April 8, 1930. S. W. BOURN 1,753,498

FOXING CEMENTING MACHINE

Original Filed April 30, 1924 2 Sheets-Sheet 1

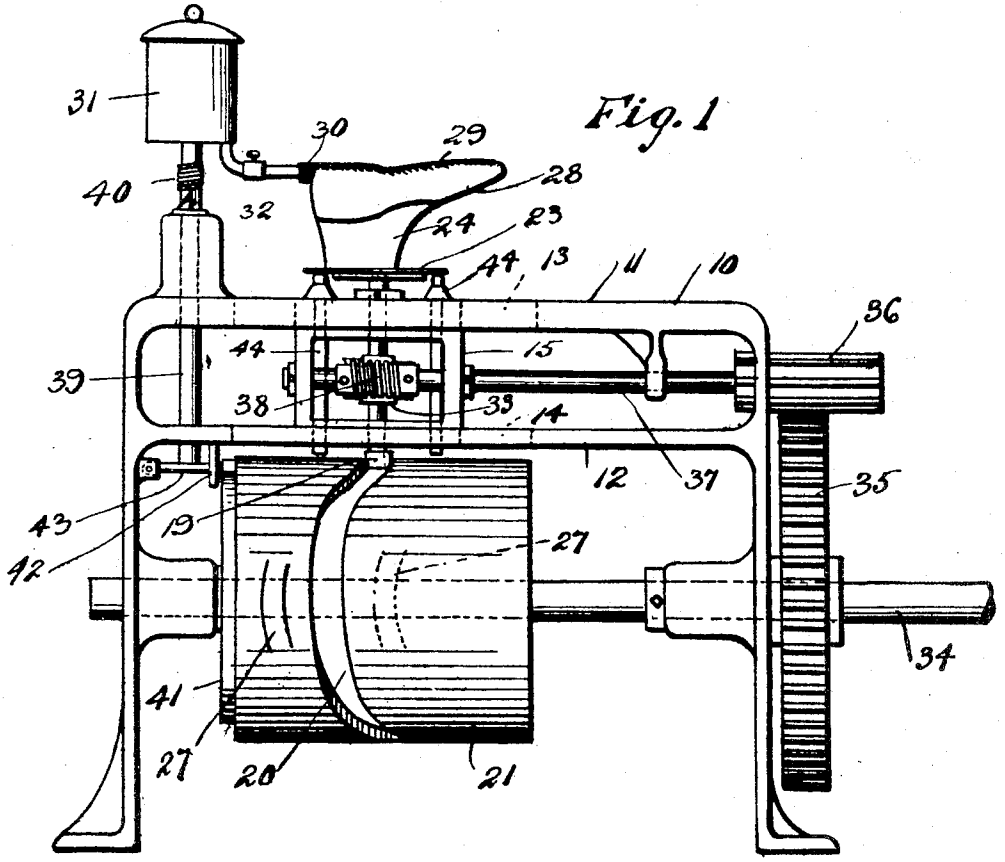


Fig. 1

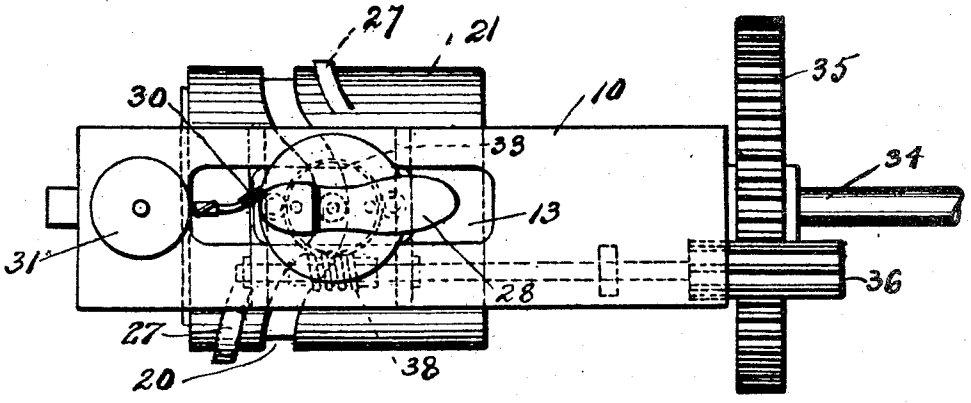


Fig. 2

Inventor
Stephen W. Bourn

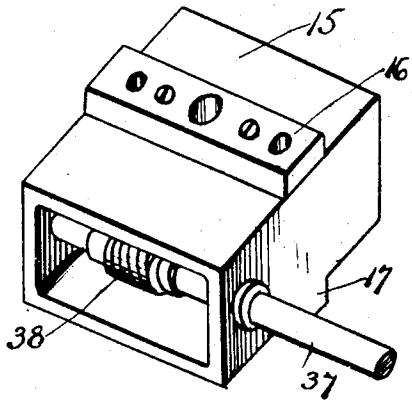
By Barlow & Barlow
Attorneys

April 8, 1930. S. W. BOURN 1,753,498

FOXING CEMENTING MACHINE

Original Filed April 30, 1924 2 Sheets-Sheet 2

Fig. 3



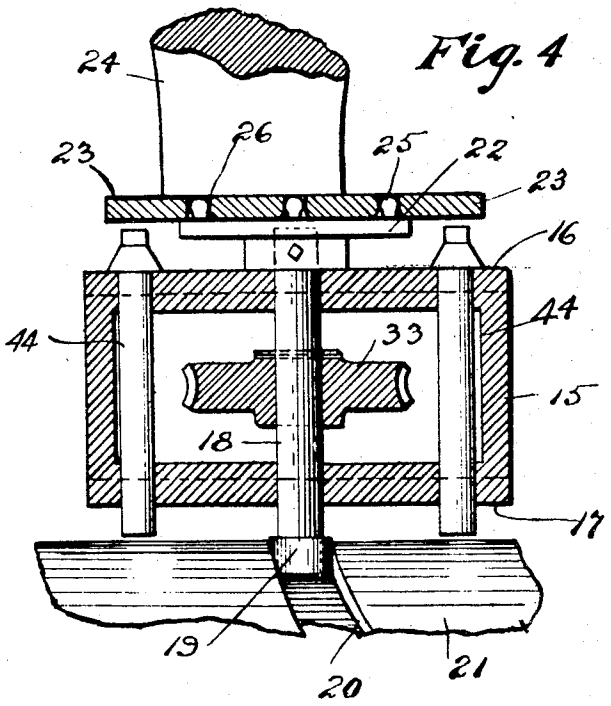


Fig. 4

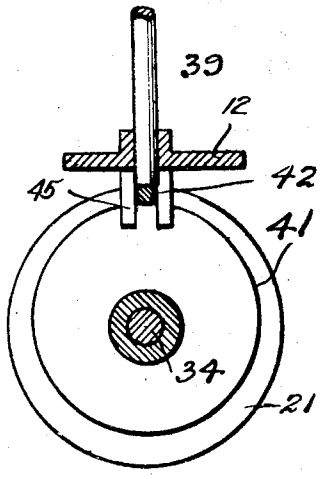


Fig. 5

Inventor
Stephen W. Bourn

By Barlow & Barlow
Attorneys

Patented Apr. 8, 1930 1,753,498

UNITED STATES PATENT OFFICE

STEPHEN W. BOURN, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR TO UNITED SHOE MACHINERY CORPORATION, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY

FOXING-CEMENTING MACHINE

Application filed April 30, 1924, Serial No. 709,998. Renewed March 13, 1929.

This invention relates to machines for applying a coating to a peripheral surface of a shoe and is herein illustrated as embodied in a machine for applying a stripe of cement to the foxing area of a shoe.

In the manufacture of rubber soled tennis shoes and the like the rubber sole of the shoe is firmly attached to the shoe by vulcanizing its margin to a strip of gum rubber known as the foxing which is applied around the lower peripheral margin of the shoe upper and is secured thereto by cement. The operation of applying the cement necessary for securing this foxing strip is known as foxing cementing, and in order to produce work of a satisfactory character it is necessary to make the stripe of cement of a practically uniform width such that it will be substantially co-extensive with the foxing strip. If the cement falls short of the foxing strip the latter will not be firmly attached, and if it extends beyond the foxing strip it creates a disfiguring blemish upon the work which must be removed as a separate operation. A machine for performing this work is illustrated in Letters Patent of the United States No. 1,387,964, granted Aug. 16, 1921, upon my application, in which a shoe is rotated past a cement applying device under the guidance of a pattern.

An object of the present invention is to provide an improved machine of this character by means of which a coating of uniform width may be more accurately and rapidly applied to the foxing area of a shoe.

In rotating a shoe past a cement applying device which is maintained in a substantially fixed position, it is necessary to impart a lateral to-and-fro movement to the shoe as it is rotated in order to keep the shoe with its irregular outline in contact with the applying device. In accordance with a feature of the invention, novel means are provided for rotating a shoe support and imparting to said rotating means a to-and-fro movement, positively to present the shoe to the applying device. As herein illustrated, the shoe is mounted upon a rotating spindle pivotally supported in a slidably mounted carriage and cams are provided for positively moving the carriage toward and away from the cement applying device as the shoe is rotated with the spindle.

Still another feature of my invention resides in the provision of means for controlling the relative height of the work and the applying means as the work is rotated to present all sides thereof to the applying means. The desirability of such an arrangement will be obvious when it is realized that most shoe lasts are made with the heel portion of the last at a level different from that of the ball or toe portion of the last, and further that commonly the shank portion of the last is recessed to a level different from that of either of the before-mentioned portions. In the illustrated machine, means are provided for controlling both the cement applying device and the work, said means including cams rotated in timed relation to the mechanism which controls the rotation and the to-and-fro movement of the work. One of the illustrated cams is arranged to impart an up-and-down movement to the cement applying device in proper time relation to the movement of the shoe and other cams are provided which cooperate with slidable members underlying the heel and toe of the shoe so as thereby to impart a heightwise movement to the shoe by tilting the shoe about an axis extending transversely thereof.

These and other features of the invention will be described with reference to the accompanying drawings in which,—

Figure 1 is a side elevation of my improved shoe surface coating machine.

Figure 2 is a top view of the machine.

Figure 3 is a perspective view of the carriage member removed from the frame.

Figure 4 is a vertical section through the carriage.

Figure 5 is an end view of the cam-drum also showing a cam for lifting the fluid-applying device.

With reference to the drawings, the machine has a frame 10 comprising superposed spaced-apart guides 11 and 12 the adjacent faces of which are recessed longitudinally as at 13 and 14. A work supporting carriage member 15, see Figure 3, is provided with central guide protuberances 16 and 17 for

engaging the recesses or slots 13 and 14, respectively in these carriage guides 11 and 12. In this carriage is mounted a vertically-disposed shaft 18, the lower end of which is provided with a roll 19 which projects into a groove 20 forming two parallel cams in a drum 21, while a lower mounting plate 22 is secured to the upper end of this shaft. This plate 22 supports a second or upper plate 23 on which latter is mounted the work-carrying last 24. There is thus provided a holder for a shoe which is rotatable about an axis extending heightwise of the shoe.

The lower plate 22 is provided with three rounded knobs or projections 25 which loosely engage corresponding openings 26 in the upper plate 23, whereby the plate 23 may be tipped relatively to the plate 22 when low portions of the contour of the shoe, such as at the shank, are encountered. This tipping may be accomplished alternatively by either of the short cams or raised portions 27 on a cam-drum 21, see Figure 2, through either of the headed pins 44 loosely mounted in the carriage 15 and arranged to be brought into engagement with the under side of the plate 23 to tip it upon the knobs 25 so as to raise the work at desired points and to tilt it about an axis extending widthwise of the shoe while its rotation continues. The shoe to be coated is treated while still upon its last 24 which is detachably mounted in any suitable manner upon the upper plate 23. The shoe or work 28 to which is to be applied a narrow stripe of cement along the foxing portion 29 thereof is moved by mechanism, to be later described, past a member for operating upon the foxing area, illustrated as a brush 30 which is supplied with cement from a reservoir or tank 31, the quantity of flow from which is regulated by a valve 32.

In order to impart a continuous turning movement to the shoe 28, I have mounted a worm gear 33 on its driving shaft 18 and I impart a rotating motion to this gear and shaft from a main shaft 34 through gear 35, elongated sliding pinion 36, pinion shaft 37 and worm 38, which causes the shaft 18 and the work to rotate at a constant speed in properly timed relation to the drum 21.

Inasmuch as a shoe is not round, presentation of its foxing area to the relatively fixed brush 30 requires movement of the carriage 15 and the work 28 longitudinally as the work rotates. Therefore I simultaneously rotate the drum 21 through the main shaft 34 in time with the rotation of the work and the groove 20 in the cam drum cooperates with the roll 19 to impart a longitudinal motion to the carriage 15 and so moves the elongated work longitudinally as it rotates in order to keep its surface in contact with the brush.

By this construction, the longitudinal movement of the carriage and work is positive in both directions both towards and from the brush so as to positively present the surface of the work to the brush as the work is carried past the brush.

It will be observed that the bottom of a tennis shoe is not perfectly flat and accordingly the foxing area just adjacent thereto necessarily is irregular and lower in some parts (when inverted), such as the shank and heel, than at the toe. In order, therefore, to provide for the difference in level between the toe and the heel portion of the foxing area, means are provided for effecting a relative movement heightwise of the shoe between the cement applying brush 30 and the foxing area. To this end the shoe is tipped so as to adjust its level relatively to the brush and to raise its lower portions as they are presented to the brush in which case the cam portions 27 on the drum, by contacting with the pins 44 will engage the under side of the plate 23 and raise one end or the other of the work to the desired level relatively to the cement applying brush at exactly the desired time.

In other instances, instead of raising the work, I also provide a cam 41 on the end of the drum 21 which engages a roll 42 on a pivoted bar 43 on which rests a vertically slidable spindle 39 carrying at its upper end the cement receptacle 31, whereby at the proper time this cam 41 will serve to impart an up and down movement to the brush 30 through spindle 39 and the receptacle 31, to cause the brush accurately follow the outline of the foxing portion 29 of the shoe. The weight of the cement receptacle 31 will hold the lower end of the spindle 39 upon the bar 43 which is pivoted at its outer end to the frame 10 and is guided at its inner end between depending pins 45 (Fig. 5).

In some instances, it is found of advantage in order to lay the cement properly, to cause the brush portion to yieldably press against the side of the shoe, and this is accomplished by mounting the brush 30 for swinging movement about the axis of the spindle 39, means being provided for yieldably holding the brush in operative relation to the work to accommodate itself to irregularities in the work. In so doing I use a spring 40 on the spindle 39 constructed and arranged to resist rotation of the spindle in one direction thereby to regulate the pressure of the applying surface of the brush as the brush is caused to press against the side of the shoe.

My improved device is very simple in construction and is effective in its operation and by its use cement or other fluid may be automatically applied to the surface of the shoe.

Cement applying machines embodying my invention may be connected to be operated in batteries of any desired number and suitable stop attachments, not shown, may be con-

nected thereto for arresting the operation of each machine individually and independently of the others after it has rotated its work relatively to its cement brush a predetermined number of times.

In operating the machine, after the receptacle 31 has been filled with cement and a shoe has been mounted upon the plate 23, which is tiltably supported upon the lower plate 22, thereby to permit heightwise movement of the shoe, power is then supplied to the shaft 34 which rotates the shoe to carry the foxing area past the applying brush 30 which is yieldingly held in contact with the shoe. As the shoe is rotated the work supporting carriage 15 is positively moved laterally toward and away from the cement applying device by the cam groove 20. Combined with this lateral movement is a heightwise movement of the shoe occasioned by the tilting of the shoe by the rods 44 when the cam projections 27 underlie these rods and lift them. Provision may also be made for the heightwise movement of the cement applying device by means of the cam 41 acting through the connections already described, it being remembered that the whole object of this relative heightwise movement of shoe and applying device is to apply a uniform coating of cement to the whole of the foxing area and to keep this coating or stripe substantially uniform in width so that the upper edge of the coated portion will coincide with the upper edge of the foxing strip to be applied thereto.

It will be understood that, in various aspects, the invention is not limited to embodiment in the particular type of the machine shown and described or to the performance of the particular operation referred to. Accordingly, the scope of the invention is to be determined by the broadest construction of the terms of the claims which is permitted by the prior art.

I claim:

1. In a shoe surface coating machine, a support for the work, a fluid applying member for contacting with the work, means for rotating said support, and means driven in time with said rotating means for positively moving said support towards and from said member during the rotation thereof.

2. In a machine of the character described, a support for the work, a fluid-applying device, a means for rotating the work, and means cooperating with the said rotating means for imparting a positive to and fro rectilinear movement to the work support to present the work to said applying device.

3. In a machine of the character described, a support for the work, a fluid-applying device, means for rotating the work, and cams cooperating with the said rotating means to positively move said support in presenting the work to said applying device.

4. In a machine of the character described, a support for the work, a fluid-applying member, means for rotating said work support, a cam cooperating with said rotating means for moving the work to be treated towards said member, and a cam for moving the work in the opposite direction relatively to said member.

5. In a shoe surface coating machine, a support for the work, a fluid applying member, a shaft through which said support is rotated, and a cam acting through said shaft for moving said support towards and from said fluid-applying member during the rotation thereof.

6. In a machine of the character described, a support for the work, an applying member for depositing fluid on the work, means for rotating the work, and a cam rotated in a plane different from that of the work and cooperating with said rotating means for continuously presenting the work to said applying member.

7. In a shoe surface coating machine, a carriage, a support for the work on said carriage, a fluid-applying member, means for rotating the work support relatively to said carriage, and a drum having two parallel cams respectively cooperating with said rotating means for moving the carriage towards and from said member to present the work continuously to said fluid-applying member.

8. In a shoe-surface coating machine, a carriage, a support for the work on said carriage, a fluid-applying brush, cooperating means for simultaneously moving the carriage and rotating the work support to present the surface of the work continuously to said brush, means for automatically supplying the brush with fluid, and resilient means for moving the brush to regulate the pressure of the applying surface against the work.

9. In a shoe-surface coating machine, a work support, a fluid-applying member, means for rotating said support, and means for moving said support both longitudinally and vertically relatively to said fluid-applying member to present the work to said member.

10. In a shoe-surface coating-machine, a work support, a fluid-applying device, means for moving said support in one plane to conform to the shape of a shoe, and means driven in time with said support for moving said fluid-applying device in a plane at right angles to the movement of said support to conform to the shape of the shoe in a different plane.

11. In a shoe-surface coating-machine, a fluid-applying member, a carriage slidably supported on said machine, a work support on said carriage, means for rotating said support, and a cam driven in time with said rotating means for sliding said carriage, whereby said work-support receives a combined rotating and sliding movement to present the

edge of an angularly-shaped piece of work to said member.

12. In a shoe-surface coating-machine, a fluid-applying member, a carriage slidably supported on said machine, a grooved cam, a shaft carried by said carriage having a cam groove engaging member at its lower end, a work support on the upper end of said shaft, a worm gear carried carried on said shaft, a worm mounted in said carriage to drive said gear and rotate said support, and driving means for rotating said cam and worm in unison whereby a combined rotating and sliding movement is imparted to said work support.

13. In a shoe-surface coating machine, a fluid applying member, a carriage slidably supported on said machine, a work support mounted on said carriage, means for rotating said support, a grooved cam drum driven in time with said rotating means for sliding said carriage on said machine, and means carried by said drum for inclining said carriage and work support at predetermined intervals to move the work with relation to said fluid-applying member.

14. A machine of the class described having, in combination, a support for a shoe, a member for operating upon the foxing area of the shoe, and means for producing relative movement between the shoe support and the member to cause the foxing area to be traversed by the member, said means including mechanism for causing relative movement between the shoe support and the member heightwise of the shoe to provide for the difference in level between the toe portion and the heel portion of the foxing area.

15. A machine of the class described having, in combination, a support for a shoe, means for rotating the shoe about an axis extending heightwise of the shoe, a member for operating upon the foxing area of the shoe, means for holding the member in operative relation to said area, and means for tilting the shoe about an axis extending widthwise of the shoe during its rotation.

16. A machine of the class described having, in combination, a support for a shoe, means for rotating the shoe about an axis extending heightwise of the shoe, a member for operating upon the foxing area of the shoe, means for holding the member in operative relation to said area, and means for rocking the shoe forward and back during its rotation.

17. A machine of the class described having, in combination, a support for a shoe, a member for operating upon the foxing area of the shoe, means for rotating the shoe to cause the foxing area to be traversed by the member, and means for causing movement of the shoe support heightwise of the shoe to keep the operating member within the foxing area of the shoe regardless of the difference in level between the heel portion and the toe portion thereof.

18. In a foxing cementing machine, a cement applying member mounted on the machine, a shoe support, a shaft secured to said shoe support, means for slidably supporting said shaft for movement toward and away from the cement applying means, means for rotating said shaft as it is slid constructed and arranged for effective operation regardless of said sliding movement, and a cam constructed and arranged positively to move the shaft to and fro as it is rotated, said shaft being constructed and arranged to cooperate with both said rotating means and said cam.

19. In a foxing cementing machine, a cement applying device, a rotary work supporting shaft, a shoe support carried upon said shaft for rotation therewith and loosely mounted on the shaft to allow tilting movement of the shoe with respect to the shaft without interfering with the rotation of the shoe, and means operable in timed relation to said rotating shaft constructed and arranged to tilt the shoe about an axis extending widthwise of the shoe, thereby to present to the cement applying device portions of the foxing area lying at different levels.

20. In a foxing cementing machine, a yieldingly mounted cement applying device, a rotatable work supporting shaft, means for holding a shoe upon said shaft for rotation therewith constructed and arranged to allow tilting movement of the shoe with respect to the shaft, and a cam for positively lifting one end of the shoe in timed relation to its rotation and to an extent dependent upon the shape of the shoe automatically to present all portions of the foxing area of the shoe to the cement applying device during the rotation of the shoe.

21. In a foxing cementing machine, a yieldingly mounted cement applying device, a rotatable shoe support, means to rotate said support to carry a shoe past the applying device, a slidable member underlying the heel end of the shoe, and cam means for raising said slidable member, thereby to tilt the shoe about an axis extending widthwise of the shoe as the shoe is rotated past the cement applying device.

22. In a foxing cementing machine, a cement applying device, a rotatably mounted shoe support, means for rotating said shoe support, thereby to present the foxing area of the shoe to the cement applying device, and means for relatively moving said applying device and shoe support up and down to change the relative level of the cement applying device and the shoe whereby various portions of the foxing area of the shoe are given a coating of equal width as the shoe is carried past the cement applying device.

23. In a foxing cementing machine, a cement applying device, a rotatably mounted

shoe support having also provision for heightwise movement of the shoe, means for rotating said shoe support thereby to present the foxing area of the shoe to the cement applying device, and means for moving said shoe heightwise to maintain various portions of the foxing area opposite said applying device whereby a stripe of cement of uniform width is applied to the foxing area of the shoe.

24. In a foxing cementing machine, a cement applying device supported for up-and-down movement, means for rotating a shoe to carry the foxing area of the shoe past the cement applying device, and means for raising and lowering the cement applying device as the shoe is rotated thereby to hold said device at the desired level with respect to different portions of the shoe.

25. In a foxing cementing machine, a cement applying device mounted for up-and-down movement and for lateral swinging movement, a rotatably mounted work supporting shaft, means for supporting a shoe tiltably upon said shaft, and means for imparting an up-and-down movement to the cement applying device and for lifting one end of the shoe as the latter is rotated, operating together to effect the application of a stripe of cement of uniform width about the foxing area of the shoe.

26. In a foxing cementing machine a cement applying device, a work supporting carriage mounted for sliding movement toward and away from said device, a shoe carrying shaft rotatably mounted in said carriage, means for tiltably supporting a shoe upon said shaft, means for rotating said shaft, cam means for imparting to-and-fro movement to the carriage, slidable means underlying the heel and toe end of the shoe, and means operable in timed relation to said cam for lifting said slidable members, thereby to tilt the shoe about an axis extending widthwise of the shoe as the shoe is carried past the cement applying device.

In testimony whereof I affix my signature.

STEPHEN W. BOURN.