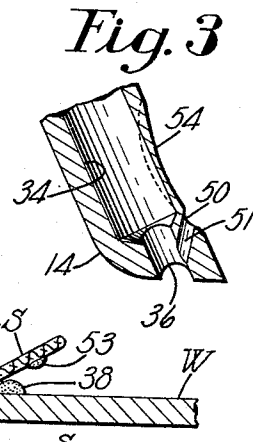
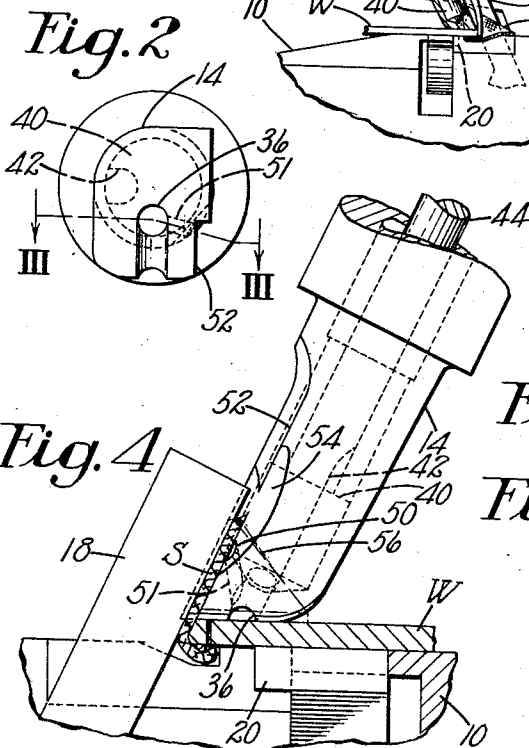
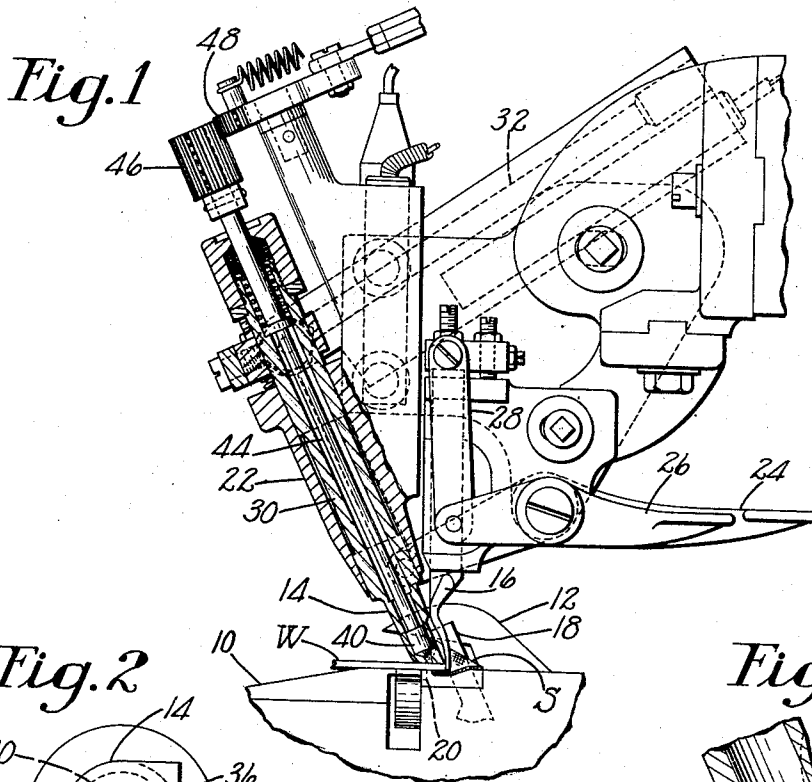


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FOLDING MACHINE

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FOLDING MACHINE

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This invention relates to folding machines and more particularly to machines for cementing and folding the marginal portions of shoe uppers. The invention is illustrated as embodied in a machine of the type shown in Letters Patent of the United States No. 2,301,202, granted November 10, 1942 on an application filed in the name of Paul H. Dixon, although it will be understood that the invention is not limited in its application to machines of the type disclosed therein.

The machine shown in the Dixon patent is particularly adapted for operating upon shoe uppers to which a strip of French binding has been secured and includes instrumentalities for applying adhesive to the marginal portion of the leather, folding the binding strip over the coated marginal portion, and pressing the strip against the marginal portion. Such instrumentalities include a folding finger which turns the binding strip upwardly, a creaser foot against which the strip is turned by the folding finger and a hammer and anvil which cooperate to press the margin of the binding strip against the body of the work and to impart a feeding movement to the work. The creaser foot has a passage terminating in an extrusion port in the bottom surface thereof through which cement is delivered onto that portion of the work against which the binding strip is to be folded so that the strip is secured firmly to the body of the work.

In folding certain types of wide binding strips, a heavy deposit of cement is required to secure adhesion of the binding strip throughout its entire width to the body of the work. It frequently happens in such cases that the cement is squeezed from between the upper and the binding during the fold pressing portion of the folding operation, which results in soiling of the work. In the manufacture of shoes having unlined uppers it is important that the strip be firmly secured throughout its width but that the cement not be squeezed out below the binding so as to be visible on the upper leather or stick to hosiery.

It is an object of the present invention to provide an improved folding machine in which the difficulties referred to above are eliminated. To this end, and in accordance with a feature of the invention, the machine is provided with adhesive-applying means designed to deposit a band of cement along the body of the work inwardly of the line of fold and another band of cement along the margin to be folded. As illustrated herein, the cement is applied by a creaser foot having a passageway therethrough terminating in an

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extrusion port in the lower surface thereof, and having a second extrusion port in that face of the creaser foot against which the margin of the work is turned by the folding finger, this latter port being in communication with the passageway.

Further to insure that the cement is applied throughout the width of the folded margin while minimizing the danger of the cement being squeezed beyond the edge of the folded portion, and in accordance with another feature of the invention, the ports in the creaser foot are so arranged that the band of cement on the body of the work is adjacent to the line of fold, whereas the band of cement on the folded margin is inwardly of the edge of said margin but more remote from the line of fold.

Still further to insure against the cement being squeezed from beyond the edge of the folded margin, the port through which cement is extruded onto the folded margin is smaller than the port in the bottom face of the creaser foot so that the band of cement on the folded margin contains less cement than the band on the body of the work.

The above and other features of the invention, including various details of construction and novel combinations of parts, will now be described by reference to the drawing and pointed out in the claims.

In the drawing,

Fig. 1 is a front elevation, partly in section, of a portion of a folding machine in which the invention is embodied;

Fig. 2 is a bottom plan view on a larger scale of the creaser foot of Fig. 1 looking in the direction of the longitudinal axis of the creaser foot;

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

Fig. 4 is a rear elevation, on the same scale as Figs. 2 and 3, of the creaser foot and associated parts;

Fig. 5 is a section on an enlarged scale of a portion of a piece of work to which a binding strip is secured, showing the strip in partially folded condition and the bands of cement applied to the strip and to the body of the work; and

Fig. 6 is a similar view showing the binding strip pressed against the body of the work with the bands of cement squeezed out to extend substantially throughout the width of the folded-over portion of the strip.

The machine is illustrated as comprising a work support 10 over which a piece of work W, to

the margin of which has been secured a binding strip S, is fed by the cooperative action of a hammer 12 and an anvil, not shown. The work is fed beneath a creaser foot 14 with respect to which the work is guided by a gage finger 16 engaging the edge of the body of the work. The work is fed in a step-by-step manner, and between each of the feeding steps the binding strip is turned upwardly by a folding finger 18 against the adjacent surface of the creaser foot. During this time the work is clamped against the under surface of the creaser foot by a gripper member 20 having a portion underlying the creaser foot so that the work is stationary during the action of the folding finger 18. Upon downward movement of the finger 18 the hammer 12 moves downwardly to press the upturned binding strip back upon the body of the work, the gripper 20 moves downwardly out of clamping engagement with the work, and the hammer and anvil then move to feed the work a small amount, as illustrated and described in detail in the aforementioned Dixon patent.

The creaser foot 14 is slidably carried for upward movement by a support 22 having a connection with a hand lever 24 by which the creaser foot may be raised by the operator to facilitate the introduction of a work piece into the machine. A second hand lever 26 is connected by a link 28 to the gage finger 16 to lift the gage finger at the same time. The mounting of the creaser foot is similar to that shown in Letters Patent of the United States No. 2,347,674, granted May 2, 1944 on an application filed in the names of Dow and Andrews.

As shown in the Dow et al. patent, the creaser foot is in the form of a hollow tube 30 into the upper end of which cement is delivered by way of a laterally extending passageway 32, whence it flows by way of an axial passageway 34, Fig. 3, through the creaser foot. In the lower portion of the creaser foot is a port 36 through which cement is extruded in the form of a band 38, Fig. 5, onto the body of the work. The port 36 is smaller in diameter than the passageway 34 and is disposed eccentrically of the passageway as best shown in Fig. 2, so that the flow through the port is readily controlled by a rotatable valve 40 which seats on the shoulder formed between the passageway 34 and the port 36. The valve 40 has a groove 42 extending heightwise in the surface thereof so that when the valve is turned to align this groove and the port 36, cement flows through the creaser foot around a stem 44 of the valve and out through the port 36. Upon rotating the valve until the groove 42 occupies the position shown in broken lines in Fig. 2, the flow of cement through the port 36 is cut off. The upper end of the valve stem 44 carries a pinion 46 which meshes with a gear sector 48 operated by a solenoid, not shown, but illustrated and described clearly in the Dow et al. patent. Thus, the control of the flow of cement onto the work is always under the control of the operator, the machine being provided with a switch by which the solenoid may be energized or deenergized to turn the valve 40 into either of its two positions.

In order that sufficient cement be available to cause adhesion of the binding strip throughout its width to the body of the work, that face of the creaser foot against which the binding strip is turned by the folding finger 18 is provided with a small port 50. As best shown in Fig. 3, this port is connected by a downwardly extending passageway 51 to the port 36, the arrangement

being such that when cement is forced onto the work through the port 36, sufficient pressure is built up to cause cement to flow upwardly to the extrusion port 50 whereby a band of cement 53 is deposited on the binding. It will be noted that the port 50 is spaced farther from the intersection of the surface against which the binding is folded and the bottom surface of the creaser foot than is the port 36. By this arrangement the cement is deposited onto the body of the work nearer the line of fold than is the cement which is deposited upon the binding. It will also be noted that the port 50 is smaller in diameter than the port 36 so that less cement is deposited on the binding than on the body of the work. With such an arrangement it has been found that, when the binding strip is pressed onto the body of the work, as shown in Fig. 6, the cement does not squeeze out onto the face of the work beyond the edge of the binding, but is distributed throughout substantially the entire width of the folded-over portion of the binding.

As shown in Figs. 2 and 4, the creaser foot is provided with a notch or rabbeted portion 52 with which the folding finger cooperates and in line with the surface of which the edge of the work is held by the gage finger 16. It will be understood that the hammer is located close to the creaser foot, and to facilitate the pressing of the binding strip upon the work the foot is provided with a concaved or recessed portion 54 across which the marginal portion of the strip is tensioned during the fold-pressing operation, as shown at 56, Fig. 4. This recessed portion intersects the surface of the creaser foot against which the strip is folded, and thus forms a continuation of the surface and of the rabbeted portion. It has been found desirable to locate the extrusion port 50 at least partially in the recessed portion 54 of the creaser foot, as illustrated in Fig. 4, and it may lie entirely in the portion 54 so that the cement is applied to the strip as near as possible to the time that the strip is to be pressed down upon the body of the work. Preferably, the cement is of a thermoplastic type which sets rapidly upon application to the work, and it is accordingly desirable that the folded margin be pressed very quickly following the application of the cement.

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 folding machine, means for folding the margin of a piece of work, a hammer for pressing the folded margin upon the body of the work, and means for simultaneously delivering adhesive to the body of the work and to the folded margin in narrow bands spaced differently from the line of fold, said means being located to apply the adhesive just prior to the action of the hammer.

2. In a folding machine, a folding finger, a creaser foot having a lower work-engaging surface and a surface against which the margin of the work is folded by the folding finger, a hammer for pressing the folded margin of the work against the body thereof, the path of movement of said hammer in the pressing operation being contiguous to said folding finger, said creaser foot having a passageway for adhesive extending therethrough and terminating in a port in the lower work-engaging surface, and a port communicating with said passageway opening into that surface of the creaser foot last contacted

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by the margin of the work prior to the pressing of the folded margin by the hammer.

3. In a folding machine, a folding finger, a creaser foot having a lower work-engaging surface and a surface against which the margin of the work is folded by the folding finger, a hammer for pressing the folded margin of the work against the body thereof, said creaser foot having a rabbeted portion in one of its sides against which the margin of the work is turned by the folding finger, said creaser foot also being provided with a recess forming a continuation of the rabbeted portion and around which the margin of the work is tensioned by the hammer during the fold pressing operation, said creaser foot having a passageway for adhesive extending therethrough and terminating in a port in the lower work-engaging surface, and a port communicating with said passageway and opening into the recessed portion of said creaser foot.

4. In a folding machine, a folding finger, a creaser foot having a lower work-engaging surface and a surface against which the margin of the work is folded by the folding finger, a hammer for pressing the folded margin of the work against the body thereof, said creaser foot having a rabbeted portion in one of its sides against which the margin of the work is turned by the folding finger, said creaser foot also being provided with a recess forming a continuation of the rabbeted portion and around which the margin of the work is tensioned by the hammer during the fold pressing operation, said creaser foot having a passageway for adhesive extending therethrough and terminating in a port in the lower work-engaging surface, and a port communicating with said passageway and opening into the recessed portion of said creaser foot, said ports being arranged to apply bands of adhesive to the body of the work and to the folded margin thereof, said bands being spaced different distances from the line of fold.

5. In a folding machine, a folding finger, a creaser foot having a lower work-engaging surface and a surface against which the margin of the work is folded by the folding finger, a hammer for pressing the folded margin of the work against the body thereof, said creaser foot having a rabbeted portion in one of its sides against which the margin of the work is turned by the folding finger, said creaser foot also being provided with a recess forming a continuation of the rabbeted portion and around which the margin of the work is tensioned by the hammer during the fold pressing operation, said creaser foot having a passageway for adhesive extending therethrough and terminating in a port in the lower work-engaging surface, a port communicating with said passageway and opening into the recessed portion of said creaser foot, and a valve at the delivery end of said creaser foot for controlling the flow of adhesive through said ports.

6. A folding machine creaser foot having a

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lower face engageable with the body of a work piece inwardly of the margin thereof and an upwardly inclined face against which the margin is turned during the folding operation, said creaser foot having a passageway therethrough for the flow of adhesive to be applied to the work, said passageway terminating in a port in the lower face thereof for the deposit of adhesive onto the body of the work, a port in the upwardly inclined face of the creaser foot against which the margin of the work is turned, said last-named port being smaller than the first-named port, a small downwardly extending passageway connecting said last-named port and the first-mentioned passageway, and a valve for controlling the flow of adhesive to said ports, said valve being located immediately adjacent to but above the intersection of said passageways.

7. A folding machine creaser foot having a lower face engageable with the body of a work piece inwardly of the margin thereof and an upwardly inclined face against which the margin is turned during the folding operation, said creaser foot having a passageway therethrough for the flow of adhesive to be applied to the work, said passageway terminating in a port in the lower face thereof for the deposit of adhesive onto the body of the work, a port in the upwardly inclined face of the creaser foot against which the margin of the work is turned, and a small downwardly extending passageway connecting said last-named port and the first-mentioned passageway, said last-named port being located further from the intersection of said faces than the first-named port.

8. A folding machine creaser foot having a lower face engageable with the body of a work piece inwardly of the margin thereof and an upwardly inclined face against which the margin is turned during the folding operation, said creaser foot having a passageway therethrough for the flow of adhesive to be applied to the work, said passageway terminating in a port in the lower face thereof for the deposit of adhesive onto the body of the work, a port in the upwardly inclined face of the creaser foot against which the margin of the work is turned, and a small downwardly extending passageway connecting said last-named port and the first-mentioned passageway, said last-named port being located further from the intersection of said faces than the first-named port, and being smaller than the first-named port.

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