June 10, 1941. W. L. MacKENZIE 2,244,791

NOZZLE FOR COATING APPARATUS

Filed June 13, 1940

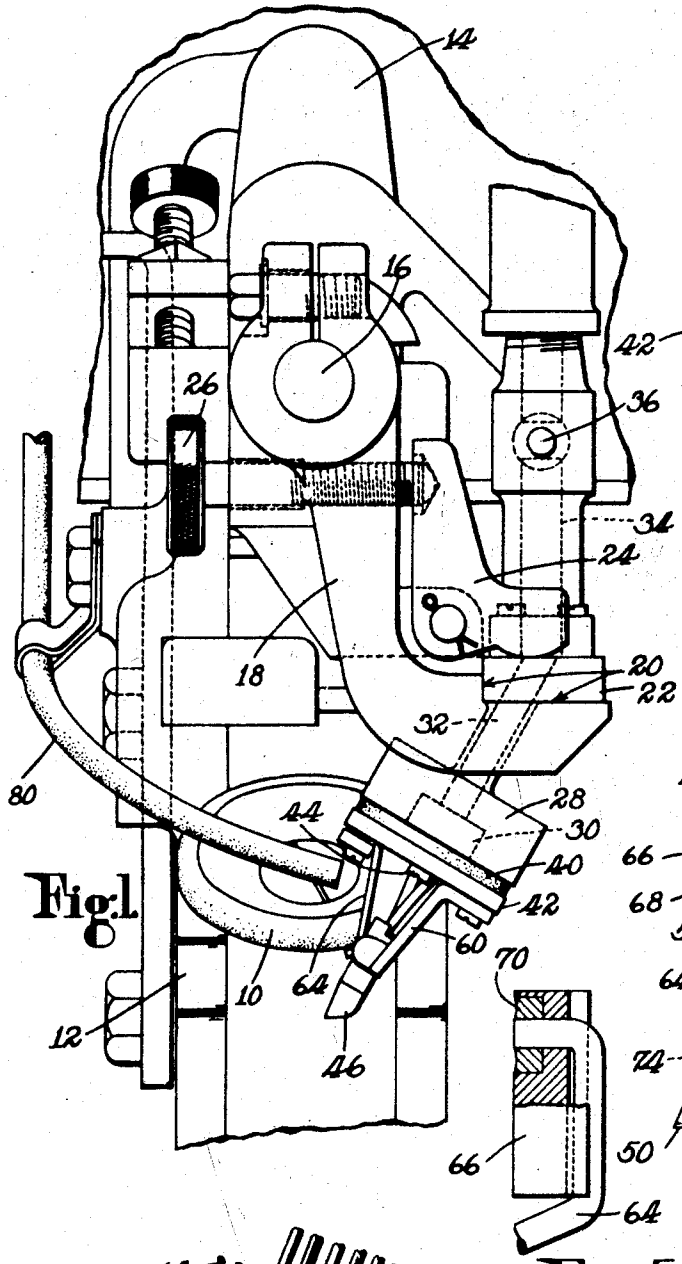


Fig. 1.

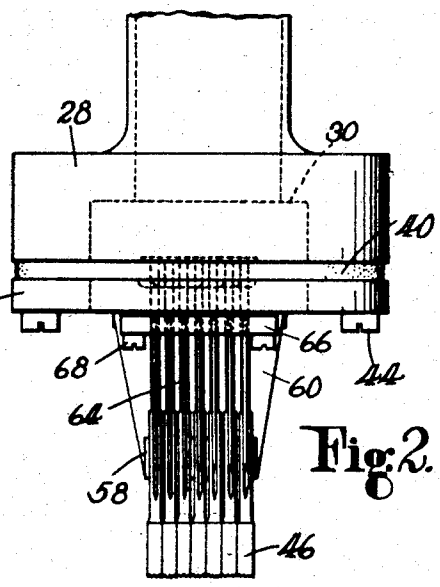


Fig. 2.

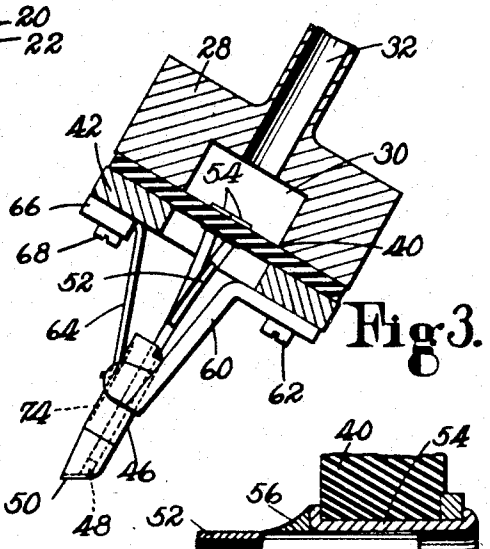


Fig. 3.

Fig. 5.

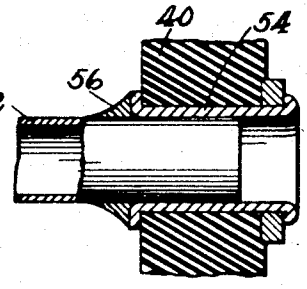


Fig. 7.

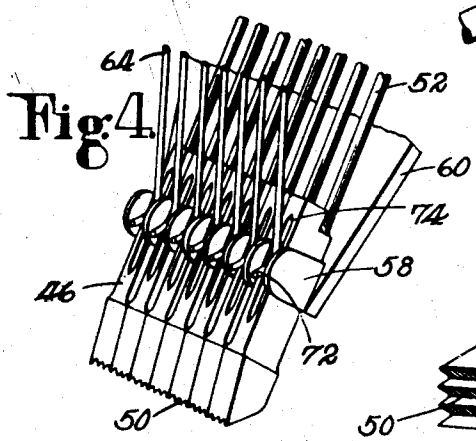


Fig. 4.

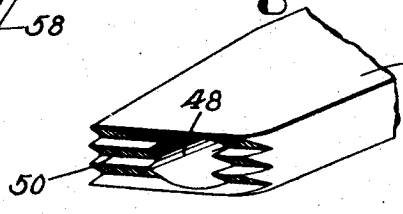


Fig. 6.

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UNITED STATES PATENT OFFICE

2,244,791

NOZZLE FOR COATING APPARATUS

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Application June 13, 1940, Serial No. 340,348

5 Claims. (Cl. 91—43)

This invention relates to nozzles for coating machines and is herein illustrated as applied to a machine for coating the overlasted margin on shoe bottoms, said machine being of the type illustrated in Letters Patent of the United States No. 2,100,341, granted November 30, 1937, on an application of W. L. MacKenzie.

There are numerous types of work, in the making of shoes, in which the surface of the work is irregular, so that a satisfactory coating may not be applied thereto by extruding the coating material through a rigid nozzle. The reason for this seems to be that the continuity of the applied coating depends to a large extent upon physical contact between the work and the outlet of any nozzle. Flexible nozzles have been provided, therefore, of rubber and rubber substitutes and nozzles have been made of metal which comprise a plurality of delivery members positioned side by side to apply a series of individual stripes which merge to form a continuous band of coating material, such as adhesive cement. One such nozzle is illustrated in Letters Patent of the United States No. 2,177,666, granted October 31, 1939, on an application of W. L. MacKenzie and E. S. Nokes, and it is an object of the invention to provide an improved nozzle of the type therein described.

To avoid the necessity of machine work in preparing a series of delivery members which are to be pivotally mounted on the supporting machine and, furthermore, to avoid the possibility of breakage which results where the metal nozzle parts must bend to secure flexibility, the nozzle illustrated herein, in accordance with features of the invention, provides a series of delivery members placed side by side which are individually supplied through capillary tubes, and the cement is delivered to these tubes through holes in a diaphragm. This diaphragm is of flexible material, and the individual tubes are secured in the holes of the diaphragm as by riveting. With this construction, flexibility is provided by flexing the diaphragm rather than by bending the tubes. These and other features of the invention will best be understood from a consideration of the following description taken in connection with the accompanying drawing, in which—

Fig. 1 is an end view of a bottom cementing machine to which my improved nozzle has been applied;

Fig. 2 is a view on a larger scale looking at the right side of the nozzle of Fig. 1;

Fig. 3 is an end elevation of the nozzle with the upper portion shown in section;

Fig. 4 is an angular view of the work-engaging feet of the nozzle delivery members; and

Figs. 5, 6, and 7 are detail views to show the spring mounting, the tube mounting, and the bottom of the foot, respectively.

Although it will be understood that the nozzle may be utilized for a variety of work, it has been illustrated for convenience as applied to a bottom cementing machine of the type illustrated in the above-mentioned MacKenzie Patent No. 2,100,341, to which reference may be had for a more complete disclosure of those portions of the machine not herein shown. As is common in such machines, the work is fed beneath a depending nozzle by means of a driven feed roll 10 which engages the side of an inverted shoe and which is journaled in a member supported in a frame 12. This frame serves also for a support for a tiltable arm 14 which has an outwardly extending rod 16 to which a nozzle-supporting bracket 18 is clamped. The lower end of this bracket is provided with supporting and positioning surfaces 20 against which a nozzle block 22 may be clamped by means of a bell-crank lever 24 which is urged against the block 22 by a hand screw 26. The nozzle block has an enlarged portion 28 to provide an open-sided chamber 30 to which coating material such as adhesive cement may be supplied under pressure through a passage 32 connecting with a similar passage 34 leading to a pump (not shown) by means of which the cement may be supplied under the desired pressure, the flow of cement being controlled by a valve 36.

The open side of the chamber 30 is closed by a flexible diaphragm 40 which may be made of any suitable material which is substantially unaffected by the solvents of the cement. One such material is the rubber substitute known as "Koroseal." This diaphragm is held in place on the nozzle block by a clamping frame 42 secured by screws 44 (Fig. 2). For engagement with the work the nozzle has a series of plate-like delivery members 46 which are placed side by side and each of which has a passage terminating in an outlet 48. This outlet 48 appears in a grooved end surface 50 inclined to the length of the delivery member and provided with a series of grooves through which the adhesive passes as the work is moved from right to left (Fig. 1) beneath the nozzle. Each delivery member is connected to the chamber 30 by an individual tube 52 of capillary size which passes through a perforation in the diaphragm and is secured in place in the diaphragm by means of a tubular eyelet-

like member 54 to which the tube is attached, as by soldering, at 56. These eyelet-like members are set in the diaphragm by flanging or upsetting the inner end of each over a washer. It will be noted that the upper ends of the tubes are staggered (Fig. 3) so that more room for their attachment to the diaphragm will be provided.

The work-engaging delivery members 46 are secured to the tubes as by means of solder, and each member occupies its own notch between the teeth 58 of a comb-like supporting and guiding member 60 which is attached by screws 62 (Fig. 3) to the nozzle block portion 28. Individual springs 64 serve to resist upward deflection of the feet of the delivery members, and a series of these springs is mounted on a plate 66 which is attached to the nozzle block by screws 68. The upper ends of the springs are held in the plate by solder 70, and the lower ends 72 are curved and ride in shallow grooves 74 formed in the upper surfaces of the delivery members 46.

When a shoe bottom is raised into engagement with the grooved ends 50 of the delivery members, the latter will be held in firm engagement with the surface of the work despite any irregularities in the latter because each individual delivery member can be moved separately against the tension of its spring 64, and this movement is allowed by flexing of the diaphragm 40 substantially without any bending of the supply tubes 52. It will be understood that in the operation of the patented machine the feed wheel 10 is moved toward the observer in Fig. 1 and downwardly with respect to the nozzle because of the pivotal support provided therefor as described in the patent. Any possible tendency of the delivery members to stick together is avoided by supplying a solvent to the upper side of said members through a tube 80.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent of the United States is:

1. In a coating machine, a nozzle comprising a chamber to which coating material is supplied under pressure, a diaphragm of flexible material closing said chamber, and a delivery member having one end secured to said diaphragm and the other end positioned for engagement with the work.

2. In a coating machine, a nozzle comprising a chamber to which coating material is supplied under pressure, a diaphragm of flexible material closing said chamber, a hollow delivery member having one end secured to said diaphragm and the other end positioned for engagement with the work, and means for guiding the work-contacting end of the delivery member as it yields under pressure of the work.

3. In a coating machine, a nozzle comprising a supporting member having a chamber, a passage leading to said chamber through which coating material may be supplied under pressure, a diaphragm of flexible sheet material closing said chamber, work-engaging members each having a passage terminating in an outlet opening, and means for supplying said work-engaging members comprising hollow tubes the other ends of which are rigidly secured to said diaphragm and are capable of movement by reason of the flexibility of the diaphragm.

4. In a coating machine, a nozzle block having a chamber open at one side and provided with a supply passage through which coating material may be supplied under pressure, a diaphragm of flexible material closing the open side of said chamber, and a series of hollow elongated delivery members the supply ends of which are fastened in said diaphragm and the outlet ends of which are associated with the work to be coated, said outlet ends being relatively movable by reason of the resilience of the diaphragm.

5. In a coating machine, a nozzle block provided with a chamber open at one side, a supply passage leading to said chamber, a diaphragm of flexible material closing the open side of said chamber, a series of tubular members riveted in said diaphragm, work-engaging feet on the other ends of said tubular members, and a guiding plate for said tubular members for maintaining the feet in adjacent relation to apply a series of parallel stripes of coating material which may merge to form a band, said feet being movable by reason of the resilience of the diaphragm when pressed out of normal position by changes in the contour of the work being presented thereto.

WILBUR L. MACKENZIE.