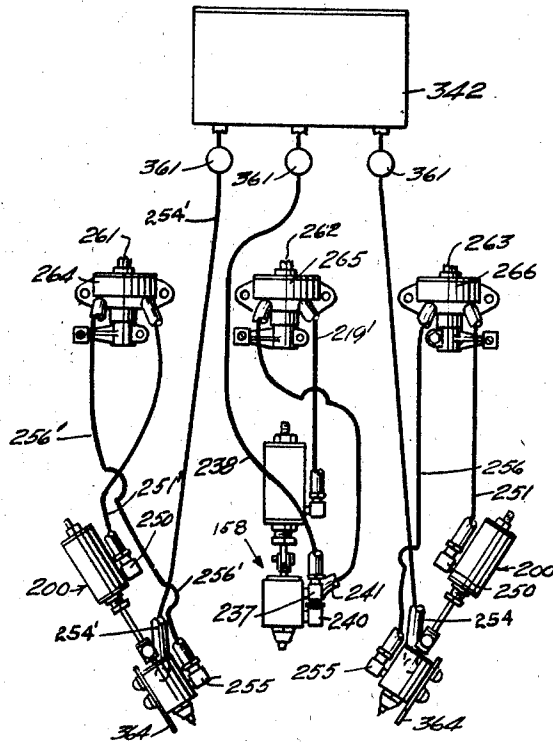


Fig. 11.

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UNITED STATES PATENT OFFICE

2,296,079

GLUING HEAD

Helmer Anderson, Minneapolis, Minn., assignor
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ware

Original application January 23, 1939, Serial No.
252,506. Divided and this application June 21,
1941, Serial No. 399,171

5 Claims. (Cl. 299—59)

This is a division of my application Serial No. 252,506, filed January 23, 1939, now Patent No. 2,247,110, granted June 24, 1941.

This invention relates to gluing heads for applying adhesive to the mouth parts of bags intended to be held closed by such adhesive.

An object of this invention is to provide gluing or gumming heads for use on a gumming machine of the character described in the above-mentioned patent.

This and other objects as will hereinafter appear are accomplished by this invention which is fully described in the following specification and shown in the accompanying drawings in which

Figure 1 is an enlarged vertical sectional view of a gluing head embodying the present invention.

Fig. 2 is an enlarged axial section of a nozzle shown in Fig. 1.

Fig. 3 is a section on the line 3—3 of Fig. 2.

Fig. 4 is an enlarged longitudinal section of a modification of the invention disclosing a single gluing head.

Fig. 5 is a sectional view on line 5—5 of Fig. 6, showing a section through one of the air control valves used herein.

Fig. 6 is a section of Fig. 5 on the line 6—6, showing certain valve ports.

Fig. 7 is a view similar to Fig. 6, showing the ports partly opened.

Fig. 8 is a view similar to Fig. 6 but showing the ports fully opened.

Fig. 9 is a view similar to Fig. 6 but showing still another position of the valve.

Fig. 10 is a detail bottom view of the valve and stem, showing the ports.

Fig. 11 is a schematic view showing the gum tank, air control valves and the gum dispensing heads.

This gluing head is part of an applicator for use in connection with bag closing and sealing machines. While the device may be used with various forms of packaging machines those parts of one such machine which directly relate to the present applicator will be found in the above-mentioned patent, it being clearly understood that variations may be made in the packaging machine without necessitating variations in the applicator although variations may be made in the construction of the applicator without departing from the scope of the invention as set forth in the claims hereto appended.

The middle gumming head

In this head, which is particularly disclosed in Figs. 1 and 2, the frame 157 supports at its upper part an air cylinder 201 and in its lower part an adhesive dispensing casing 202 the center of which is axially aligned with the cylinder 201. The upper end of the cylinder 201 has a head 203 secured thereon by screws 204. Slidable in the cylinder 201 is a piston comprising an upper plate 205, a lower plate 206 and a cup-shaped packing 207. A compression spring 209 is located between the head 205 and the plate 206 to urge the piston downwardly. Vents 210 serve to permit the influx and escape of air as the piston moves. The piston is provided with a piston rod 211 which is secured to the piston by nuts 212 and a lock nut 213. Through the center of the head 203 is a stop screw 214 having a lock nut 215 by means of which the upward movement of the piston may be adjustably limited, to control the opening of the valve and the amount of gum applied. On the lower end of the cylinder 201 is a head 216 held in place by screws. This head carries a stuffing box 217 and the piston rod 211 passes through this stuffing box and carries on its lower end a cross head 218. Between the piston and the head 216 the wall of the cylinder is provided with an air port 219. An air supply pipe 219' (Fig. 11) is connected to the port 219 by a suitable elbow.

The lower end of the casing 202 is provided with a pair of threaded openings 220 wherein are screwed a pair of air nozzles 221. In the casing 202 is a partition 222 dividing the casing into an upper adhesive compartment 223 and an air compartment 224. The partition 222 is provided with a pair of screw threaded openings 225 and screwed in these openings is a pair of adhesive nozzles 226 having tapered lower ends entering the air nozzles 221. The nozzles 226 are provided exteriorly with ribs 227 serving to constitute vanes for directing the flow of air between said nozzles 221 and 226 thereby preventing swirling of air in the nozzles and insuring a good spray. The top of the casing is closed by a head 228 secured by screws 229 and having openings aligned with the nozzles and provided with tubular guide extensions 230. Through the head and its guides pass needle valves 231 which normally close the nozzles 226 extending completely there-through (Fig. 1) so as to prevent the adhesive from plugging the nozzle. The valves 231 are connected to the head 218. A port 232 serves to admit adhesive to the chamber 223 and thus to the nozzles 226 and communicates by an elbow

237 with an adhesive supply pipe 238. An air port 239 is provided for the admission of air to the chamber 224 and leads to an elbow 240 to which is connected an air supply pipe 241.

In the operation of this gumming head, air under pressure is admitted to the cylinder 201 beneath the piston which causes it to move upwardly and open the valves 231. Air under pressure is also admitted to the chamber 224 and will flow out through the spaces between the nozzles 221 and 226, thus assisting the flow of adhesive from the chamber 223 by reason of the asperating effect of such outflowing air.

The side gumming heads

As shown in Fig. 11 there are two of these gumming heads 200 and these heads are alike in construction. Fig. 4 is a section through one such head and consists of an upper air cylinder 233' having a head 234' similar to the head 205 and like it provided with an adjustable stop screw 235'. A spring 236' urges a piston 237', of the same detail construction as the middle head piston, downwardly and a piston rod 238' is fixed to the piston 237' and extends downwardly through a stuffing box 239 carried by the lower head 240' of the cylinder 233'. This gumming head also has a lower cylinder 241' divided by a partition 242 into an upper adhesive chamber 242' and a lower air chamber 243. An air nozzle 244 and an adhesive nozzle 245 are provided in connection with this cylinder 241'. A needle valve 246 is formed on the lower end of a stem 247 which passes through the removable head 248 and is connected to the rod 238' as at 249. The construction of this part is the same as that shown in the center gumming head which is shown in Fig. 1. The cylinder 233' has an elbow 250 screwed therein to form a port for admission of air beneath the piston 237' and for connection of air pipes 251 and 251' for the two gumming heads. The cylinder 241' has a port 252 leading to the adhesive chamber 242 and an elbow affords communication between this port and an adhesive supply pipe 254. An elbow 255 provides connection between the air chamber 243 and an air supply pipe 256 for the right gumming head, a similar pipe 255' supplying air to the left gumming head.

The operation of these side gumming heads is the same as that described in connection with the middle gumming head. In each instance, air is first applied to compartment 224, then needle valve 231 is withdrawn causing adhesive to be sprayed. Then valve closes the orifice in the nozzle 226 before air on 224 ceases. Thus air cleans nozzle of any surplus glue. Also as valve opens, it scrapes off any adhesive on the end 231 and insuring a clean nozzle.

The air supply in general

In order to supply the necessary air for operation of the various mechanisms a suitable source of air under pressure (not shown) has pipes 261, 262 and 263 leading respectively to individual control valves 264, 265, and 266 for the three gumming heads and from these valves lead the pairs of pipes 251' and 256', 219' and 241 and 251 and 256. The three valves 264, 265, and 266, are of the same construction and but one of these will be described in detail.

The gumming head control valves

The detail of construction and operation of the valve 266 is shown in Figs. 5 to 10, inclusive.

The other valves are identical in construction. The valve 266 comprises a casing 318 having an inverted frusto-conical bottom 319 having a central depending tubular boss 320. The top of the casing is closed by a cover 321 held to the casing by screws 322. A gasket 323 is interposed between the cover and casing to provide an air tight joint. The cover 321 is provided with a screw threaded opening in which is screwed one of the pipes leading from the air header (not shown), the pipe here shown being the pipe 263. In the bottom 319 of the casing 318 is a pair of ports 324 and 325 to which are connected one pair of the pipes leading to the particular gumming head controlled by the corresponding valve. In each instance the pipe to the upper or air cylinder is connected to the port 325 and the pipe leading to the lower or adhesive cylinder is connected to the port 324. In the casing 318 is an inverted frusto-conical valve 326 having a valve stem 327 which projects downward through the boss to terminate well below the boss so that an operating lever 328 can be adjustably mounted on said valve stem. The valve 326 is provided with a circular port 329 which may be brought into and out of registry with the port 325 by rotation of the valve. The valve is also provided with an arcuate port 330 which may similarly be caused to register with the port 324. Also a grooved passage 331 is formed on the under side of the valve 319 and in a certain position of the valve the passage 331 will register with the port. The valve casing is also provided with an exhaust port 332 wherewith the passage 331 may register at the time it registers with the port 325 so that the air may be exhausted from beneath the upper or air cylinder of the respective gumming head.

To operate the valves 264, 265, and 266 suitable cams actuating respective bell crank levers and operating levers 328 of the several valves are provided. It is understood that the cams are so positioned that the valves operate in proper sequence.

The operation of each valve is as follows: The normal position of the valve 326 is shown in Fig. 6 and in that position the ports 329 and 330 are in closed position so that no air can flow to the gumming head which is connected to the particular valve. The operation of the valves is also timed in relation to the downward movement of the gumming heads, as described in the above patent. The respective gumming heads move down and the valve now moves in the direction of the arrows until the ports 330 and 324 register, which admits air to the lower cylinder so long as the forward end of the port 330 registers with port 324. In this position air simply blows out between the air and adhesive nozzles. Movement of the valve continues and the port 329 registers with the port 325, the rear end of the port 324 now registering with the rear end of port 330. The valve is now fully open and, while air still continues to flow to the lower cylinder of the gumming head, the air will flow to the upper cylinder and raise the piston, thus opening the adhesive nozzles for the flow of adhesive. The valve 326 starts in reverse motion and when the position shown in Fig. 9 is reached the passage 331 connects the ports 325 and 332 so that air will be exhausted from the space beneath the piston in the upper cylinder so that the needle valve or valves will close. Now it is to be noted that the needle valves have tips 231'. When the needle valves close these tips clear the

passage in the points of the adhesive nozzles 226. At the same time the port 330 will move until the port 324 registers with its forward end. Thus after the needle valves close air will continue to flow through the space between the air nozzle 231 and adhesive nozzles 226 and clean the tips 231'. Thus any clogging of the adhesive nozzles, or jamming of the needle valves is prevented.

Adhesive storage and supply

Mounted on top of the frame is an adhesive supply tank, provided with three outlets, one for each of the gluing heads to which they are connected by means of lines 254, 254' and 238. Valves 361 serve to regulate the flow of adhesive to the gluing heads.

The general operation

The operations of the several parts of the mechanisms having been previously described immediately following descriptions of their constructions, it is not deemed necessary to again particularize these operations. In general, however, the operations on a filled bag may be traced as follows:

Through the action of the packaging machine the bag is brought to station A for action thereon by the gumming machine. The movement of the bag ceases for such period of rest as to enable the gumming operations to be performed. As the bag moves into such position the mechanism coupling the upper cam shaft to the lower cam shaft is tripped by the bag and the upper shaft controlling the air supply starts rotation. The first action on the bag itself is that one cam operates to effect closing of the bag at its neck. This is followed by the action of another cam on the mechanism controlled thereby, which causes opening of the mouth of the bag. Then a further cam effects lowering of the middle gumming head while a still further cam effects, through the mechanism controlled thereby, oscillation of the middle gumming head. As this head is lowered and oscillated, the air valve controlling the pipes leading thereto effects opening of the adhesive nozzles of the head and adhesive in applied inside the edge portions of the bag mouth. At the same time the glue head control cams and the air valve control cams operate to effect alternate lowering and opening of the side gumming heads and the deposition of adhesive in the fold portions of the bag. The bag is thus gummed for closing. The gumming heads are now closed and retracted, whereupon the bag is again put in motion by the packaging machine. As the bag leaves the station A the upper cam mechanism is disconnected from the lower cam mechanism and thus the air control valves cease to operate until the next filled bag is moved into position for operation thereon.

I claim as my invention:

1. A gluing head for machines of the class described comprising an air cylinder and an adhesive holding compartment, said compartment having an adhesive distributing nozzle, a needle valve carried by said compartment controlling the flow of adhesive through the nozzle, a piston in said cylinder, means operatively connecting the needle valve and said piston, means to admit air under pressure beneath said piston, spring means in said cylinder acting in opposition to the admitted air for returning the

needle valve to closed position, said compartment being provided with a transverse partition dividing it into an upper adhesive chamber from which the adhesive nozzle is fed and a lower air chamber, an air nozzle leading from said air chamber surrounding the adhesive nozzle, the adhesive nozzle extending beyond the air nozzle, both nozzles converging outwardly, and means to admit air under pressure to said air chamber.

2. A gluing head for machines of the class described comprising spaced concentric conical nozzles, the outer nozzle carrying air, the inner nozzle carrying liquid adhesive under pressure and extending beyond the outer nozzle, a needle valve within the inner nozzle and extending beyond the inner nozzle when in closed position, both nozzles converging outwardly, means for reciprocating the needle valve in the inner nozzle so as to open the inner nozzle to permit adhesive to flow therethrough, and means for feeding air to outer nozzle during the time the needle valve is open and for a short time after it is closed so as to blow any excess adhesive off the nozzle.

3. A gluing head for machines of the class described comprising spaced concentric conical nozzles, the outer nozzle carrying air, the inner nozzle carrying liquid adhesive under pressure and extending beyond the outer nozzle, a needle valve within the inner nozzle and extending beyond the inner nozzle when in closed position, both nozzles converging outwardly, means for reciprocating the needle valve in the inner nozzle so as to open the inner nozzle to permit adhesive to flow therethrough, and means for feeding air to outer nozzle before and during the time the needle valve is open and for a short time after it is closed so as to blow any excess adhesive off the nozzle.

4. A gluing head for machines of the class described comprising spaced concentric conical nozzles, the outer nozzle carrying air, the inner nozzle carrying liquid adhesive under pressure and extending beyond the outer nozzle, a needle valve within the inner nozzle, both nozzles converging outwardly, means for reciprocating the needle valve in the inner nozzle so as to open the inner nozzle to permit adhesive to flow therethrough, and means for feeding air to outer nozzle before and during the time the needle valve is open and for a short time after it is closed so as to blow any excess adhesive off the nozzle, the needle valve extending through the adhesive nozzle so as to cause the latter to scrape off any adhesive left on the outer end of the needle valve as the valve is withdrawn.

5. A gluing head for machines of the class described comprising spaced concentric conical nozzles, the outer nozzle carrying air, the inner nozzle carrying liquid adhesive under pressure and extending beyond the outer nozzle, a needle valve within the inner nozzle and extending beyond the inner nozzle when in closed position, both nozzles converging outwardly, means for reciprocating the needle valve in the inner nozzle so as to open the inner nozzle to permit adhesive to flow therethrough, all said nozzles being at an acute angle, and means for feeding air to outer nozzle during the time the needle valve is open and for a short time after it is closed so as to blow any excess adhesive off the nozzle.

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