(No Model.) 2 Sheets—Sheet 1.

J. STEWART.

HARDENER AND FORMER FOR FELT BOOTS.

No. 550,202. Patented Nov. 19, 1895.

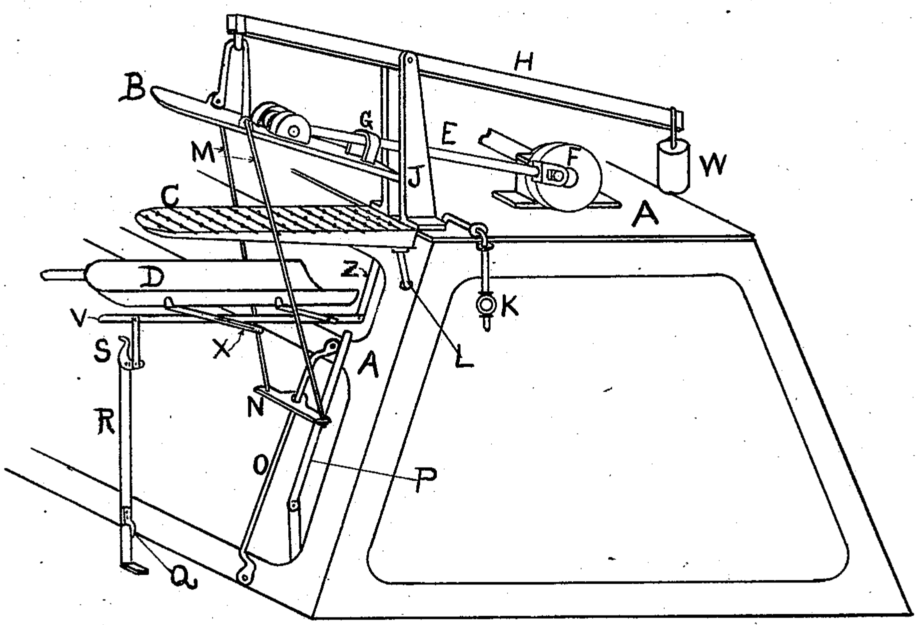

FIG. 1.

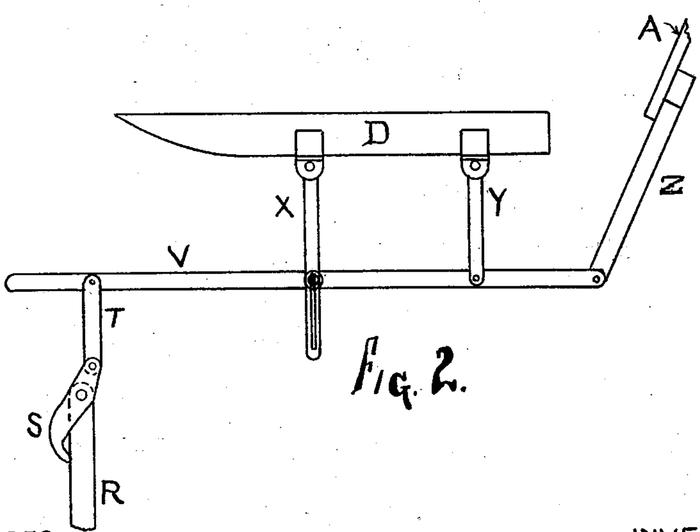

FIG. 2.

WITNESSES

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Christopher Hondelink

INVENTOR

James Stewart

By Edward Taggart

His — ATTORNEY

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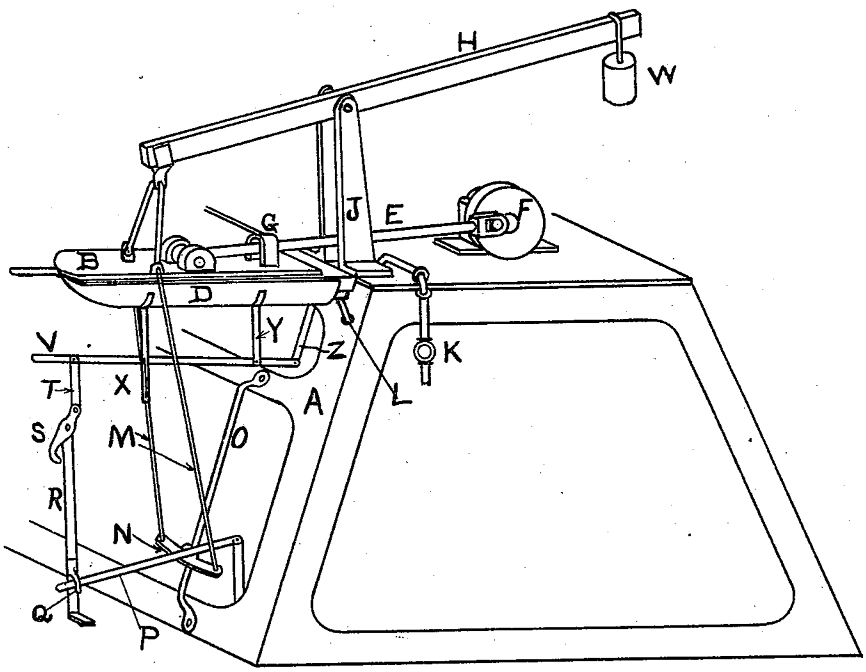

FIG. 3

WITNESSES

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UNITED STATES PATENT OFFICE.

JAMES STEWART, OF GRAND RAPIDS, MICHIGAN.

HARDENER AND FORMER FOR FELT BOOTS.

SPECIFICATION forming part of Letters Patent No. 550,202, dated November 19, 1895.

Application filed December 14, 1894. Serial No. 531,837. (No model.)

To all whom it may concern:

Be it known that I, JAMES STEWART, a citizen of the United States, residing at the city of Grand Rapids, in the county of Kent and State of Michigan, have invented a certain new and useful Hardener and Former for Felt Boots, &c., of which the following is a specification.

My invention relates to a certain new and improved machine for hardening and forming felt foot-coverings, such as boots and shoes and the like, and the same is adapted particularly for the hardening and forming of blanks for felt boots and combined knit and wool boots and shoes; and the object is to facilitate the work of forming the blanks complete, and also to enable the operator to prepare, form, and harden the blank at one operation, substantially as hereinafter described, which objects are accomplished by the machine illustrated and described in this specification, in which—

Figure 1 is a perspective view of a machine in position to receive the felt upon the steam-box, which steam-box acts as a former. Fig. 2 is an enlarged detail view of the supporting-pan which is placed beneath the steam-box, together with its connecting and operative parts; and Fig. 3 shows a perspective view of the machine with the felt on the steam-box, and with the supporting-pan brought in contact with the steam-box, thereby clasping and retaining the felt in position.

Similar letters refer to similar parts throughout the several views.

A represents the supporting-frame, of any suitable form, composed preferably of metal.

C represents the steam-box, which is preferably provided with corrugations on its upper surface, as shown, and also with openings for allowing the steam to escape from the box through the felt placed thereon.

D is a supporting-pan or former, which, when opened, assumes the position shown in Fig. 1, and when closed is adapted to press against the lower side of the steam-box, retaining the felt upon the steam-box in its position, the same being shown closed in Fig. 3. It also has for its object to prevent the steam from softening the felt on the lower side and assists in hardening the body of felt.

B is the jigger, which is brought in contact with the upper surface of the felt on the steam-box C, and has a reciprocating motion conveyed to it through the pitman E and the crank F, said crank F being revolved by any suitable mechanism in order to give a reciprocating motion to the jigger. The pitman E is connected to the jigger at or near its central portion, as shown in the drawings, and a loop G passes over the pitman E, limiting the rocking movement of the jigger relatively to the pitman E.

H is a weighted lever which in the example of my invention I have shown at a point above the jigger, and the same is adapted to raise the jigger to the position shown in Fig. 1 when not in operation, said lever H being provided with a counterweight W. This weighted lever, however, may be placed in any suitable position to lift the jigger, and, if desired, a spring might be used in the place of the weight W, in order to counterbalance the weight of the jigger.

J are standards or posts supporting the pivotal fulcrum of the lever H.

K is a pipe which admits steam into the steam-box C. At one end of the steam-box, and preferably at what I term the "rear" end, is a drain-pipe L, which serves the purpose of allowing the steam that has condensed in the steam-box to pass off. It may be constructed so as to allow the water in the steam-box to be removed when the steam is first admitted into the steam-box C.

The letters M M indicate connecting-rods, which in the example of my invention shown in the drawings serve to connect the jigger with the spring N, said spring N being constructed of a piece of metal, preferably flat, so as to prevent too great rigidity. However, the spring N may be dispensed with and the rods M M used in connection with the weighted lever for raising the jigger.

N is a spring which in the example of my invention shown in the drawings is a flat spring adapted to move on a guide-rod O, and P is a lever pivoted at one end and having a free end adapted to turn down from the position shown in Fig. 1 to the position shown in Fig. 3, carrying with it the spring N and drawing down by means of the connecting-rods M M the jigger B upon the felt on the steam-box, the lever P, when the jigger is closed, resting upon the spring N, and the free end of the lever P is held down by means of the catch Q.

R is a standard, preferably secured to the main frame, adapted to support the catch Q and also to support the lever-latch S, said latch S being pivoted at a point intermediate its ends to the standard R and one end pivoted to the pivoted or linked connection T, said link connection T being pivoted at its upper end to the lever V, said lever V having one end pivoted to the connecting-rod Z, which rod Z is rigid with and forms a part of the main frame A. Instead of using the connection Z, any other suitable point may be selected upon the main frame to which may be pivoted said lever V.

X and Y are pivotal connections forming supports for the pan D, said support X being slotted at its lower end and the connection being such that the pan D is raised practically in a horizontal position, so as to fit closely against the lower side of the steam-box. The lever-latch S serves the purpose of raising and securing the pan D in position and retaining the same against the lower side of the steam-box. Blanks for wool boots and shoes are formed on suitably-shaped forms and are then placed upon the steam-box and subjected to the heat and moisture of the steam and the action of the jigger, they being turned over during the operation; but the boot-blank so formed is liable to croze marks or welts, if the operation is continued beyond a certain time, while if sufficient time is not given to the operation the blank will be soft and liable to damage in the withdrawing of it from the form, thereby requiring care and experience.

In making a combined knit and felt boot a knit stocking of large size is drawn over the form and a sheet of partially-hardened wool-bat is folded and formed over the stocking and its inclosed form. It is then placed on the steam-box and subjected to the action of the jigger and the steam. Frequent turnings of the blank and its inclosed form are required, it being needful, also, to remove and reinsert the form to prevent the croze-marks. In case the knit fabric does not incorporate with the felt in all its particulars it is liable to separate in the subsequent operations.

In making use of my invention and process for forming boot-blanks a sheet of wool-bat (hardened down the center by a previous operation) a little larger in size than the under side of the steam-box, with the edges left soft and unhardened, is placed upon the supporting pan or shell D. This pan is raised by the levers and forced to press firmly upon the under side of the steam-box. One of the free sides of the bat is brought up and over the upper surface of the steam-box, and then the other side is brought up and lapped over the edge of the bat first turned over. The open end is contracted and lapped, thus inclosing the steam-box, when the jigger is brought to its working position and steam is admitted into the box, the power applied giving a rapid reciprocating motion to the jigger, which action effectually unites and hardens the soft lapped parts, forming a seamless boot-blank.

In making the combined knit and felt boot-blank a tubular knit or woven fabric closed at one end is drawn upon the steam-box. A partially-hardened wool-bat is laid over the fabric on the upper surface of the steam-box, presenting one thickness of fabric and wool-bat to the action of the jigger, thereby effectually uniting the fabric and the bat. The fabric and its adhering bat are turned on the steam-box, and the united and hardened portions now being on the under surface of the steam-box the two free sides of the bat are brought up and lapped upon the upper surface of the steam-box, and the operation is continued in the same way as is done in forming wool boot-blanks. It is desirable to have the fabric on the outside, and the blank for that purpose is turned inside out in a subsequent operation.

In handling and forming a shoe or slipper blank the steam-box, jigger, and supporting-pan will be made shorter, while the steam-box will be higher in side elevation in order to bring the upper surface higher above the level of the frame.

The operation of making a shoe or slipper blank is as follows: A bat large enough to make a shoe-blank is previously hardened by a special jigger, leaving the sides and top soft. It is now placed upon the supporting-pan and brought up to its place against the under side of the steam-box. The free sides are lapped over the top of the steam-box and the toe-forming portion contracted and lapped. The soft lapped top portion projecting beyond the raised part of the steam-box will not be subjected to the hardening operation. After hardening, the blanks are removed from the steam-box, and a part of the previously lapped but unhardened top is removed by cutting or tearing. It is then again placed upon the steam-box with the previously-hardened toe portion under the steam-box. The soft parts are brought up and lapped over the tops of the steam-box, and thus being hardened will form a counter.

Having thus described my invention, what I claim to have invented, and desire to secure by Letters Patent, is—

1. The combination with a steam-box adapted to receive and support the bat from which the blank is to be made, of a reciprocating jigger adapted to operate upon one surface of such bat, an adjustable pan or shell adapted to clamp and hold the bat upon the steam-box while being operated upon, means for holding said pan or shell fixed and stationary in its operative position upon the bat and means for moving said pan or shell toward and away from said steam-box, substantially as described.

2. The combination with a steam-box adapted to receive and support the bat from which the blank is to be made, of a reciprocating

jigger adapted to operate upon one surface of said bat, an adjustable pan or shell adapted to clamp and hold the bat upon the steam-box while being operated upon, means for moving said pan or shell toward and away from the steam-box, and means for holding said pan fixed and stationary and locking it in its clamping position, substantially as described.

3. The combination with the stationary steam-box C, of the movable pan or shell D, rods X, Y pivotally connected to said pan or shell, a pivoted lever V pivotally connected to said rods, and a reciprocating jigger adapted to operate upon a bat supported upon the steam-box, substantially as described.

4. The combination with the stationary steam-box C, of the movable pan or shell D, the pivoted lever V, pivotal connections between said pan or shell and said lever, and a lever latch S fulcrumed to a fixed support and pivoted at one end to the lever V for locking the pan or shell in against the steam-box, substantially as described.

5. The combination with the stationary steam-box C, of the jigger B, the pitman E pivoted thereto intermediate the ends of the jigger, a loop G secured to the jigger near one end of the latter and straddling the pitman, a weighted lever H pivotally connected at one end to said jigger, a movable pan or shell D for clamping the bat on the steam-box, and rods M and lever P for drawing the jigger into operative position upon the bat substantially as described.

In witness whereof I have hereunto set my hand and seal in the presence of two witnesses.

JAMES STEWART. [L. S.]

Witnesses:

EDWARD TAGGART,

CHRISTOPHER HONDELINK.