S. ESPACH.

Horseshoe-Machine.

No. 168,008. Patented Sept. 21, 1875.

FIG. 8.

FIG. 1.

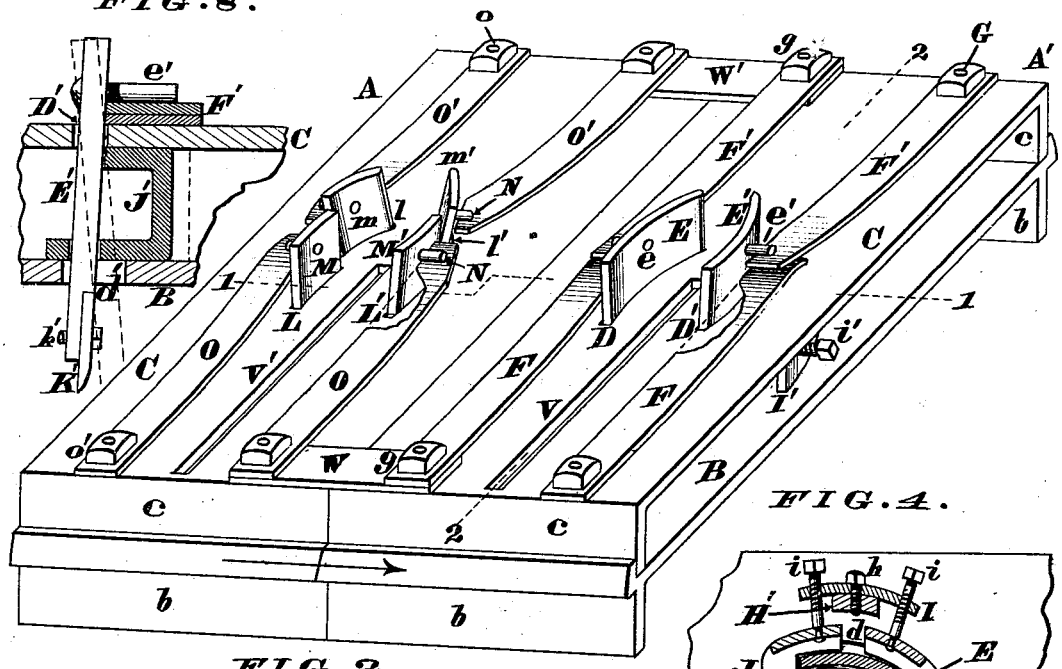


FIG. 4.

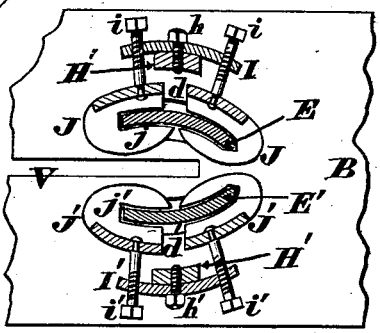


FIG. 2.

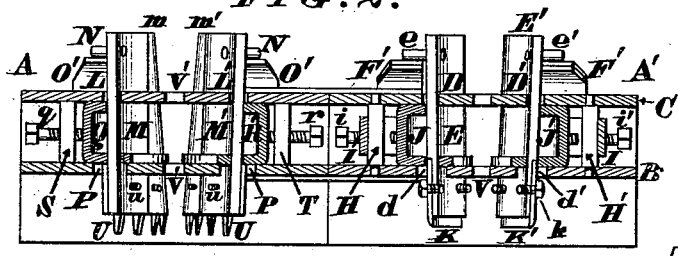


FIG. 5.

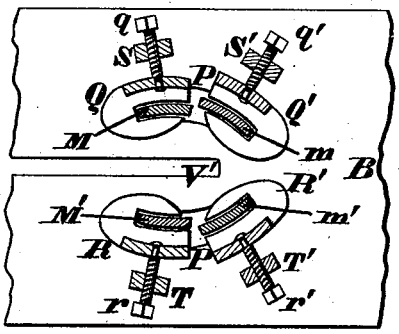


FIG. 3.

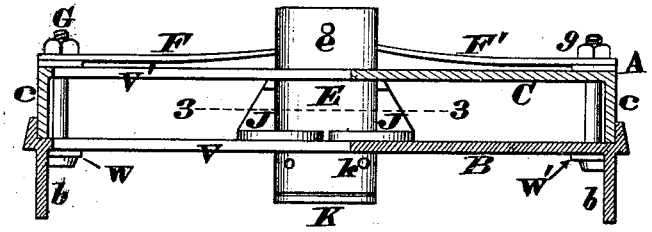


FIG. 7.

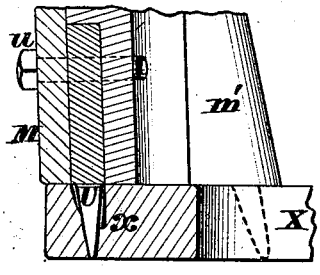
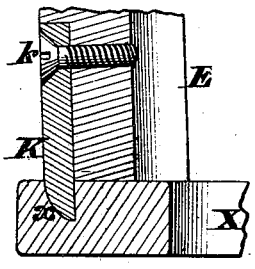


FIG. 6.



Seraphin Espach
by Knight Bros Att'ys.

Attest.
Jas. N. Layman
Chas. J. Gooch

UNITED STATES PATENT OFFICE.

SERAPHIN ESPACH, OF CINCINNATI, OHIO, ASSIGNOR TO HIMSELF AND JOHN R. R. LINDNER.

IMPROVEMENT IN HORSESHOE MACHINES.

Specification forming part of Letters Patent No. **168,008**, dated September 21, 1875; application filed July 12, 1875.

To all whom it may concern:

Be it known that I, SERAPHIN ESPACH, of Cincinnati, Hamilton county, Ohio, have invented certain new and useful Improvements in Horseshoe-Machines, of which the following is a specification:

My invention relates to an improved mechanical device for creasing or fullering the heated blank, and punching the nail-holes. These two operations, creasing and punching, are consecutively performed by means of suitable vertically-acting punches mounted within a horizontally-reciprocated slide or carriage, which is moved at proper intervals either by hand or else by mechanical appliances.

The first of these operations, namely, the creasing or fullering, is performed by means of two punches, which are curved in their horizontal section to correspond with the desired contour of creases. Said punches are, at the proper moment, driven a suitable distance into the heated and bent blank by means of any suitable drop-weight or compressor, and then instantly elevated or retracted by means of springs, so as to be liberated from the creased blank.

The second operation, namely, the formation of the nail-holes, is effected by four plungers, to whose lower ends the punches proper are applied. Of these punches, the two that are to make the perforations near the side edges of the creased blank are but slightly inclined, being pitched at about the same angle as the corresponding creases are, but the pair of punches for perforating the toe of the blank are inclined much more from the perpendicular.

By this arrangement of two distinct creasing and four distinct nail-hole punches, the nail-holes are enabled to be more or less under-punched, as stated, a result which cannot be accomplished by the use of two punches only.

In order to render these creasing and perforating punches capable of being regulated so as to operate with a less or greater pitch, and nearer to or farther from the outer edges of the blank, said punches are made adjustable laterally by means of set-screws and box-hooks, as hereinafter more fully explained.

In the accompanying drawing, Figure 1 is a perspective view of the reciprocating carriage and its accessories, the carriage being supposed to be moving in the direction of the arrow. Figs. 2 and 3 are sections at lines 1 1 and 2 2, respectively. Figs. 4 and 5 are sections at line 3 3 through the creasers and punchers, respectively. Figs. 6 and 7 are diagrams showing the action of the creasers and punchers, respectively. Fig. 8 is a vertical section through the upper portion of the creaser in its depressed position. Of the above illustrations, Figs. 6, 7, and 8 are drawn on an enlarged scale.

My reciprocating box, slide, or carriage consists essentially of two separate, but precisely similar members, A A′, which are capable of being securely united together, as hereinafter more fully explained.

Each member of the carriage is composed of two stout horizontal castings or plates, B and C, of which one plate, B, has downwardly-projecting flanges *b*, that are adapted to run in suitable grooves or ways in the main frame of the machine, so as to guide said carriage in its proper path. The upper plate C has two similar flanges, *c*, which serve to maintain the two members B and C a suitable distance apart, and parallel with each other. The plate C has two curved slots, D D′, within which are snugly fitted the upper portions of the creasers E E′, whose outwardly-projecting studs *e e′* bear upon springs F F′, the latter being secured to the carriage by bolts G and nuts *g*. These bolts and nuts also serve to secure the two plates B and C together. (See Fig. 3.) The plate B has two slots, *d d′*, of corresponding shape to those D D′, and located directly beneath them. The slots *d d′* are, however, considerably wider than the slots D D′, in order that the lower ends of the creasers E E′ may be caused to approach toward or recede from one another, so as to operate farther from or nearer to the outer edge of the blank.

This adjustment of the creasers is effected in the following manner: Firmly secured between the plates B and C are upright bars H H′, to which are attached, by rivets or bolts *h h′*, two curved arms, I I′, which are tapped

to receive set-screws *i i'*, whose inner ends carry hook-shaped clamps or boxes J J', which are slotted at *j j'* to receive the creasers E E'. (See Fig. 4.) These hooked boxes rest upon the upper surface of plate B, and are readily shifted thereupon by proper manipulation of set-screws *i i'*. K K' represent the bits of the creasers, secured in their proper positions by means of bolts or screws *k k'*. The upper plate C of the left member A of the carriage has four distinct curved slots, L L' *l l'*, for reception of the punching-plungers M M' *m m'*, which are furnished with outwardly-projecting lugs N, that rest upon springs O O', the latter being secured to the carriage A A' by means of nutted bolts *o o'*.

By referring to Fig. 1 it will be seen that the nearest plungers M M' are set at about the same angle as the creasers E E', as said plungers are designed to operate in that portion of the crease which skirts the sides of the shoe. The remote pair of plungers *m m'* are, on the other hand, inclined much more from the perpendicular, in order that their perforators U may under-punch the holes near the toe of the blank.

Located beneath the slots L L' *l l'*, and in plate B, are four similar, but somewhat wider, slots, P, for the reception of the lower portions of the plungers. These plungers are fitted in suitable slotted hook-boxes Q Q' R R', whose respective set-screws *q q' r r'* are engaged with the upright bars S S' and T T'. (See Fig. 5.) U are the punches proper, which punches are secured to the plungers M M' *m m'* by screws *u*, or other suitable means. V V' are slots in the plates B and C for the engagement of a key or stop wherewith the carriage A A' is arrested at the proper moments. W W' are straps that serve to unite the two members A and A' securely together after the creasers and punches have first been properly adjusted within said carriage.

The operation of the device is as follows: As previously stated, the present invention relates solely to the creasing and perforating punches, and therefore no specific description of the appliances for bending the heated blank around the die or former is given, although it may be stated that this preliminary operation may be performed in any suitable manner, or still better, with a machine which I design to make the subject of an application for patent. Presuming, then, that the heated blank has just been bent, and is held immovably in position by a suitable griper or clamp, the carriage A A' is advanced a definite distance to the right with the creasers or punches in their normal or elevated position, as seen in Fig. 1. This advance of the carriage may be effected either automatically or by hand, and as soon as the machine has advanced sufficiently to bring its slots V directly over the center of the blank its farther progress is immediately arrested, for the time being, by a suitable key or stop engaging with said slot. The creasers E E' are now forcibly depressed, either by a lever, by an eccentric, or by a drop-weight, until the studs *e e'* prevent the farther descent of said devices. (See Fig. 8.) Owing to this depression of the creasers, their bits K K' are forced into the substance of the heated blank X, (see Fig. 6,) and a suitable gutter or groove, *x*, is at once formed therein. The depression of the creasers continues but for a moment, and as soon as they are freed from the blank, by the stress of springs F F', the key is disengaged from slot V, and the carriage A A' is advanced a definite distance to the right, so as to engage the key with the other slot V', and to bring the punches U directly in line with the previously-formed crease *x*. The operating-lever, eccentric, or drop-weight is then again brought into action, but this time upon the plungers M M' *m m'*, so as to forcibly depress the latter, and to drive their puncturing-bits U into the crease *x*, and completely through the blank. (See Fig. 7.) The retaining-key is then disengaged from the slot V', the carriage retracted, the creased and punched shoe released from the machine, and, another heated blank being applied, the operation is repeated. Owing to the precision with which the creasers and punches operate, the blanks are perfect fac-similes of each other, and the metal is not injured by any violent strain or concussion.

If at any time it should be desired to have the creasing and puncturing punches operate nearer the outer edges of the heated blank, the nuts *g* and *o'* must first be slackened, so as to permit the disengagement of straps W W', after which act the two members A A' of the carriage may be separated, thereby affording access to the adjusting devices. The set-screws *i i'* are then rotated, so as to shift the creasers E E' toward the posts or uprights H H', and to cause a greater separation of the bits K K', as indicated by dotted lines in Fig. 8. The perforating-plungers M M' *m m'* are then adjusted to correspond with this shifting of the creasers, and the two members of the carriage reunited.

To adjust the machine so as to produce creases more remote from the outer edges of the blank, the above actions are of course reversed.

It should be understood that the machine here represented is designed for the manufacture of only one size and shape of shoe, other like machines being provided for other shapes and sizes.

In case the bits K or punches U should become worn or broken, they are readily replaced by new ones.

I claim as new and of my invention—

1. The combination, in the slide or carriage A A', of the creasing-punches E E', and perforating-punches M M' *m m'*, when adapted to operate successively upon the heated blank, in the manner explained.

2. The combination of slotted carriage B *d d'* C D D', vertically-acting creasers E E' K

K′, and adjusting devices H H′ I *i* I′ *i*′ J *j* J′ *j*′, as and for the purpose specified.

3. The combination of slotted carriage B P C L L′ *l l*′, vertically-acting punches M M′ *m m*′ U, and adjusting devices Q *q*, Q′ *q*, R *r*, R′ *r*′, S S′, and T T′, as and for the object designated.

In testimony of which invention I hereunto set my hand.

SERAPHIN ESPACH.

Attest:
GEO. H. KNIGHT,
JOHN R. R. LINDNER.