May 23, 1944. R. R. CAMPBELL 2,349,245

MACHINE FOR INKING EDGES OF SHOE PARTS

Filed June 19, 1941 3 Sheets-Sheet 3

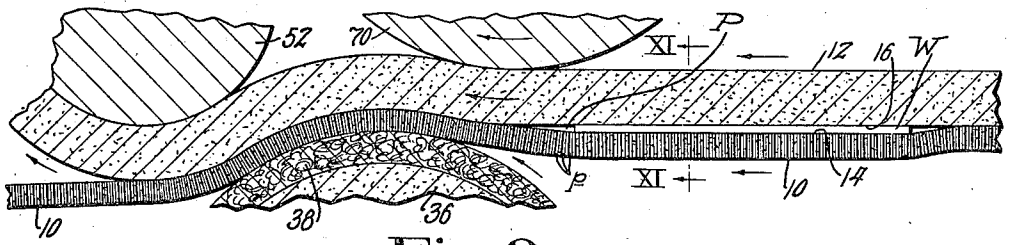


Fig. 9.

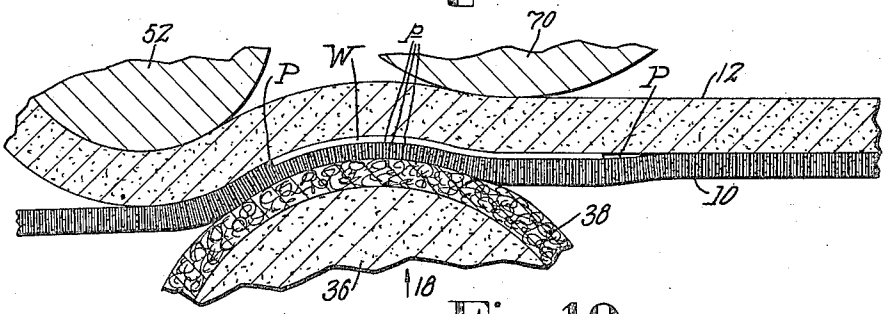


Fig. 10.

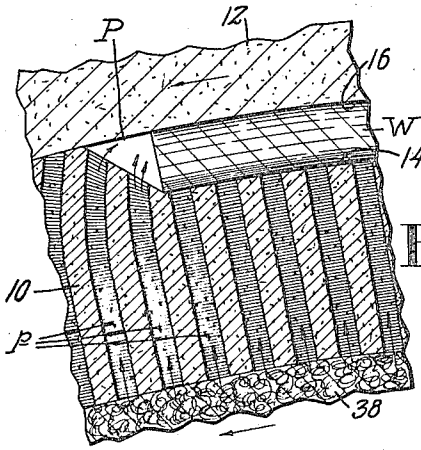


Fig. 12.

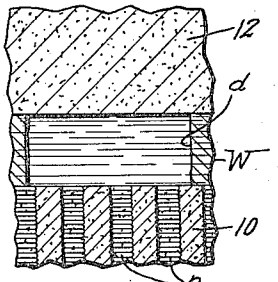


Fig. 11.

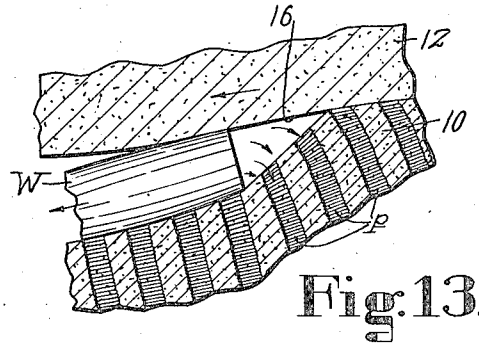


Fig. 13.

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MACHINE FOR INKING EDGES OF SHOE PARTS

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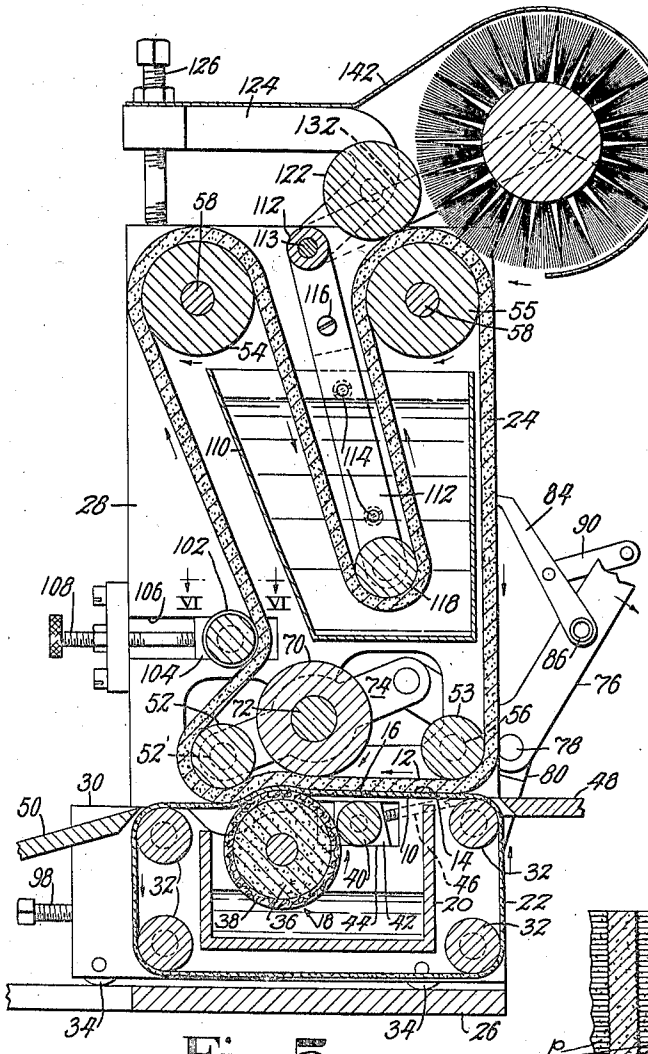


Fig. 5.

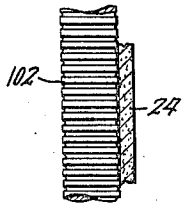


Fig. 6.

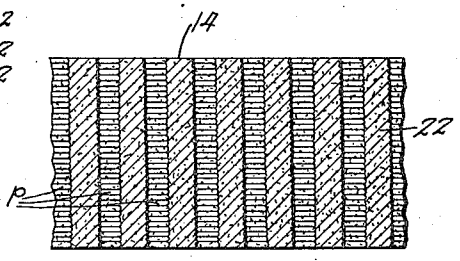


Fig 8.

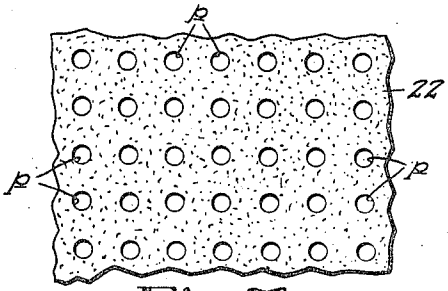


Fig. 7.

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May 23, 1944. R. R. CAMPBELL 2,349,245

MACHINE FOR INKING EDGES OF SHOE PARTS

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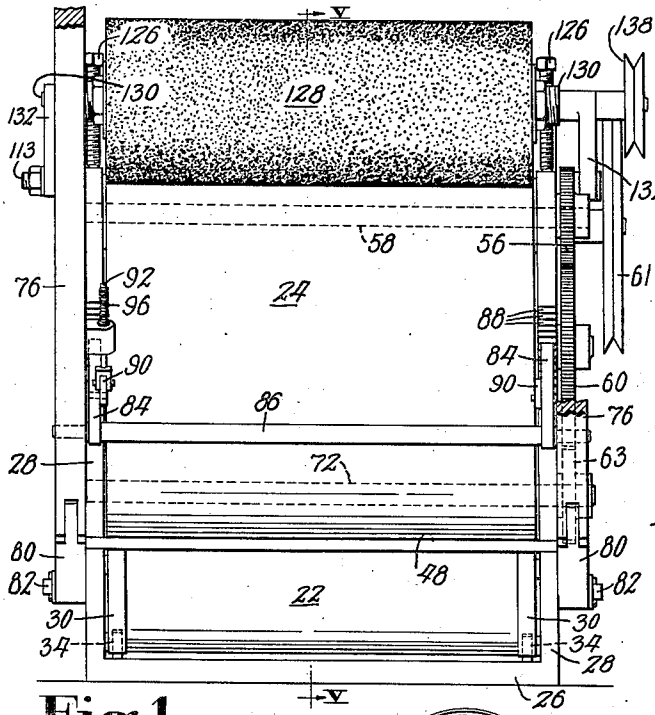


Fig. 1.

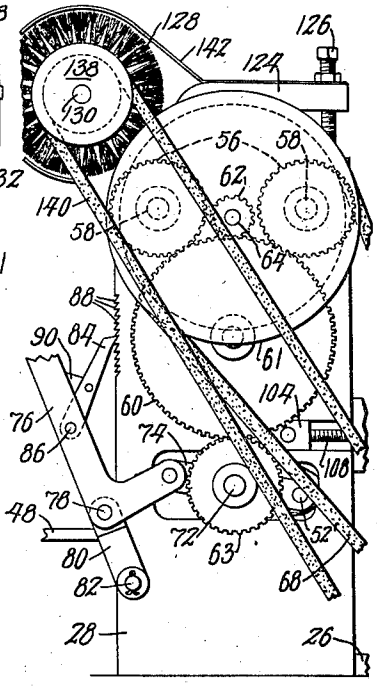


Fig. 2.

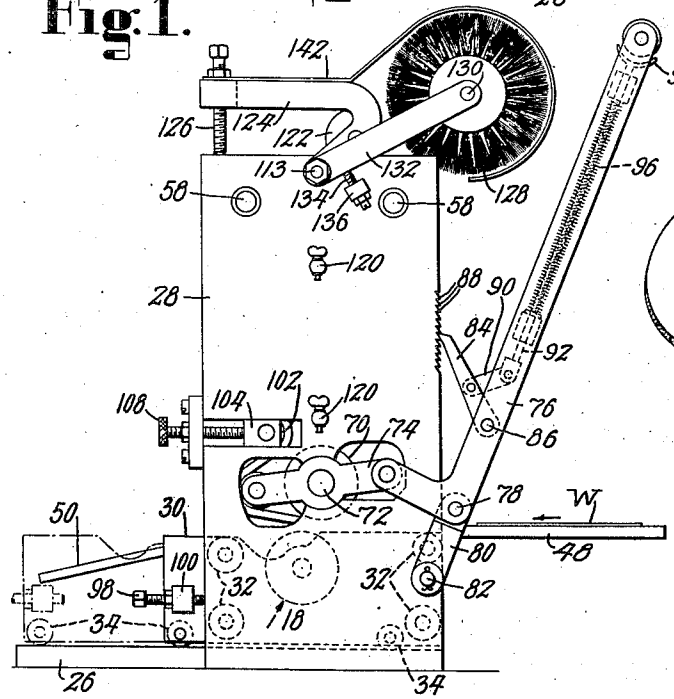


Fig. 3.

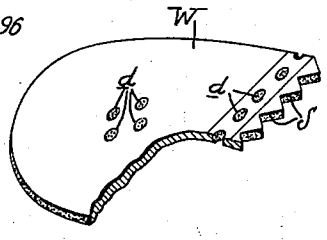


Fig. 4.

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Patented May 23, 1944 2,349,245

UNITED STATES PATENT OFFICE

2,349,245

MACHINE FOR INKING EDGES OF SHOE PARTS

Rouel R. Campbell, Lynn, Mass., assignor to United Shoe Machinery Corporation, Flemington, N. J., a corporation of New Jersey

Application June 19, 1941, Serial No. 398,857

30 Claims. (Cl. 91—54)

The present invention pertains to a machine for applying a coating to the edges of sheet material and is more particularly directed to applying stain to the raw edges of shoe parts.

In many styles of shoes, parts thereof are decorated by perforations, cut-outs and serrated edges. Sometimes it is desirable to stain these raw edges with a color similar to that of the shoe to impart a finished appearance thereto. In novelty shoes, it may be desirable to stain the edges to secure a contrasting color for decorative purposes. Heretofore, this has been done largely by hand, small brushes or pipe cleaners being employed for getting into the perforations, cut-outs and serrations. Because of the expensiveness of hand methods, machines have been developed for mechanically applying the stain. In such machines, the edges of the shoe part are coated by supplying a quantity of stain to the whole of the flesh or wrong side of the shoe part and allowing the stain to flow about the edges while protecting the opposite, display or grain side by holding it against a clean shielding device. While coating the entire flesh or wrong side of the shoe part does not spoil the appearance of the work, because it is hidden from view, a considerable quantity of stain is absorbed by the fibrous texture of the flesh side of the work and is wasted. Moreover, according to some, the stain adversely affects the leather, causing it to feel tinny.

It is an object of the present invention to provide an improved machine of the type heretofore employed which will rapidly and effectively coat the edges and cut-outs of parts of shoes, which will maintain the display side clean and unblemished, and in which substantially no stain will be deposited on the flesh or wrong side of the shoe parts.

In the prior machines, the work was held with its grain or display side against a shielding member, having a surface designed to protect the display side of the work from the ink, by a perforate member such as felt, cheesecloth, or a wire cloth of fine mesh which engaged the opposite side of the work and was interposed between the work and an ink carrier. Means was provided for pressing the members together to express the ink from the ink carrier through the perforate member over the entire opposite side of and about the edges of the work. In the present machine, a feature of the invention resides in a perforated member other than fibrous or metallic in character for controlling the flow of ink which, as illustrated, is interposed between the ink carrier and the shielding member, means to bring the members together to enclose the work, and means thereafter to press the perforated member, while in engagement with the shielding member around the edges of the work, against the ink carrier.

As shown herein, and in accordance with other features of the invention, the shielding member and perforate member take the form of endless rubber or synthetic rubber-like belts portions of which are arranged to engage the opposite sides of the work, means being provided for moving the belts past an ink applying roll and pressing the perforate belt into contact therewith. Also, as illustrated, invention resides in the employment of means for varying the pressure between the perforate belt and the ink applying roll.

Still other features of the invention reside in the provision of cleaning devices for the surface of the shielding belt, which has a highly polished surface so that ink will not adhere readily to it, or is made of an ink-repellent substance. These cleaning devices are a water bath for washing the ink from the surface of the belt and a rotating brush for drying the surface of the belt.

The machine will now be described in detail with reference to the accompanying drawings, in which

Fig. 1 is a rear elevation of the entire machine;

Fig. 2 is a side elevation of the machine as seen from the right end of Fig. 1;

Fig. 3 is a side elevation of the machine as seen from the left end of Fig. 1;

Fig. 4 shows a piece of work of the type to which the stain as it be applied;

Fig. 5 is a section on the line V—V of Fig. 1;

Fig. 6 is a section on the line VI—VI of Fig. 5;

Fig. 7 is an enlarged fragmentary plan view of the multipore belt;

Fig. 8 is an enlarged fragmentary section of the multipore belt;

Fig. 9 is an enlarged fragmentary section, showing the work disposed between the multipore belt and the pressure applying belt, moving toward the ink-carrying roll;

Fig. 10 is an enlarged fragmentary section, showing the work between the multipore belt and the pressure applying belt in engagement with the ink-carrying roll;

Fig. 11 is an enlarged section on the line XI—XI of Fig. 9;

Fig. 12 is an enlarged section, showing the leading edge of the work as it passes over the ink roll; and

Fig. 13 is an enlarged section, showing the trailing edge of the work as it leaves the ink roll.

A shoe part of the kind to which stain is to be

applied is shown by way of illustration in Fig. 4 as a shoe tip W having perforations *d* and a serrated edge *s* at the rear portion thereof, as is customary. It is desirable to treat these raw edges with a stain, hereinafter called "ink," which corresponds to the color of the display side of the shoe, or is in contrast thereto in the case of novelty shoes, without getting any of this ink on the display side and substantially none on the flesh or wrong side. In order to do this, it is necessary to shield the display side of the shoe part and to supply a quantity of ink to the wrong side of the shoe part in such a manner that only the raw edges are exposed to the ink. This is accomplished by placing the shoe part between a pair of members 10 and 12 having faces 14 and 16 which may be brought together about the shoe part to enclose the same (Figs. 9 to 13). The member 12 is a shield designed to protect the display side of the work, and the member 10 is a perforate, non-absorbent body of rubber or rubber-substitute, through the perforations *p* of which ink may be passed to the edges of the work. The member 10, while in engagement with the member 12 and enclosing the work, is pressed against an absorbent or bibulous member 18 which is supplied with ink from a receptacle 20 (Fig. 5).

The perforate member 10 employed herein is manufactured in sheet form by the United States Rubber Company and is disclosed in the form employed herein by Patent No. 2,032,941, granted March 3, 1936, to C. E. Linscott et al., assignors to the United States Rubber Company. The pores in this multipore sheet range from .0004 to .0008 of an inch or larger in diameter and from 1,000 to 10,000 or more perforations per square inch in number. Unstretched, the material appears to be imperforate, the perforations not being readily visible to the naked eye and under high magnification would appear as shown in Figs. 7 and 8. At the present time a multipore sheet containing about 3,400 perforations per square inch seems to give the best results, but it is to be understood that it is entirely within the scope of the invention to use a multipore sheet with a greater or smaller number of perforations as the particular conditions change.

Since the surface 16 of the member 12 contacts the display side of the work, it is necessary to keep it absolutely free of ink. For this reason, the member 12, which is rubber, is provided with a very smooth, polished surface which tends to shed any ink coming in contact therewith. The same result may also be had by using a synthetic rubber which is resistant to ink, that is, it has no affinity for the ink and consequently, if any ink does come in contact with the surface, it will not cling to it.

It is to be observed that the perforations *p* in the perforate member 10 are separated from one another by impervious portions and are non-communicating; that is, the material between the perforations is not permeable and there is therefore no opportunity for the ink to pass from one pore to another as there would be a flow of ink from one opening to another in a permeable member such as cheesecloth, felt, or a wire cloth of fine mesh. Therefore, the perforate member 10 affords a means for controlling the passage of ink to the work because, unlike a bibulous member such as felt, cheesecloth, or a wire cloth of fine mesh through every portion of which the ink will pass with the maximum freedom of movement from one pore to another without restraint, the passage of ink through certain portions or areas of the perforate member may be stopped by blocking or sealing the upper ends of the perforations in these portions or areas. The pores are capillary in size and, because of the fact that the material between the pores is impervious, that is, does not allow the flow of ink from one pore to the next, are referred to in the appended claims as being discrete capillary pores, or as pores separated or isolated from each other. As illustrated, the work W lies on the surface 14 of the perforate member 10, thereby covering the upper ends of the perforations *p*, and when the member 12 is moved into contact with the work and with the member 10 (Fig. 9), the work is pressed so firmly against the perforate member that the upper ends of the perforations *p* are sealed by contact of the work with their upper ends. The sealed upper ends of the perforations trap a quantity of air when the member 10 is moved into engagement with and is pressed against the ink-carrying member 18 (Figs. 10 and 12). Consequently, the ink expressed by reason of the pressure exerted against the ink-carrying member rises only part way through the perforations. Some leathers are not as dense as others and in some instances there may be a slight leakage of air through the leather. Consequently, a little ink may reach the top of the perforations and come in contact with the wrong side of the work, but the amount of such leakage is minimized because of the short space of time the work is under pressure and because of the seal formed between the surfaces 14 and 16 of the members 10 and 12 when they are brought together to enclose the work. Other factors may cause or contribute to this sealing of the perforations, but the important thing is that no ink passes through the pores when they are covered by a layer of material such as a piece of work. The member 12 does not seal all of the perforations in the member 10 due to the fact that the surfaces of the members 10 and 12 do not conform perfectly to the edge of the work, as seen in Figs. 12 and 13. Because of this, a closed passage P is formed entirely around the work (Fig. 9), the walls of the passage being formed by the edge of the work and a portion of the surfaces of the members 10 and 12 adjacent to the edge of the work (Figs. 12 and 13). Since the upper ends of the perforations *p* which open into the passage P are not confined or obstructed, the ink expelled from the ink-carrying member passes freely through them and fills the passage P (Fig. 12), thereby coming into contact with the edge of the work. It is to be observed that, when the members 10 and 12 are brought together, the work W is forced into the surface 14 of the perforate member 10 and, as a result, that portion of the member 10 adjacent to the edges of the work slopes sharply upward toward the member 12. The deformation takes place almost wholly in the member 10 because it is so full of perforations that when pressure is applied it will yield whereas the solid imperforate rubber member 12 will not yield appreciably because it is made of a firmer and less readily deformable material than that used for the member 10. This tendency for the member 10 to wrap itself about the edges of the work bends the perforations *p* in the direction of the edges of the work (Fig. 12). When, therefore, the ink is forced through these perforations, it is squirted against the edges of the work with some force. When the members 10 and 12 are

moved out of engagement with the ink-carrying member 18, the ink-carrying member, which is very absorptive and is of a resilient nature, is allowed to expand and, in doing so, it sucks back the ink in the perforations of the perforate member, thereby withdrawing the ink from the passage P and the perforations *p* so that no ink stands in these perforations (Fig. 13). This prevents the capillary action of the perforations from holding ink during the time when the perforate member is not in contact with the ink-carrying member. It is important that there should be no ink in the perforations prior to pressing the member 10 against the ink-carrying member because, if ink filled these perforations, there would be no opportunity for air to get into the upper ends of the perforations and thus the function of the perforate member would be partly impaired.

As illustrated in Fig. 5, the members 10 and 12 are preferably endless belts 22 and 24 so arranged that the portions 10 and 12 thereof are parallel. These belts are supported for co-operation on a frame consisting of a base 26 and upright walls 28. The belt 22 is composed of the material disclosed in the above-mentioned Patent No. 2,032,941 and has a multitude of fine perforations *p* therein (Fig. 8). The belt is nonabsorbent and forms a support for the work. Through long usage, the perforations of the belt 22 may become clogged by small particles of solid matter in the ink and, consequently, the belt is mounted on an independent subframe 30 which rests on the base 26 of the frame to permit the belt 22 to be moved bodily from its position beneath the backing belt 24 without disassembling any of the parts of the machine. As illustrated, the belt 22 is mounted on guide rolls 32 journaled in the walls of the subframe, the latter having wheels 34 adapted to support the subframe on the base and to facilitate rolling the subframe into and out of position.

The ink-carrying member 18 and the ink receptacle 20 are also supported by the subframe 30 and, consequently, may be removed as a unit, together with the belt 22, for cleaning and refilling. Furthermore, since the subframe carrying the belt 22 and the ink receptacle 20 forms a readily replaceable unit, it is apparent that color changes may rapidly be made with little effort by replacing one unit for another whenever it is desirable to change from one color to another. The ink receptacle 20 is fastened between the sides of the subframe and between the runs of the belt 22 with its mouth adjacent to the upper run of the belt (Fig. 5). The ink-carrying member 18 is an ink-carrying roll consisting of a resilient core 36, preferably of rubber, and an absolute surface 38 of felt or some other similar bibulous material in the form of a sleeve disposed around the core. The resilient core permits the surface 38 to flatten out when pressure is applied, thereby providing a broad area of contact between the belt 22 and the surface 38. The ink-carrying roll is journaled in the walls of the receptacle 20 with its lower side dipping in the ink and its upper side in engagement with the portion 10 of the upper run of the belt 22. If the contact between the portions 10 and 12, the work, and the ink-carrying roll is confined to a line contact, the effectiveness of the apparatus would be largely lost because there would be a tendency for the ink forced upwardly into the passage P at the point where the pressure is applied to leak from the passage P between the surfaces of the work and the belts at each side of the point of applied pressure where the pressure falls off. For that reason, it is desirable to have the contact between the portions 10 and 12, the work, and the ink-carrying roll extend over a substantial area of the surface of the ink-carrying roll so that when the belts are pressed against the ink-carrying roll, the surfaces 14 and 16 will be sealed uniformly over an area of substantial extent. To this end, the ink-carrying roll is arranged with its top above the normal plane of the upper run of the belt 22, that is, so that the top of the ink roll deflects the upper run of the belt 22, causing it to pass over an arcuate section of its surface.

A doctor roll 40 is mounted adjacent to the ink-carrying roll at the upgoing side thereof to squeeze the excess ink thereform. The doctor roll 40 is journaled at its ends in bearings 42 slidably mounted in slots 44 formed in the walls of the receptacle 20, and screws 46 are provided for adjusting the position of the bearings 42 to vary the degree of the wringing action between the ink-carrying roll and the doctor roll.

Tables 48 and 50 are mounted at opposite ends of the subframe adjacent to the incoming and outgoing sides of the belts. The table 48 is fixed to the walls 28 and serves as a support for a pile of work and as a guide for sliding the pieces of work to the bite of the belts. The table 50 is fixed to the subframe and slopes downwardly from the exit side of the belts, by which the finished work is conducted to a bench or table at the back of the machine.

The backing belt 24 is mounted between the walls 26 upon guide rolls 52, 53, 54, 55 and 118 and under a roll 70 with the portion 12 in engagement with the portion 10 of the belt 22. The rolls 54 and 55 provide means for driving the belt in the direction of the arrows (Fig. 5) and, to this end, are mounted on shafts 58 journaled in the walls 28. Gears 56 (Figs. 1 and 2) are fastened to the ends of the shafts 58 and are driven by means of a gear 60 with which they mesh and which, in turn, is driven by a gear 62 attached to the shaft of a pulley 61 connected to an outside source of power by a belt 68. The rolls 53 and 70 hold that section of the belt 24 at the right side of the top of the ink-carrying roll 18 (Fig. 5) in contact with the adjacent portion of the belt 22 and substantially in a horizontal plane, thereby providing means for feeding the work to the ink-carrying roll and sealing the work between the surfaces 14 and 16. As illustrated, the roll 70 is mounted for rotation on a shaft 72 which is journaled at its ends in the walls 28, one end of the shaft 72 having a gear 63 fixed thereto which meshes with the gear 60. The guide roll 52 is mounted at the left side of the top of the ink-carrying roll with its bottom side below the bottom sides of the guide rolls 53 and 70, thereby to wrap the sections of the belts 22 and 24 at the left of the guide roll 70 downwardly about the surface of the ink-carrying roll. The amount of wrapping and pressure between the belts over the area of contact with the ink-carrying roll may be varied by moving the guide roll 52 which, for this purpose, is mounted on a shaft 52' journaled between the ends of a pair of arms 74, the latter being turnably mounted on the ends of the shaft 72. The arms 74, in turn, are journaled in the walls 28, as illustrated. By tilting the arms 74 in their journals, the guide roll 52 may be moved about the shaft 72 as a center, and this is accomplished by fastening the opposite ends of the arms to bell-

crank levers 76. The bell-crank levers are pivotally fastened at 78 to links 80 (Fig. 3) which, in turn, are pivotally attached to the side walls 28 at 82. Pawls 84 are provided for locking the bell-crank levers in the desired position. The pawls are pivotally mounted at one end on a spindle 86 journaled at its ends between the bell-crank levers 76. The other ends of the pawls engage one of a number of serrations 88 formed on the edges of the walls 28. In order to hold the pawls out of engagement with the serrations during movement of the bell-crank levers 76 to increase or decrease the pressure, the pawls are joined by links 90 to rods 92 which extend upwardly along the inside of the bell-crank levers 76 and are joined at their upper ends by a hand grip 94 by which the pawls may be lifted and held while the adjustment is being made. Springs 96 are placed about the rods 92 and serve normally to urge the pawls 84 in a counterclockwise direction, as seen in Fig. 3, to return the pawls to locking position when the hand grip 94 is released.

While the belt 24 is driven by means of the guide rolls 54 and 55 in the directions of the arrows, the belt 22 is only driven by contact with the belt 24. This arrangement eliminates any complicated driving connections which would be necessary to drive the rolls 32 and at the same time permits ready removal of the subframe and replacement thereof. As constructed, the subframe is held in place only by the guide roll 52 and that portion of the belt passing around it which lies against the upper surface of the ink-carrying roll so that the top of the ink-carrying roll is pocketed behind the guide roll 52 and cannot be moved outwardly without first raising the latter. To prevent the inward pressure of the guide roll 52 from pushing the subframe too far beneath the belt 24, a pair of stop screws 98 (Fig. 3) are threaded through bosses 100 fixed to the walls of the subframe 30 with their ends abutting the edges of the walls 28.

In order to keep the backing belt 24 taut at all times irrespective of the position of the guide roll 52, a tension roll 102 is provided. This roll bears against the backing belt 24 and is provided with a grooved surface (Fig. 6) to permit any ink on the surface of the belt to pass beneath it, since it is not desirable to have the ink squeezed off the belt at this point and thereby caused to drip down onto the belt 22. The roll 102 is journaled in bearings 104 which are slidably mounted in slots 106 formed in the walls 28 so that they may be moved to and from the belt 24. Screws 108 are provided for adjusting the position of the bearings 104, and consequently the roll 102, in order to procure the proper tension in the belt 24. It is evident that an increase in the tension of the belt 24 also uniformly increases the pressure between the belts along that portion thereof between the guide rolls 52 and 70.

Ordinarily, the ink comes in contact with the surface of the belt 24 only where the passage P is formed about the work and through the cut-outs in the work. Some additional ink may, however, be present due to the fact that the contact between the surfaces of the belts may not be absolutely perfect and the pores themselves may not be wholly closed by the pressure. When, for example, particles of dirt or fragments of leather are carried between the surfaces of the belts, the surfaces may be held apart sufficiently to permit a small amount of ink to leak through the perforations *p* to and between the surfaces of the belts. Consequently, this surface 16 must constantly be cleaned to remove any ink that might otherwise find its way to the display or grain surface of the work. This is accomplished by looping the belt 24 through a water container 110 supported by a pair of straps 112 which are fastened to the walls of the container 110 by means of screws 114 and to the walls 28 by screws 116. The belt 24 passes about a roll 118 submerged in the container 110, the roll 118 being journaled in the lower ends of the straps 112. The water serves to wash the ink from the belt 24 and, when the water becomes too dirty, the container may be emptied through one of a pair of cocks 120 (Fig. 3) and refilled with clean water through the other. After the washing, the belt must be dried, and for this purpose a wringer roll 122 is provided for squeezing the water from the surface of the belt back into the container 110. The wringer roll 122 is mounted adjacent to the guide roll 55 and contacts the belt where it passes over the guide roll. The wringer roll is journaled between a pair of angular members 124 which are pivotally mounted at one end to the upper ends of the straps 112 on studs 113. Screws 126 are passed through the opposite ends of the members 124, the lower ends of the screws resting upon the top edges of the walls 28 and thereby providing means for increasing or decreasing the pressure between the rolls 122 and 55 and, consequently, the wringer action between the wringer roll 122 and the belt 24. While the wringer roll 122 squeezes most of the water from the surface of the belt 24, a small amount of moisture remains and tends to cause the ink to spread. It is necessary, therefore, completely to remove this moisture, and this is accomplished by means of a rapidly rotating brush 128 which is mounted on a shaft 130 adjacent to the wringer roll 122 at the right-hand side of the machine, as seen in Fig. 5, with the tips of its bristles barely touching the surface of the belt. The shaft 130 is journaled in arms 132 (Fig. 3) which are mounted on the ends of the studs 113. In order to increase or decrease the wiping action of the brush 128, adjusting screws 134 are provided for changing the position of the brush with respect to the surface of the belt. The screws 134 are threaded through bosses 136 fixed to the walls 28 with their ends abutting the arms 132. A pulley 138 (Fig. 2) is fastened to the shaft 130, the latter being rotated by a belt 140 which is connected to an outside source of power. The rotation of the brush not only wipes the belt but sets up currents of air which tend to evaporate the moisture on the belt. A guard 142 is placed about the brush 128, the guard being fastened to the members 124.

When the machine is in operation, the work is pushed along the table 48 until its leading end is gripped by the bite of the belts and drawn inwardly between them. At this time, before the work reaches the ink-carrying roll, the belts, which are under considerable tension, enclose the work, as shown in Fig. 9, the surfaces 14 and 16 of the belts meeting all around the work and forming a passage P completely surrounding the work. While the pressure between the belts is not very great at this point, it is sufficient to cause the work to seal the upper ends of the perforations *p* beneath it and to form a seal between the belts. As the work enclosed by the belts moves on to and between the ink-carrying roll 18 and the rolls 70 and 52, the belts are uniformly squeezed against the ink-carrying

roll, thereby depressing the surface 38 of the ink-carrying roll (Fig. 10) and expressing the ink therefrom. As the leading end of the work enters the bite between the ink-carrying roll and the roll 70, the ink rises through the perforations *p* (Figs. 10 and 12), as indicated by the arrows, and passes through the upper ends of the perforations which terminate in the passage P and into contact with the edges of the work. The air in the other perforations, the upper ends of which are closed by the work and the surface 16 of the belt 24, is trapped therein and prevents the ink from rising to the tops of these perforations. As the work is passed beyond the ink-carrying roll and the roll 52, the pressure is relieved and the felt on the ink-carrying roll is allowed to expand, whereupon a suction is set up which withdraws the ink from the passage P and the perforations *d* (Fig. 13). The work is finally carried out by the belt 22 to the delivery table 50. The pressure and the amount of ink are variable factors and must be adjusted by experiment for the particular kind of leather being finished, since they vary with the density and the thickness of the leather and sometimes with the finish.

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

1. In a machine for coating the surfaces of the edges of a piece of work, separate means for engaging the opposite surfaces of the work, one of said means having a plurality of discrete capillary pores therein, said separate means being movable into intimate contact with each other and with the work, thereby to cause those pores in one of said means which terminate opposite the other one of said means and an imperforate portion of the work to become sealed while the remaining pores adjacent to the edge surfaces of the work are unobstructed, a bibulous member supplied with ink adjacent to said means, and means for relatively moving said separate means and the bibulous member to bring the means having discrete capillary pores therein firmly against the bibulous member to cause ink to flow through said unobstructed discrete capillary pores onto the edge surfaces of the work.

2. In a machine for coating the surfaces of the edges of a piece of work, separate means for engaging the opposite surfaces of the work, one of said means having a plurality of unconnected pores therein, said separate means being movable into intimate engagement with each other and with the work, thereby to cause those pores in one of said means which terminate opposite the other one of said means and the imperforate portion of the work to become sealed while the remaining pores adjacent to the edge surfaces of the work are unobstructed, a bibulous member containing ink, and means for relatively moving said separate means and the bibulous member to press said means having pores therein against the bibulous member to cause ink to flow through the said unobstructed pores onto the edge surfaces of the work.

3. In a machine for coating the edge surfaces of a piece of work, separate means for engaging the opposite surfaces of the work, one of said means being composed of rubber and having a plurality of pores therein isolated from each other by impervious portions, said separate means being movable into intimate engagement with each other and with the work, thereby to close the pores in one of said means which terminate opposite the other one of said means and an imperforate portion of the work while the pores opposite to an edge or a perforation in the work are open, a bibulous member containing ink, and means for relatively moving said separate means and the bibulous member to press the rubber one of said means against the bibulous member to cause ink to flow through the open pores onto the edge surfaces of the work piece.

4. In a machine for coating the edge surfaces of a piece of work, separate means for engaging the opposite surfaces of the work, one of said means being composed of rubber and having a plurality of pores therein isolated from each other by impervious portions, said impervious portions being more than 75% of the total area of any unit of area, said separate means being movable into intimate engagement with each other and with the work, thereby to close the pores in one of said means which terminate opposite the other one of said means or the imperforate portion of the work while the pores opposite to an edge or a perforation in the work are open, a bibulous member containing ink, and means for applying pressure to said separate means while in intimate contact in a direction to press the rubber one of said means against the bibulous member to cause ink to flow through the open pores onto the edge surfaces of the work.

5. In a machine for coating the edge surfaces of a piece of work having perforations therein, separate means for engaging the opposite surfaces of the work, one of said means having a plurality of pores therein separated from one another by nonpermeable portions, said separate means being movable into intimate engagement with each other and with the work, thereby to seal the pores in said one of said means which engage an imperforate portion of the work and the other one of said means, while the pores opposite to an edge or a perforation in the work are open, a bibulous member containing ink, and means for applying pressure to said separate means while in intimate contact in a direction to press said porous one of said means against the bibulous member to cause ink to flow through said open pores onto the edge surfaces of the work, the ink in said closed pores being prevented from rising therein by air trapped in their upper ends.

6. In a machine for coating the edge surfaces of a piece of work having perforations therein, separate means for engaging the opposite surfaces of the work, said separate means being movable into intimate engagement with each other and the work thereby to form a closed passage entirely surrounding the work, one of said means having a plurality of pores therein separated from one another by nonpermeable portions, the pores terminating in said passage and the perforations in the work being unobstructed while the pores terminating adjacent to an imperforate portion of the work and the other of said first-named means are closed thereby forming pockets, a bibulous member containing ink, means for relatively moving said separate means and the bibulous member to press said porous one of said means against the bibulous member thereby to cause ink to flow through said unobstructed pores onto the edge surfaces of the work and to

trap air in said closed pores thereby preventing the flow of ink onto the imperforate portion of the work or said other one of said means.

7. In a machine for coating the edge surfaces of a piece of work, a shielding member engaging the display surface of the work, a perforate control member engaging the opposite face of the work, said control member being made of a yielding, rubber-like material with a smooth surface adapted to be brought into firm contact with one face of the work, said control member having a plurality of spaced, pore-like perforations emerging through said smooth surface and noncommunicating adjacent to said surface, whereby they are sealed by the piece of work, an ink carrier for supplying ink to the other surface of said perforate member, and means for squeezing together said members, a piece of work interposed between them and said ink carrier, thereby to cause ink to flow through the unsealed perforations onto the edge surfaces of the work.

8. A machine for coating the edges of a shoe part comprising an endless backing belt for protecting the display side of the work, means for holding the shoe part against said backing belt, means for supplying ink to the edges of said shoe part while held in engagement with the backing belt, and means to wash the backing belt while out of contact with the first-named means.

9. A machine for coating the edges of a shoe part comprising means having a surface for supporting the work, an endless belt a portion of which is parallel to the surface of the supporting means for engaging the opposite side of the work, said supporting means being a perforate nonabsorbent member, means for moving said surfaces into and out of engagement to close successive pieces of work, an ink-applying member adjacent to the first-named means, means for supplying ink to said ink-applying member, means for pressing said first-named means and said endless belt against said ink-applying member while in engagement, and means for washing said endless belt while out of engagement with the first-named means to insure a clean portion for each piece of work.

10. A machine for coating the edges of a shoe part comprising means having a surface for supporting one side of the work, an endless belt a portion of which is parallel to the surface of the supporting means for engaging the opposite side of the work, said supporting means being a nonabsorbent multipore member, means for moving said surfaces into and out of engagement to enclose the work, an ink-applying member adjacent to the first-named means, means for supplying ink to said ink-applying member, means for pressing said endless belt and said first-named means against said ink-applying member while in engagement, and a bath through which the endless belt passes to wash the ink therefrom.

11. A machine for coating the edges of a shoe part comprising means having a surface for supporting one side of the work, an endless belt a portion of which is parallel to the surface of the supporting means for engaging the opposite side of the work, said supporting means being a nonabsorbent multipore member, means for moving said surfaces into and out of engagement to enclose successive pieces of work, a resilient ink-applying member adjacent to the first-named means, means for supplying ink to said ink-applying member, means for pressing said first-named means against the ink-applying member while in engagement with the endless belt, and means for washing and drying the endless belt while out of contact with said first-named means.

12. A machine for coating the edges of a shoe part comprising an endless backing belt for protecting the display side of the work, means for holding the shoe part against said backing belt, means for supplying ink to the edges of the shoe part while held in engagement with the backing belt, and means for washing and drying the endless belt while out of contact with said first-named means.

13. A machine for coating the edges of a shoe part comprising means having a surface for supporting one side of the work, an endless belt a portion of which is parallel to the surface of the supporting means for engaging the opposite sides of the work, said supporting means being a nonabsorbent multipore member, means for moving said surfaces into and out of engagement to enclose successive pieces of work, a resilient ink-applying member adjacent to the first-named means, means for supplying ink to said ink-applying member, means for pressing said first-named means against said ink-applying member while in engagement with the endless belt, means for washing the endless belt while not in contact with the first-named means, and a brush for drying the belt.

14. A machine for coating the edges of a shoe part comprising means having a surface for supporting one side of the work, an endless belt a portion of which is parallel to the surface of the supporting means for engaging the opposite side of the work, said supporting means being a nonabsorbent multipore member, means for moving said surfaces into and out of engagement to enclose successive pieces of work, an ink-applying member adjacent to the first-named means, means for supplying ink to said ink-applying member, means for pressing said first-named means against said ink-applying member while in engagement with the endless belt, a bath through which the endless belt passes to wash ink therefrom while it is out of contact with the first-named means, and a cylindrical brush rotatable in contact with the belt to dry the same.

15. A machine for coating the edges of a shoe part comprising a support for the work consisting of a nonabsorbent multipore endless belt, means having a surface parallel to a portion of the endless belt for engaging the opposite side of the work, means for bringing the parallel surfaces of said endless belt and said first-named means together to enclose the work, an ink-applying member adjacent to the endless belt, means for supplying ink to said ink-applying member, and means for pressing together said endless belt and said ink-applying member and the work.

16. A machine for coating the edges of a shoe part comprising a support for the work consisting of an endless multipore belt adapted to engage one surface of the work, means having a surface parallel to a portion of the endless belt for engaging the opposite surface of the work, means for bringing the parallel surfaces of said endless belt and said first-named means together to enclose the work thereby to form a closed passage entirely surrounding the work, one wall of which is the edge of the work, an ink absorbent member adjacent to that portion of the endless multipore belt parallel to the first-named means, an ink receptacle for supplying ink to said absorbent member, and means for pressing said endless belt and said first-named means while

in engagement toward the absorbent member to bring the belt into engagement with it.

17. A machine for coating the edges of a shoe part comprising a support for the work consisting of an endless multipore belt adapted to engage one surface of the work, an imperforate belt having a surface parallel to a portion of the multipore belt for engaging the opposite surface of the work, guide rolls, one of which is driven, for bringing the parallel surfaces of said multipore belt and said imperforate belt together to enclose the work, an ink receptacle, a felt roll adjacent to the endless multipore belt and having a lower portion which dips in said ink receptacle, and a roll in engagement with the imperforate belt operable to press said multipore belt while in contact with the imperforate belt and a shoe part against the felt roll.

18. A machine for coating the edges of a shoe part comprising a support for the work consisting of an endless multipore belt adapted to engage one surface of the work, means having a surface parallel to a portion of the endless belt for engaging the opposite surface of the work, means for bringing the parallel surfaces of said endless belt and said first-named means together to enclose the work, an ink absorbent member adjacent to that portion of the endless multipore belt which is parallel to the first-named means, an ink receptacle for supplying ink to said absorbent member, means for pressing said endless belt and said first-named means while in contact against said ink absorbent member, and means for removing the excess ink from said absorbent member before said endless belt is pressed into engagement therewith.

19. A machine for coating the edges of a shoe part comprising a support for said work consisting of an endless multipore belt engaging one surface of the work, an absorbent member adjacent to said multipore belt, means for supplying ink to said absorbent member, a second endless belt having a portion thereof parallel to the endless multipore belt, means for bringing said parallel portions of said belts together to enclose the work, and means uniformly to press together a section of the parallel portions of said belts and said absorbent body.

20. A machine for coating the edges of a shoe part comprising an endless multipore belt engaging one surface of the work, a felt ink roll over a portion of which passes the multipore belt, a second endless belt having a portion parallel to a portion of the multipore belt engaging the opposite side of the work, and means for pressing together a section of the parallel portions of the belts against the peripheral surface of the felt ink roll thereby to force the ink through the perforations of the multipore belt.

21. A machine for coating the edges of a shoe part comprising an endless multipore belt engaging one surface of the work, a felt ink roll over a portion of which passes the multipore belt, a second endless belt having a portion parallel to a portion of the multipore belt engaging the opposite side of the work, means for holding the parallel portions of said belts in engagement, and means for pressing a section of said parallel portions into engagement with the surface of the felt ink roll.

22. A machine for coating the edges of a shoe part comprising an endless multipore belt engaging one surface of the work, a felt ink roll over a portion of which passes the multipore belt, a second endless belt having a portion parallel to the multipore belt engaging the opposite side of the work, guide rolls arranged to hold the parallel portions of said belts in engagement and to move them to feed the work, and another roll, between the guide rolls which support the second endless belt, operable to press a section of said parallel portions into engagement with the surface of the felt roll.

23. A machine for coating the edges of a shoe part comprising an endless multipore belt adapted to engage one surface of the work, a felt ink roll over a portion of which passes the multipore belt, an endless backing belt having a portion parallel to a portion of the multipore belt and engaging the opposite side of the work, spaced rolls, at least two of which are within the endless backing belt, for supporting the parallel portions of the belts in engagement with each other, one of said inside supporting rolls engaging the backing belt at one side of the ink roll and another engaging said backing belt at the other side of the ink roll, and means for moving one of said supporting rolls relative to the ink roll to wrap the belts around the surface of the ink roll.

24. A machine for coating the edges of a shoe part comprising an endless belt arranged to engage one surface of the work, an endless multipore belt arranged to engage the opposite surface of the work, means for supporting said multipore belt as a unit including means for applying ink to a portion thereof, said means being removable to disengage said belts, and means to hold said supporting means in operative position.

25. A machine for coating the edges of a shoe part comprising an endless backing belt arranged to engage one surface of the work, an endless multipore belt arranged to engage the opposite surface of the work, means for supporting said multipore belt and applying ink to a portion thereof, means for supporting and driving the backing belt, and a grooved idle roll movable against the backing belt to take up the slack therein.

26. A machine for coating the edges of a shoe part comprising an endless multipore belt engaging one surface of the work, a felt ink roll over a portion of which passes the multipore belt, a second endless belt having a portion parallel to a portion of the multipore belt engaging the opposite side of the work, means for holding the parallel portions of said belts in engagement, a roll arranged to engage the parallel portions of the belts between the means for holding said parallel portions in engagement, said roll being adapted to press a section of said parallel portion into engagement with the surface of the felt ink roll, and means adapted to move said roll to vary the pressure.

27. A machine for coating the edges of a shoe part comprising an endless multipore belt engaging one surface of the work, a felt ink roll over a portion of which passes the multipore belt, a second endless belt having a portion parallel to a portion of the multipore belt engaging the opposite side of the work, means for holding the parallel portions of said belts in engagement, one of said last-named means comprising a roll arranged to engage a section of said parallel portions and to press it into engagement with the surface of the felt ink roll, and means to move said roll to vary the pressure.

28. A machine for coating the edges of a shoe part comprising an endless multipore belt engaging one surface of the work, a felt ink roll

over a portion of which passes the multipore belt, a second endless belt having a portion parallel to a portion of the multipore belt engaging the opposite side of the work, means for holding the parallel portions of said belts in engagement, one of said last-named means comprising a roll, levers for supporting said roll in engagement with a section of said parallel portions, said levers being movable to cause said roll to press said section against the ink-carrying roll.

29. A machine for coating the edges of a shoe part comprising an endless multipore belt engaging one surface of the work, a felt ink roll over a portion of which passes the multipore belt, a second endless belt having a portion parallel to a portion of the multipore belt engaging the opposite side of the work, means for holding the parallel portions of said belts in engagement, one of said last-named means comprising a roll, means for supporting said roll in engagement with a section of said portions, said means being movable to cause said roll to press said section against the ink-carrying roll, and means to lock said last-named means in a predetermined position.

30. A machine for coating the edges of a shoe part comprising an endless multipore belt engaging one surface of the work, a felt ink roll over a portion of which passes the multipore belt, a second endless belt having a portion parallel to a portion of the multipore belt engaging the opposite side of the work, means for holding the parallel portions of said belt in engagement, one of said last-named means comprising a roll, means for supporting said roll in engagement with a section of said parallel portions, said means being movable to cause said roll to press said section against the ink-carrying roll, locking means to lock said last-named means in a predetermined position, and means for holding the locking means inoperative during the positioning of said roll.

ROUEL R. CAMPBELL.

CERTIFICATE OF CORRECTION.

Patent No. 2,349,245. May 23, 1944.

ROUEL R. CAMPBELL.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Page 1, second column, line 33, for "as it" read --is to--; page 3, first column, line 57, for "absolute" read --absorbent--; page 6, first column, line 37, claim 9, for the word "close" read --enclose--; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 8th day of August, A. D. 1944.

(Seal)

Leslie Frazer

Acting Commissioner of Patents.