Oct. 5, 1937. I. L. KEITH 2,094,658

MACHINE FOR APPLYING LIQUID IN THE MANUFACTURE OF SHOES

Filed June 4, 1935

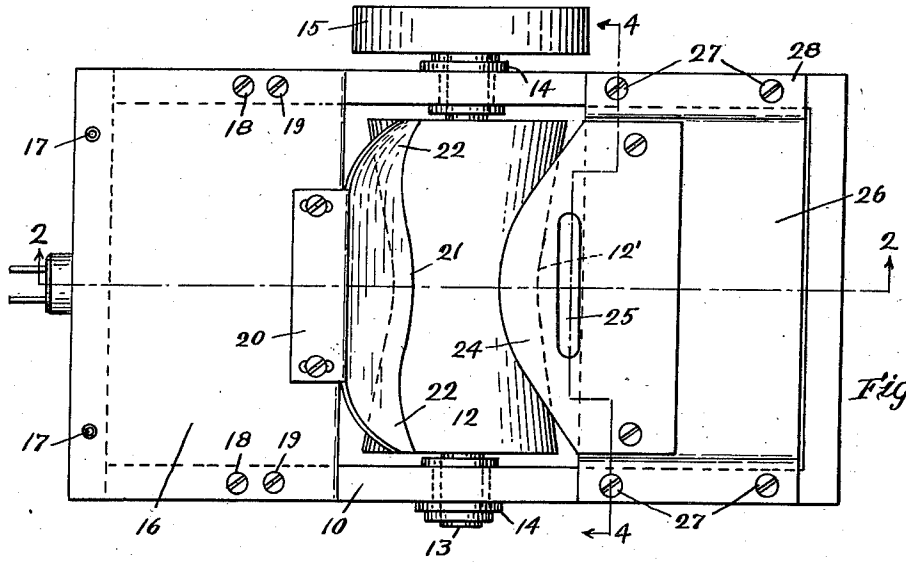


Fig. 1.

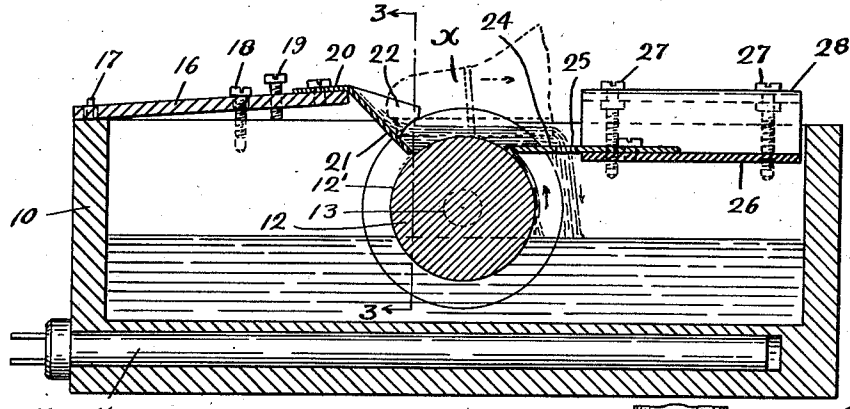


Fig. 2.

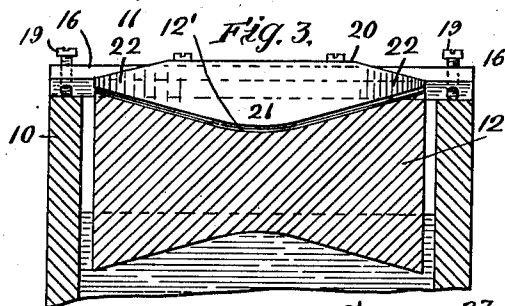


Fig. 3.

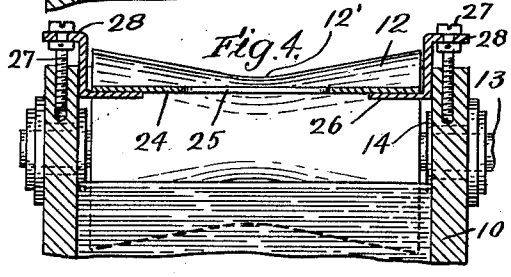


Fig. 4.

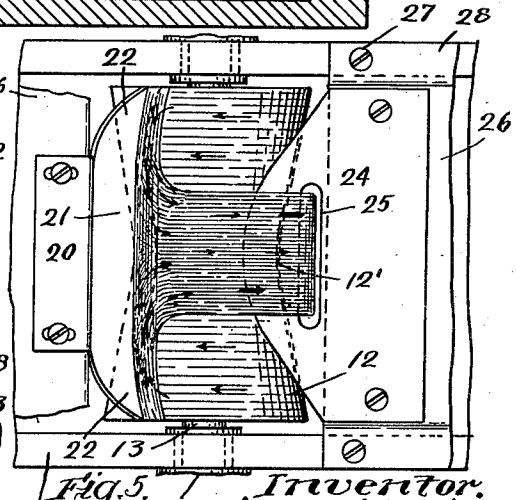


Fig. 5.

Inventor.
Irving L. Keith,
by L. D. Cammeyer
Atty.

Patented Oct. 5, 1937

2,094,658

UNITED STATES PATENT OFFICE

2,094,658

MACHINE FOR APPLYING LIQUID IN THE MANUFACTURE OF SHOES

Irving L. Keith, Haverhill, Mass.

Application June 4, 1935, Serial No. 24,883

8 Claims. (Cl. 12—80)

This invention relates to a type of cementing or liquid adhesive applying means which is primarily designed for use in connection with the manufacture of welted shoes, although it may be useful in other relations.

In the manufacture of welted shoes it has been customary, after the upper has been lasted onto the innersole, and before the welting operation is performed, to bind a wire about the toe portion of the upper, lining and tip, which extends over the lip of the innersole and which are sewed together when the welt is sewed thereto, for the purpose of holding these parts in position during the sewing operation. It has also been customary to drive staples into these parts for the same purpose.

According to a more recent practice, the use of the binding wire, or staples, has been abandoned, as such use is objectionable for several reasons, and in lieu thereof the edge portion of the upper etc., which will have been partly trimmed off, is then dipped into a quick setting adhesive composed largely of melted wax, which sets immediately on cooling and acts to hold the edges of the upper, tip and lining together, so that the welting operation may be more effectively performed, and after this operation has been performed, the edge portions which have been dipped in the quick setting adhesive are trimmed off.

While this operation is successful when properly performed, considerable difficulty has been encountered in performing the above described cementing operation, in that satisfactory results are only secured when the trimmed edges are dipped to the depth of about ¼ of an inch, as it is necessary to dip these edge portions to about this depth to bind them together satisfactorily, while it is objectionable if they are dipped to a greater depth. For example, when these edge portions are merely dipped in a bath of adhesive, it is extremely difficult for the operator to perform this operation satisfactorily, as he is likely to dip them either to an insufficient or to too great an extent, and in attempting to perform this operation by means of a roll which is driven while partly submerged in the liquid, it was found that the depth of the cement carried up by the roll on its surface was insufficient for the purpose. The fact that the adhesive which is employed sets almost instantly on cooling has also increased the difficulty in performing this operation satisfactorily.

In other words, so far as I am aware, no satisfactory means has been developed, prior to my invention, for performing this operation.

The objects of my invention, therefore, are to provide an apparatus by means of which this cementing operation may be quickly and satisfactorily performed, and with which the depth to which the edge portion of the upper and lining may be dipped in the adhesive may be constant and may be controlled and varied.

I accomplish these objects by providing a tank having heating means and in which a roll is arranged to be driven horizontally in a position in which it will be partly submerged in the liquefied material in the tank, said roll being tapered in diameter from each end towards the middle and a correspondingly shaped scraper being arranged in contact with the surface of said roll throughout its length, in an oblique position, so that when the roll is rotated in one direction the scraper will cause the liquid on its surface to flow towards the middle of the roll and thereby cause an accumulation of liquid at the middle of the roll which flows over the latter back into the tank, in the opposite direction to the direction of rotation of the roll, in a stream of substantial depth, which may be varied by varying the proximity of the scraper to the roll. The cementing operation may then be performed by merely dipping the edge portion of the shoe upper into the stream thus formed.

For a more complete disclosure of the invention, reference is now made to the following specification, in connection with the accompanying drawing, in which:

Fig. 1 is a plan view of a machine embodying a preferred form of my invention.

Fig. 2 is a sectional view at line 2—2 of Fig. 1.

Fig. 3 is a sectional view at line 3—3 of Fig. 2.

Fig. 4 is a sectional view at line 4—4 of Fig. 1.

Fig. 5 is a plan view illustrating the operation of the machine.

According to my invention I provide a tank 10 of convenient size, having electrical heating units, as 11, in its bottom, so that its contents may be heated. A roll 12 is mounted in said tank on shafts 13 at each end, said shafts being journaled in the sides of the tank in liquid tight bearings 14, to rotate about a horizontal axis, said roll being driven by a pulley 15 on one of the shafts.

Said roll 12 is tapered in diameter from each end towards the middle, both end portions thereof therefore being of trunco-conical form with the base at the end of the roll. The middle portion 12 of the roll, which is the portion of least diameter, is preferable slightly concave as shown but may be of uniform diameter, with the end por-

tions merging with the middle portions in a slight curvature.

I further provide cover 16 which extends over the portion of the tank in the rear of the roll, and rests on the rear wall, in which a pair of pins 17 are mounted which extend loosely through the cover, the front portion being connected to the sides of the tank by screws 18, which are threaded therein, set screws 19 being provided which are threaded in the cover and engage the top edges of the sides adjacent thereto, so that by adjusting said screws in an obvious manner the inclination at which said cover may be held may be varied to a limited extent. A scraper 20 is secured to the end of cover 16 next the roll, and is provided with a middle portion 21, which extends obliquely downward from the cover 16 towards the axis of the roll, at an angle of approximately 45°, so that it is disposed in a radial position with relation to the roll, with its edge, which corresponds in formation to the middle portion 12' of the roll, in close proximity to the surface thereof. The end portions 22 of the scraper extend obliquely from the middle portion 21 to the ends of the roll, with their edges also in close proximity to the surfaces of the roll end portions, respectively, said end portions 22 being extended at such an angle to the middle portion 21 that the edges of the portions 22 extend obliquely from the ends of the roll, in convergent relation. As thus arranged, the cover 16 may be so adjusted that the edge of the scraper may be held in actual contact with the roll surface, throughout the entire length of the edge, from end to end of the roll, or in as close proximity thereto as may be desired.

As thus arranged when the partly submerged roll is rotated in the direction of the arrows shown at its ends in Fig. 5, so that its top portion travels towards the scraper, which is therefore located in the rear of the vertical plane of the axis of the roll or with its edge in engagement with the down-going side of the roll adjacent its top portion, the heavy liquid, which will be carried up on the surface of the roll, will be swept by the end portions 22 of the scraper towards the middle portion thereof, so that a stream of the liquid will flow down the inclined end surfaces of the roll in contact with the end portions 22, as indicated in Fig. 5. At the same time the middle portion 21 will act as a dam, so that the liquid carried up on the middle portion of the roll will accumulate in front of said middle portion 21, and the two streams coming from both ends of the roll will thus be added to the accumulation in front of said middle portion and, as a result, a pool of liquid to such a depth will be accumulated on the top side of the scraper, and on the middle top portion of the roll in front of the scraper that a stream of substantial depth, approximately ¼ of an inch, will flow from the pool thus accumulated over the middle portion of the roll, back into the tank in a direction opposite to the direction of rotation of the roll, as indicated in Figs. 2 and 5.

A stream or pool of sufficient length, width and depth, is thus produced which will be suitable for the purpose in many instances, but the length of the stream, before it flows downward into the tank is preferably substantially increased by providing a horizontally disposed shelf 24, which is arranged to receive the stream as it is discharged from the roll and would otherwise be discharged directly into the tank, and conducts it for a short distance, before it is discharged into the tank, through an opening 25 therein. Said shelf 24 is secured to a cover 26, which extends over the tank in front of the roll and is vertically adjustable by means of screws 27, which provide a swivel connection for the angular bracket 28 at the ends of the cover and are threaded into the sides of the tank. The shelf 24 is adjusted so that its edge next the roll will be held at a short distance from the roll surface, which distance is at least as great as the depth of the film of cement which is carried upward on the roll, so that no cement will be removed from the roll thereby, before it is carried above the shelf, said shelf being so formed that the only portion which is carried in proximity to the roll surface is the portion opposite the middle portion of the roll.

As thus arranged the stream which flows back over the middle portion of the roll, as before described, will flow onto the shelf and then flow through the opening 25 back into the tank, as shown in Fig. 5, thereby providing a stream of substantially increased length.

In using the above described apparatus, the shoe, as *x*, which has been lasted and the upper etc. trimmed so that the edge portion thereof projects uniformly for a substantial distance beyond the inner sole, will be held in the position of Fig. 2, and the tip portion of said edge portion will then be dipped in said stream of cement which flows back over the roll onto the shelf to a depth of about one-fourth of an inch, as shown in Fig. 2, and as the length of the stream from the scraper to the aperture 25 is approximately as long and as wide as the length and width of the tip portion of the average shoe, a simple dipping operation is all that is necessary to apply the necessary amount of adhesive thereto, so that when the adhesive sets, as it will immediately on cooling, the edge portion of the tip, lining and upper will be secured together. In performing this operation the tip end of the shoe will usually be placed in the stream as close to the scraper middle portion 21 as possible and will then be moved in the direction of the flow as it is removed, so that the liquid will not flow up onto the edge portion to a greater depth than the depth of the stream.

The operation may thus be rapidly performed and the edge portion dipped to the required extent, without being dipped to too great an extent.

By adjusting the scraper towards or from the roll the depth of the stream may be varied to an extent according to requirements and the position of the shelf 24 may be varied if desired.

While I have shown a preferred form of my invention, similar results may be secured with rolls of somewhat different formation and with correspondingly varied forms of scraper blades, the purpose being in each instance to form a stream of adhesive of substantial depth which will flow forwardly over the roll back into the tank, and into which the shoe part may be dipped, a constant circulation of the adhesive being thus maintained, which will be returned to the tank before it will be cooled sufficiently to set.

I claim:

1. In a machine for applying cementing liquid, a tank for containing the liquid, a roll mounted to rotate therein about a horizontally disposed axis with the lower portion thereof submerged in the liquid, means to rotate said roll continuously in one direction to provide a film of liquid on the unsubmerged portion of its surface, and a scraper disposed with its edge in proximity to the surface of the roll at points adjacent its top portion extending longitudinally and obliquely of the roll in position to sweep the film of liquid

thereon to a predetermined longitudinal portion of the roll to accumulate the liquid on the top portion of the roll in front of the scraper and provide a stream of substantial depth which flows therefrom back into the tank.

2. In a machine for applying cementing liquid, a tank for containing the liquid, a roll mounted to rotate therein about a horizontally disposed axis with the lower portion thereof submerged in the liquid, means to rotate said roll continuously in one direction to provide a film of liquid on the unsubmerged portion of its surface, and a scraper comprising a plate having its edge disposed in proximity to the surface of the roll at its down going side and adjacent its top portion, with its top side extending from the roll at an upward inclination and its edge extending longitudinally and obliquely of the roll in position to sweep the film of liquid thereon to a predetermined longitudinal portion of the roll to accumulate the liquid on the top side of the scraper and on the top portion of the roll in front of the scraper in a pool of substantial depth which flows in a stream back into the tank.

3. In a machine for applying cementing liquid, a tank for containing the liquid, a roll mounted to rotate therein about a horizontally disposed axis with the lower portion thereof submerged in the liquid, means to rotate said roll continuously in one direction to carry a film of liquid upward on the unsubmerged portion of its surface, and a scraper disposed with its edge in proximity to the surface of the roll at points adjacent its top portion and at its down-going side, the edge of said scraper extending longitudinally and obliquely of the roll in position to sweep the film of liquid carried up on the roll surface to a predetermined portion of said surface to accumulate liquid in front of the scraper to sufficient depth to flow in a stream over the top of the roll in the opposite direction to the direction of rotation thereof and back into the tank.

4. In a machine for applying cementing liquid, a tank for containing the liquid, a roll mounted to rotate therein about a horizontally disposed axis with the lower portion thereof submerged in the liquid, means to rotate said roll continuously in one direction to carry a film of liquid upward on the unsubmerged portion of its surface, said roll tapering in diameter from one end, so that its surface inclines downward from said end at the top side of the roll, and a scraper disposed with its edge in proximity to said surface adjacent the top side of the roll and extending longitudinally of the roll in position to sweep the film of liquid carried up on the roll surface from the portion of larger diameter downward to the portion of smaller diameter to accumulate the liquid in front of the scraper on said portion of smaller diameter in a pool from which a stream of substantial depth will flow back into the tank.

5. In a machine for applying liquids, a tank for containing the liquid, a roll mounted to rotate in one direction therein about a horizontally disposed axis with the lower portion of the roll submerged in the liquid, whereby a film of liquid will be carried upward on the unsubmerged portion of its surface, and a scraper arranged with its edge in proximity to said surface, the middle portion of said edge being disposed at the down-going side of the roll adjacent its top and the end portions thereof each extending obliquely from said middle portion towards the top and the adjacent end of the roll thereby to accumulate liquid in front of the scraper and direct its flow from the end portions of the roll to the middle portion thereof and provide a stream of substantial depth at said middle portion to flow from the roll back into the tank.

6. In a machine for applying liquids, a tank for containing the liquid, a roll mounted to rotate in one direction therein about a horizontally disposed axis with the lower portion of the roll submerged in the liquid, whereby a film of liquid will be carried upward on the unsubmerged portion of its surface, said roll having its end portions tapering in diameter to its middle portion, and a scraper arranged with its edge in proximity to the surface of the roll throughout the length of the roll and having its middle portion located at the down-going side of the roll adjacent its top, and having its end portions extending obliquely towards the top and ends of the roll respectively to accumulate liquid from the end portions of the roll and direct its flow to the middle thereof and provide a pool of the liquid of substantial depth on the top of the middle portion of the roll which flows therefrom back into the tank.

7. In a machine for applying liquid, a tank for containing the liquid, a roll mounted to rotate in one direction therein about a horizontally disposed axis with the lower portion of the roll submerged in the liquid, whereby a film of liquid will be carried upward on the unsubmerged portion of its surface, said roll having its end portions tapering in diameter to its middle portion, a scraper arranged with its edge in proximity to the surface of the roll throughout the length thereof adjacent its top and at its down-going side to accumulate liquid collected from the surface in a pool of substantial depth from which a stream flows over the top of the roll at its middle portion in the opposite direction to its direction of rotation to return it to the tank, and a shelf arranged in position to receive said stream from the roll and conduct it for a substantial distance before returning it to the tank.

8. In a machine for applying liquids, a tank for containing the liquid, a roll mounted to rotate in one direction therein about a horizontally disposed axis with the lower portion of the roll submerged in the liquid, whereby a film of liquid will be carried upward on the unsubmerged portion of its surface, said roll having its end portions tapering in diameter to its middle portion, a scraper arranged with its edge in proximity to the surface of the roll throughout the length thereof adjacent its top and at its down-going side to accumulate liquid collected from the surface in a pool of substantial depth from which a stream flows over the top of the roll at its middle portion in the opposite direction to its direction of rotation, and a horizontally disposed shelf having its edge disposed in sufficiently close proximity to the middle portion of the roll to deflect the stream therefrom and conduct it on the top side thereof for a substantial distance before returning it into the tank.

IRVING L. KEITH.