June 24, 1930. S. P. LOVELL 1,766,442

BOX TOE CONDITIONING MACHINE

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Fig. 1.

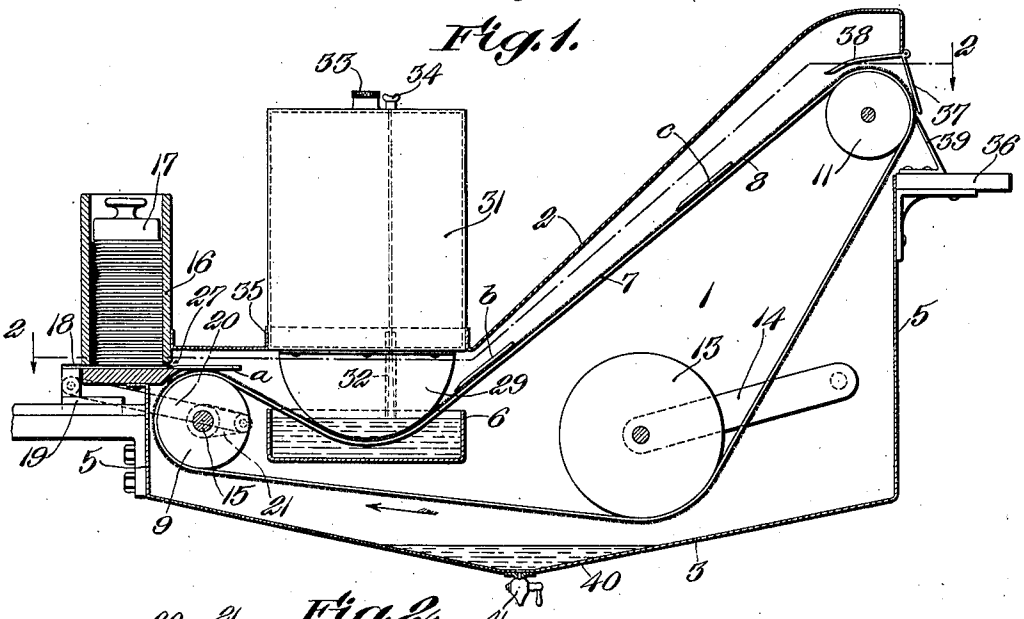


Fig. 2.

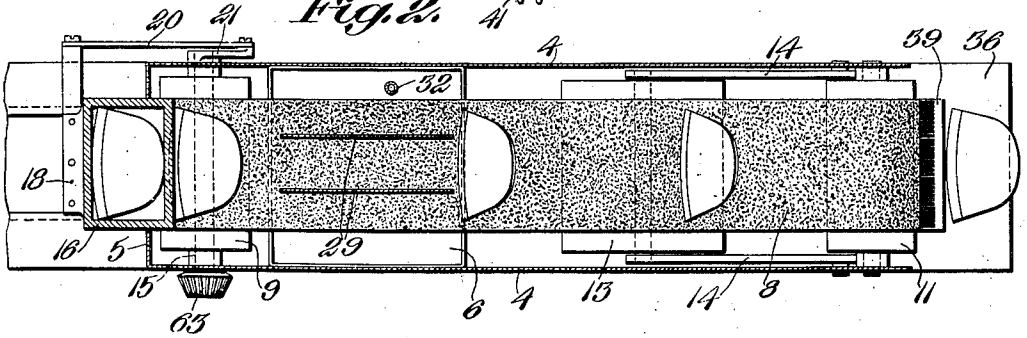
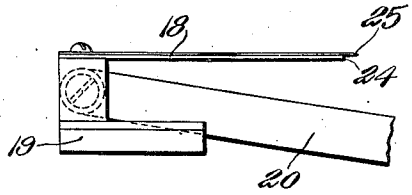


Fig. 3.



Inventor:
Stanley P. Lovell
by his attorneys
Van Everen, Fitch, Hildreth & Cary

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Fig. 4.

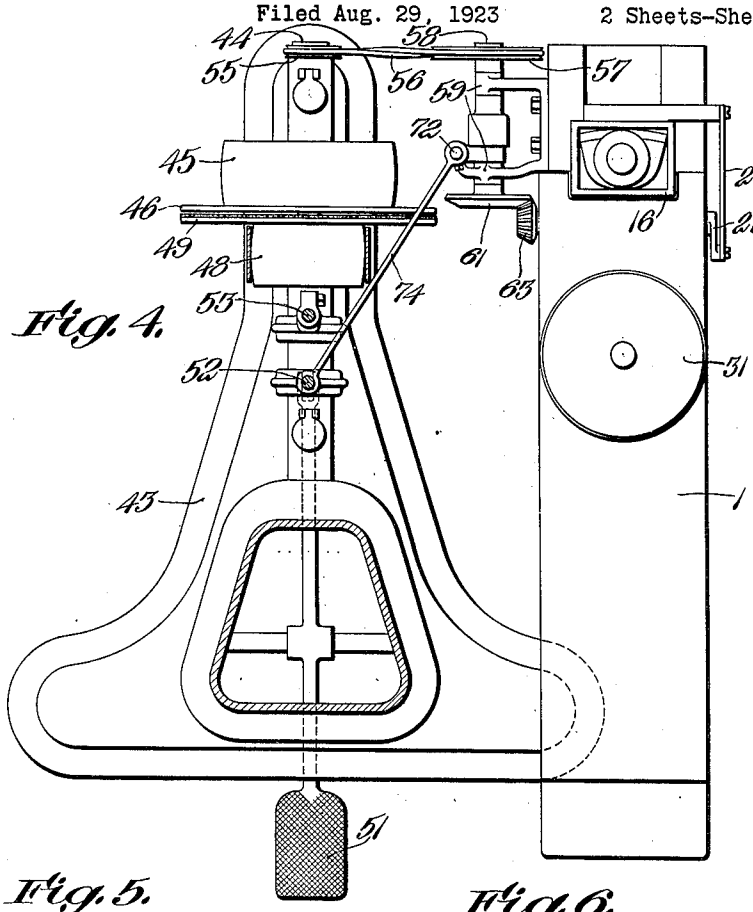


Fig. 5.

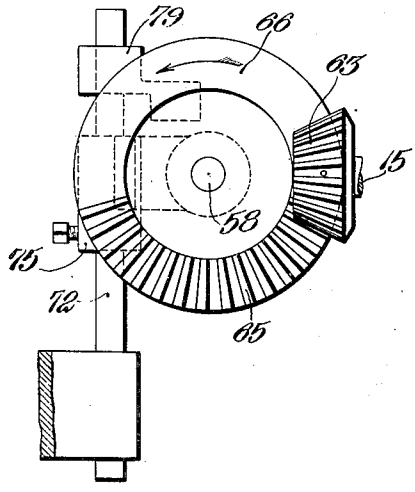
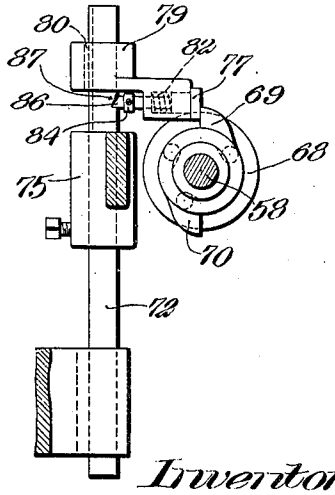


Fig. 6.



Inventor:
Stanley P. Lovell
by his attorneys
Van Everen, Fish, Hildreth & Cary

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UNITED STATES PATENT OFFICE

STANLEY P. LOVELL, OF BROCKTON, MASSACHUSETTS, ASSIGNOR TO UNITED SHOE MACHINERY CORPORATION, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY

BOX-TOE-CONDITIONING MACHINE

Application filed August 29, 1923. Serial No. 659,922.

The present invention relates to the manufacture of boots and shoes and more particularly to the treatment or preparation of shoe parts, such, for example, as box toes, for incorporation in the shoe.

It is the present practice in assembling the shoe parts, where self-hardening box toes are employed, for the operator to treat or prepare or condition, as it is commonly termed, the box toe by treating the blank with the proper solution or by subjecting it to the required heat so that it may become flexible and while in that condition may be assembled on the last with the other shoe parts and pulled-over or lasted to give it the desired shape, which it will retain after drying out or cooling.

It is the object of the present invention to provide a machine for preparing or treating shoe parts, and particularly box toe blanks, which will deliver the treated parts or box toes to the operator as required for use and in the proper condition and without effort or judgment on the part of the operator.

With these and other objects in view, as will be apparent to those skilled in the art from the following specifications, the present invention consists in the devices and combination of devices hereinafter described and particularly defined in the claims.

In the accompanying drawings which illustrate what is now considered to be the preferred form of apparatus embodying the present invention, Figure 1 is a sectional elevation of a treating and conditioning mechanism; Fig. 2 is a horizontal sectional view on the line 2—2 of Fig. 1; Fig. 3 shows in enlarged elevation the separator and feed slide and plate; Fig. 4 is a plan, partly in section, of the combined pulling-over and conditioning machine; and Figs. 5 and 6 are details of the driving and controlling devices for the conditioning mechanism.

In the illustrated embodiment of the present invention the conditioning mechanism is located in close proximity to the pulling-over machine so that there may be a common drive and control. This arrangement provides for the delivery of the treated or conditioned box toes at a point convenient for the operator of the pulling-over machine and as fast as the operator can use them, one conditioned box toe being delivered for each complete cycle of operation of the pulling-over machine.

The conditioning mechanism, as illustrated in Figs. 1, 2 and 3, comprises a closed chamber 1 having a top 2, bottom 3, sides 4, and ends 5. An open tank or receptacle 6 is provided within the chamber for holding the treating or conditioning liquid and through which the box toes are passed while supported by the endless belt or conveyor 7. This belt is preferably formed of leather having on its supporting face a multiplicity of upstanding wires 8, like card clothing. The conveyor is carried by the driving pulley 9 and idlers 11 and 13, the latter being adjustable by means of the swinging supporting arm 14 to provide the desired amount of slackness in the conveyor so that it may dip beneath the surface of the liquid in the tank 6. The driving pulley 9 on the shaft 15 is given successive single revolutions by mechanism hereinafter to be described, to advance the belt or conveyor 7 in the direction of the arrow, in intermittent successive movements.

The box toe blanks are delivered to the conveyor 7 from a magazine 16 in which they are stacked, a weight 17 holding the blanks under sufficient pressure to insure the proper separation and feeding of the lowermost blank from the stack by the feeding mechanism. This comprises a blade 18 mounted upon a slide 19 and actuated by means of a link 20 and a crank 21 on the driving shaft 15. The blade 18 is formed with a square front end 24, over-hanging which is the separator having a bevelled edge 25. The blanks are stacked in the magazine with the skived or bevelled portions in the rear, and the separator edge 25 entering between the skived or bevelled edges of the lowermost and the next adjacent blanks, separates the former from the stack and permits the square end 24 of the blade 18 to feed such lowermost blank from beneath the stack and through a throat 27 onto the con-

veyor 7 with each revolution of the shaft 15.

In order to hold the blanks in contact with the conveyor so that they will be carried by the latter beneath the surface of the liquid in the tank 6, two narrow downwardly-bowed spring members 29 are mounted on the bottom of the reservoir 31 for the treating liquid. This reservoir is supported upon the horizontal portion of the top 2 of the chamber 1 and is provided on its bottom with a depending pipe 32, the lower end of which is just beneath the surface of the liquid in the tank 6. An air tight filler cap 33 permits the automatic flow of liquid from the reservoir 31 into the tank 6 in a well-known manner, to automatically maintain a constant level of liquid in the tank. A valve in the pipe 32 controlled by the thumb nut 34 may be closed whenever it is desired to re-fill the reservoir or to remove the same bodily from the top of the conditioning mechanism where it rests in the seat or recess formed by the upstanding flange 35.

The treated or conditioned blanks are delivered onto a table or bench 36 through an opening in the chamber, normally closed by the hinged door or gate 37. A spring-finger 38 mounted within the chamber adjacent the door acts to hold the rear end of the blank in contact with the conveyor as the latter is carried around the pulley 11, not only thereby tending to free the front end of the blank from the conveyor, if there is any adherence, but also insuring the opening by the blank of the self-closing gate or door 37. A comb 39 fixed upon the table or bench 36 is also provided to separate any adhering blank from the conveyor, the teeth of the comb entering between the supporting wires of the conveyor and beneath the blank held thereon.

The bottom 3 of the chamber 1 is formed with a depression 40 to collect and retain the excess of liquid which drains or drips from the blanks as they pass from the tank 6 to the point of discharge. A draw-off cock 41 permits the withdrawal from time to time of this accumulation of this excess.

Except for the narrow throat or opening 27 through which untreated blanks are delivered to the conveyor and which is practically closed at all times either by a blank or the feed plate, and the normally closed discharge opening, the chamber 1 is substantially air tight, thus preventing the escape into the atmosphere of vapors of the treating liquid. This is a feature of importance, not only because this escape would mean a loss and waste of the treating liquid, but also because such liquid consists of, or is composed of, alcohol or naphtha or similar liquids which form inflammable and explosive gases. Furthermore, this feature permits an atmosphere saturated with the treating liquid to be maintained within the chamber 1, thereby insuring the delivery of properly conditioned box toes irrespective of how long a time beyond the minimum the treated blanks may be retained in the chamber. Delays are often experienced in the pulling-over operation and the work may be stopped altogether, yet owing to the saturated atmosphere within the enclosed chamber the evaporation of the liquid from the treated blank is prevented and hardening of the box will not occur.

In the treatment of the box toe blanks by the conditioning liquid it is desirable that the blank be dipped into the liquid only momentarily, for otherwise the stiffening compound in the blank might be dissolved or otherwise affected. Accordingly, the actuating mechanism for the conveyor or belt is so arranged that a blank will be delivered from the magazine onto the conveyor belt with one rotation of the shaft 15. On the next rotation this blank will be passed into and out of the liquid in the tank. On the next rotation of the shaft 15, the blank will be advanced toward the discharge opening but which, in the construction shown in Fig. 1, it will not reach until the fourth revolution of the shaft, when it will be delivered onto the table 36 in convenient position for the operator. Fig. 1 illustrates the position of the blanks while the shaft and conveyor are stationary, blank *a* having just been delivered from the magazine onto the conveyor, blank *b* having been passed through the tank and the excess liquid draining off, blank *c* being properly conditioned and kept so by the saturated atmosphere within the chamber.

After a box toe has been properly conditioned it is ordinarily assembled with the upper and insole upon the shoe last and is then subjected to the operation of a pulling-over machine which roughly stretches and pulls the upper over and around the last and secures it in position by means of tacks preparatory to the lasting operation. In order to insure delivery of a properly conditioned box toe within convenient reach of the operator of the pulling-over machine, it is desirable to locate the conditioning mechanism adjacent the pulling-over machine and to control the operation of the conditioning mechanism so that with each cycle of operation of the pulling-over machine there will be delivered a single conditioned box toe. In the illustrated embodiment of the present invention, such an arrangement is shown in Fig. 4 in which the conditioning machine is located at the side of, and close to, a pulling-over machine of the type illustrated in Patent No. 663,777, granted Dec. 11, 1900, upon an application filed in the name of McFeely, only so much of the base and driving and controlling mechanism thereof being illustrated as is necessary for an understanding of the driving and controlling connections

from such machine to the conditioning mechanism.

The base of the pulling-over machine 43 carries the driving shaft 44 upon which is fixed the driving pulley 45 having a friction face or flange 46. A smaller pulley for driving the instrumentalities on the upper part or head of the machine is shown at 48 and has a corresponding friction face or flange 49 for engagement with the flange 46 of the driving pulley 45 when the loose pulley 48 is moved longitudinally of the shaft 44. The devices for moving the loose pulley may be as shown in the patent identified above, comprising the treadle 51 with the vertical treadle rod 52 and the wedge rod 53, and the other connections and devices as shown in said patent. These connections and devices are such that depressing the treadle 51 causes the pulley 48 to be given a single revolution and then to be stopped. This single revolution of the pulley 48 imparts a half revolution to the main shaft on the head of the machine, its pulley being double the size of the pulley 48, and during this half revolution the grippers seize the upper and pull the same over the last. In the dwell which follows this operation, the operator may readjust the grippers or the upper upon the last, after which he will impart a second depression to the treadle which causes the pulley 48 to be driven another revolution, and the second half revolution given to the main shaft in the head, during which the tacks are driven, all as shown and described in said patent.

It will be observed that in the operation of this pulling-over machine two actuations of the treadle are necessary to cause the machine to make a single complete cycle of operations.

In the illustrated embodiment of the present invention, the driving and controlling devices for the conditioning machine are as follows. Fixed upon the rear end of the driving shaft 44 of the pulling-over machine is a small grooved driving pulley 55 for driving through the belt 56 the pulley 57 on the counter-shaft 58 of the conditioning machine. This counter-shaft rotates continuously in the bearings 59 in a bracket secured to the side of the conditioning machine and carries at its front end a bevelled gear 61, a Horton ball or roll clutch being interposed between the gear 61 and the shaft 58. A pinion 63 fixed upon the shaft 15 of the conditioning machine is engaged by the gear 61.

In order to impart a single continuous rotation of the pinion 63 and shaft 15 of the conditioning mechanism for each two actuations of the treadle of the pulling-over machine, the gear 61 is of the intermittent or mutilated type as shown in Fig. 5; that is, it is provided with teeth 65 for exactly one-half of its face, the other half, 66, being blank and cut away to clear the teeth of the pinion 63. The gear 61 being just twice the diameter of the pinion 63, the first half revolution of the counter-shaft while the cut away portion 66 of gear 65 is passing the pinion 63 will be without effect, but on the second half revolution of the gear a complete revolution will be imparted to the pinion and shaft, the gear teeth 65 then being in mesh with the teeth of the pinion.

The intermittent half revolutions are given to the counter-shaft 58 by means of the Horton clutch, the collar 68 of which has oppositely disposed stop shoulders 69 and 70. A vertically movable rod 72, mounted in the bracket 59 on the conditioning machine, is raised with each actuation of the treadle 51 by means of a rigid connecting bar 74 fixed at one end upon the treadle rod 52 and at the other to the sleeve 75 secured to the rod 72.

The abutment for engaging the stop shoulders 69 and 70 in the clutch collar 68 is in the form of a pin 77 mounted in a recess in a sleeve 79 loose upon the rod 72 but held from turning thereon by means of a spline or key 80. The pin is normally pressed outwardly by means of the spring 82, its outward movement being limited by the collar 84. The inner end of the pin is bevelled at 86 to engage a notch 87 in the rod 72.

When the parts are in the position as shown in Fig. 6, if the treadle 51 is depressed the sleeve 75 will be raised carrying with it the rod 72 and the abutment pin 77 and sleeve 79. The instant the abutment pin rises above the stop shoulder 69, the clutch is engaged and the bevelled gear 61 set in operation. The disengagement of the pin 77 permits the spring 82 to act, forcing the pin outwardly and its bevelled end 86 out of the notch 87, leaving the sleeve 79 free to drop upon the rod 72 thereby bringing the abutment pin 77 into the path of the second stop shoulder 70 and stopping the clutch collar 68 and throwing out the clutch after the counter-shaft 58 has completed one-half a revolution. Assuming that the actuation above described of the treadle 51 was the first actuation, the blank portion 66 of the gear 61 will at this time have passed beneath the teeth of the pinion 63, and the pinion and the shaft and the entire conditioning mechanism will remain stationary.

As soon as the operator releases the treadle, the rod 72 will fall and the notch 87 will again be engaged by the bevelled shoulder 86 of the abutment pin 77. Upon the second actuation of the treadle the parts will be raised as before, the clutch collar released, and the clutch closed for one-half a revolution of the counter-shaft, and during this second half-revolution of the counter-shaft the teeth 65 on the gear 61 will

engage the pinion 63 and impart one complete revolution to the shaft of the conditioning machine, causing a new blank to be delivered from the magazine, the blank delivered on the last previous actuation to be passed through the conditioning liquid, the previously treated blank to be advanced, and a properly conditioned blank to be delivered from the conditioning mechanism onto the bench or table ready to be assembled with the upper preparatory to the next pulling-over operation.

Thus for each two actuations of the treadle a single movement is imparted to the conditioning mechanism and a single conditioned box toe is delivered to the operator.

While the accompanying drawings and the foregoing specification describe a specific form of machine designed and adapted for treating or conditioning box toe blanks by means of a liquid, it is to be understood that the present invention, except where so specified in the claims, is not limited to the use of such a softening agent but may be embodied in other forms of mechanism for treating or conditioning box toes in other ways.

Furthermore, where in the claims the word "conditioning" has been employed, this is to be understood as not necessarily limited to the softening of a previously stiffened box toe blank but as defining and including any treatment or preparation of the box toe blank or other shoe part.

The combination with a machine for operating upon shoes of a conditioning machine is not claimed herein but forms the subject-matter of divisional application Serial No. 704,206, which has become Patent No. 1,635,627.

Having thus described the present invention what is claimed is:

1. A shoe stiffener conditioning machine having, in combination, a carrier having projections of small cross-section on its stiffener-supporting surface, a receptacle for liquid into which the carrier dips, and means for actuating the carrier to cause the stiffener to be immersed in and carried out of the liquid.

2. A box toe conditioning machine comprising devices for treating both sides of the box toes and means for feeding the treated box toes, said means engaging one side only of the treated box toes and having a surface which is discontinuous both widthwise and lengthwise of said feeding means.

3. A box toe conditioning machine comprising a closed chamber, means for applying a treating liquid to the box toes within the chamber to condition the same and to maintain within the chamber an atmosphere substantially saturated with the treating liquid, and mechanism for retaining a plurality of treated box toes in the chamber and exposed to such atmosphere to permit the same to remain in condition until required by the operator and for delivering the conditioned box toes from the chamber singly in a position conveniently accessible to the operator.

4. A box toe conditioning machine comprising a closed chamber, a tank within the chamber containing the treating liquid, an endless conveyor for passing the box toes through the liquid and through the closed chamber, and mechanism for intermittently actuating the conveyor to pass a box toe through the tank without stopping and to stop with a treated box toe within the chamber and on a subsequent actuation of the conveyor to deliver the treated box toe from the chamber to the operator.

5. A box toe conditioning machine comprising a closed chamber, a magazine to hold the untreated box toes, a tank within the chamber containing the treating liquid, an endless conveyor comprising a belt having wires extending from its supporting surface, devices for delivering box toes from the magazine to the conveyor, and mechanism for actuating the conveyor to pass the box toes through the liquid in the tank and through the chamber, and means for flexing the conveyor to free the treated box toe therefrom.

6. A box toe conditioning machine comprising conditioning means and a conveyor for the conditioned box toes comprising a belt having a plurality of raised separated supports for the box toes, and a separating finger positioned to pass between the raised supports and beneath the level of the faces thereof.

7. A box toe conditioning machine having, in combination, conditioning mechanism for conditioning both sides of box toes and means for delivering conditioned box toes comprising a belt and a plurality of upstanding wires to support the conditioned box toe.

8. A box toe conditioning machine comprising conditioning means, a conveyor having its supporting surface discontinuous transversely of the direction of movement for delivering the conditioned box toes, means for flexing the conveyor, and a separator adjacent the flexing means and extending beneath the supporting surface to separate the box toe from the conveyor.

9. A box toe conditioning machine having, in combination, conditioning means, a conveyor for the conditioned box toes comprising a belt having upstanding wires on its supporting surface, and a comb having teeth positioned to pass between the wires and beneath the ends thereof to separate a box toe from the conveyor.

10. A box toe conditioning machine having, in combination, a tank for containing the treating liquid, a conveyor dipping into

the tank for passing the box toes through the liquid, and devices engaging only a limited portion of the box toes for holding the same on the conveyor as they are passing through the liquid.

11. A box toe conditioning machine having, in combination, a tank for the treating liquid, a conveyor for passing the box toes through the liquid, and springs for pressing the box toes against the conveyor when the box toes are passing through the liquid.

12. A box toe conditioning machine having, in combination, conditioning means, a conveyor for the conditioned box toes, means for flexing the conveyor, and means for exerting pressure upon the box toe adjacent the conveyor flexing means to separate the front edge of the conditioned box toe from the conveyor.

13. A box toe conditioning machine having, in combination, a closed chamber having an opening through which the conditioned box toes are delivered, means for conditioning the box toes within the chamber, a conveyor for delivering the conditioned box toes from the conditioning means through the opening, and an automatically operating closure for the opening.

14. A box toe conditioning machine having, in combination, a closed chamber having an opening through which the conditioned box toes are delivered, means within the chamber for conditioning the box toes, a conveyor for delivering the conditioned box toes from the conditioning means through the opening, a swinging door normally closing the opening, and a supporting pulley for the conveyor adjacent the door for flexing the conveyor to cause the latter to discharge a conditioned box toe through the opening.

15. A box toe conditioning machine having, in combination, a closed chamber provided with a discharge opening, means within the chamber for conditioning the box toes, a conveyor belt for delivering the conditioned box toes through the opening, a self-closing door for the opening, a supporting pulley for the conveyor belt adjacent the opening for flexing the belt, and a pressure device adjacent the opening for engaging the conditioned blank.

16. A box toe conditioning machine having, in combination, conditioning means, a conveyor belt having a discontinuous supporting surface, and a separator extending beneath the supporting surface of the belt for separating the box toe from the belt.

17. A box toe conditioning machine having, in combination, a receptacle for containing the treating liquid, an endless conveyor for passing the box toes through the liquid, means for supporting and driving the conveyor adjacent the receptacle, the conveyor passing directly from said means through the liquid in the receptacle, and auxiliary supporting means for the conveyor constructed and arranged to provide a slack portion of the conveyor at the receptacle.

18. A box toe conditioning machine having, in combination, means for conditioning the box toes, a conveyor belt for delivering the conditioned box toes, a separator for separating the box toes from the belt, and a pressure device for engaging the box toe in advance of the separator.

19. A box toe conditioning machine having, in combination, a closed chamber having a discharge opening, means within the chamber for conditioning the box toes, a conveyor for delivering the box toes from the conditioning means through the opening, a pivoted closure for the opening, and a pressure device adjacent the opening for pressing the box toe against the conveyor to insure the opening of the closure by the box toe.

20. A box toe conditioning machine having, in combination, means for conditioning the box toes, a conveyor belt for delivering the conditioned box toes, a pulley around which the belt is flexed, a comb adjacent the belt for separating the box toe from the belt, and a pressure device for engaging the box toe in advance of the comb.

21. A box toe conditioning machine having, in combination, devices for treating both surfaces of the box toes, and feeding means for feeding the box toes and maintaining the same during the feeding operation substantially flat and with the bottom surfaces only in substantial engagement with said feeding means.

22. A box toe conditioning machine having, in combination, a receptacle for containing the treating liquid, an endless conveyor for passing the box toes through the liquid and means located out of contact with the liquid for supporting and driving the conveyor constructed and arranged to provide a slack portion of the conveyor which extends downwardly into the receptacle and liquid.

23. A box toe conditioning machine having, in combination, a receptacle for containing the treating liquid, an endless slack conveyor, and means for supporting and driving the same comprising an adjustable supporting roll and a driving roll, the driving roll being located adjacent to, and in advance of, the receptacle, whereby the slack of the conveyor extends downwardly into the receptacle and beneath the liquid.

24. A box toe conditioning machine having, in combination, a tank for the treating liquid, a conveyor adapted to engage the box toes on one side only, the conveyor being passed through the tank, and stationary means associated with the conveyor for causing the conveyor to be concaved upward and for maintaining the box toes in engagement

with the conveyor during their passage through the tank.

25. A shoe stiffener conditioning machine comprising a receptacle for a volatile liquid, a closed chamber for fumes of the liquid, and means for carrying a stiffener first in a short interval through the liquid and then in a longer interval through the fumes.

26. A shoe stiffener conditioning machine comprising a receptacle for a volatile liquid, a closed chamber for fumes of the liquid, and means for carrying a stiffener first in a short interval through the liquid and then in a longer interval through the fumes, the carrying means comprising a plurality of upstanding projections upon which the stiffener is supported whereby the stiffener is subjected on both sides to the action of the liquid and to that of the fumes.

27. A shoe stiffener conditioning machine comprising a receptacle for a volatile liquid, a closed chamber for fumes of the liquid, and means for carrying a stiffener first continuously through the liquid and then intermittently through the fumes.

28. A shoe stiffener conditioning machine comprising a receptacle for a volatile liquid, a closed chamber for fumes of the liquid, and means for carrying a stiffener first continuously through the liquid and then intermittently through the fumes, said carrying means being adapted to engage the stiffener at separated localities in such manner as to expose substantially all of the surface of the stiffener to the liquid and to the fumes.

29. A shoe stiffener conditioning machine comprising a carrier having projections of small cross-section on its supporting surface, a receptacle for conditioning liquid into which the carrier dips, means for actuating the carrier to cause the stiffener to be immersed in and carried out of the liquid, and a stripper to separate the conditioned stiffener from the carrier.

30. A shoe stiffener conditioning machine comprising a carrier having raised separated supports of small cross-section on its operative face, a receptacle for conditioning liquid into which the carrier dips, a presser for forcing the stiffener against the carrier, and means for operating the carrier to cause it to carry the stiffener through the liquid.

31. A shoe stiffener conditioning machine comprising a carrier having raised separated supports of small cross-section on its operative face, a receptacle for conditioning liquid into which the carrier dips, a presser for forcing the stiffener against the carrier, and means for operating the carrier to cause it to carry the stiffener through the liquid, the rate of speed of the carrier and the extent of the travel of the stiffener through the liquid being such that the immersion of the stiffener is momentary.

STANLEY P. LOVELL.