3 Sheets--Sheet 1.

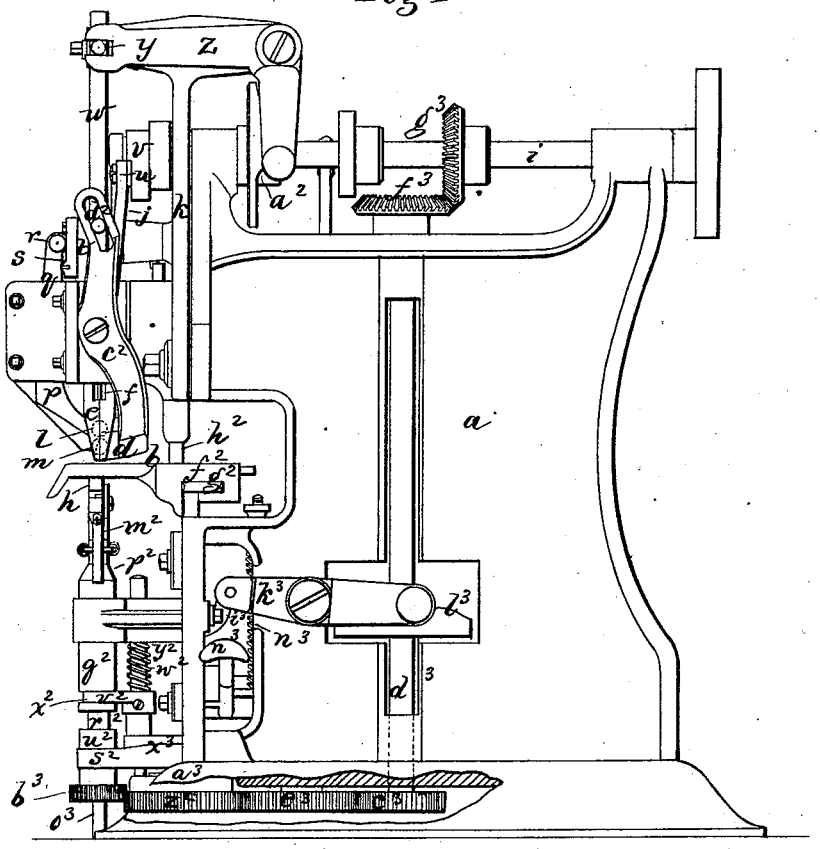
T. K. REED, dec'd.

A. B. KEITH & EUNICE S. REED, Admr's.

Machine for Forming and Driving Staples for Leather-Work.

No. 164,010. Patented June 1, 1875.

Fig. 1



Witnesses.
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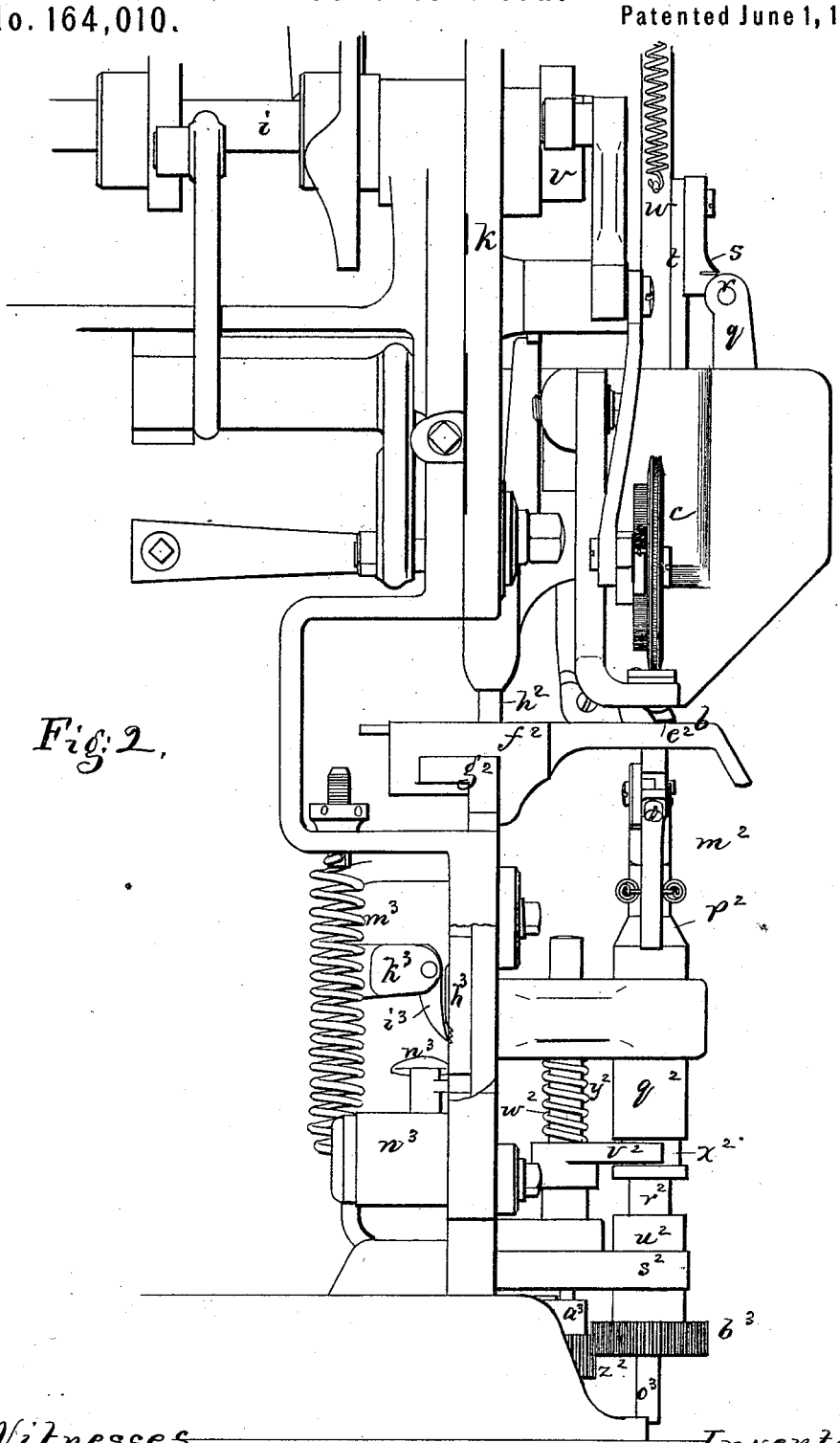

Fig. 2.

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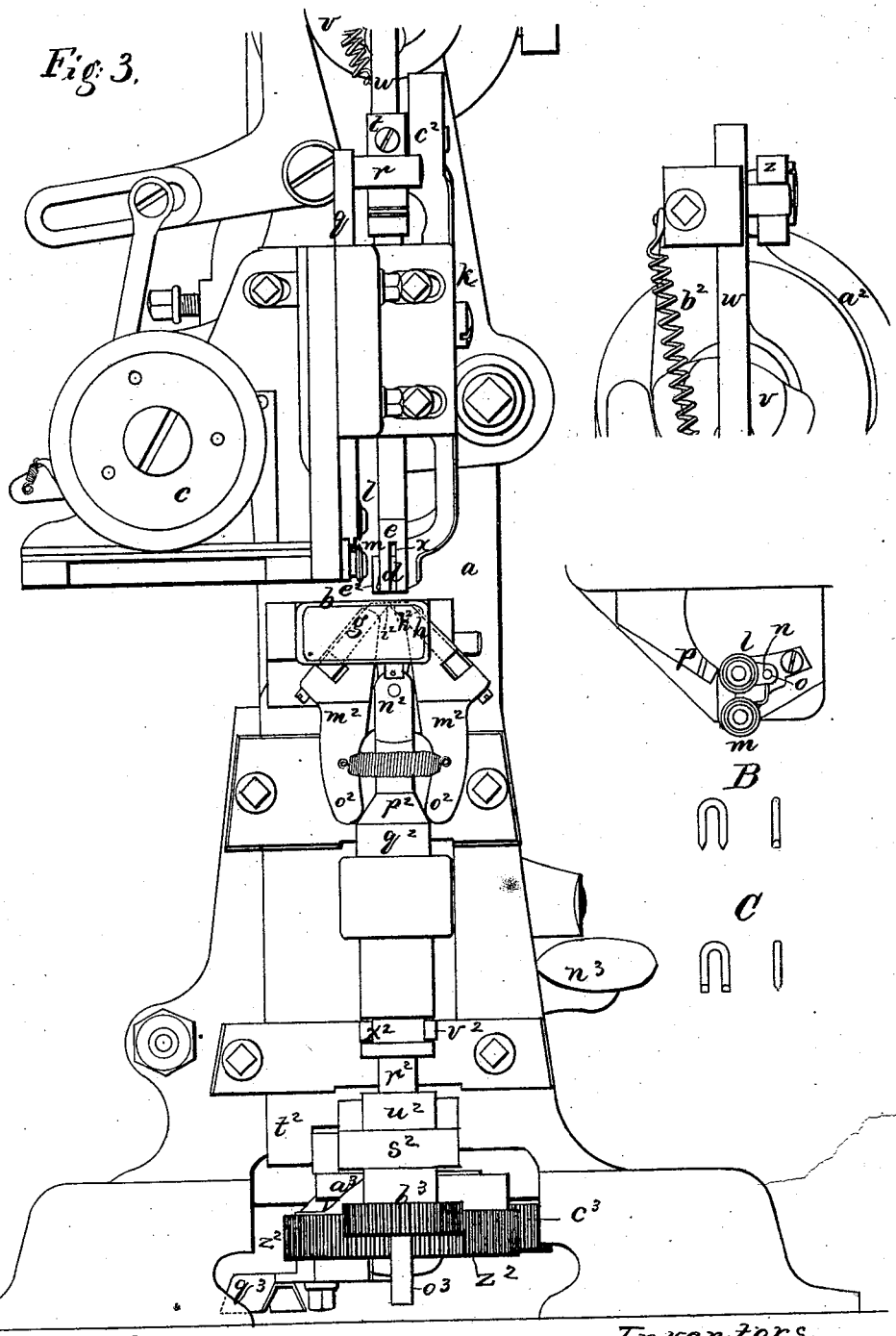
Fig. 3.



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UNITED STATES PATENT OFFICE.

ARZA B. KEITH, OF BRAINTREE, AND EUNICE S. REED, OF EAST BRIDGEWATER, MASSACHUSETTS, ADMINISTRATRIX OF TIMOTHY K. REED, DECEASED, ASSIGNORS BY MESNE ASSIGNMENTS TO METALLIC SEAM COMPANY, OF NEW HAVEN, CONNECTICUT.

IMPROVEMENT IN MACHINES FOR FORMING AND DRIVING STAPLES FOR LEATHER-WORK.

Specification forming part of Letters Patent No. **164,010**, dated June 1, 1875; application filed May 17, 1875.

To all whom it may concern:

Be it known that ARZA B. KEITH, of Braintree, Norfolk county, and TIMOTHY K. REED, of East Bridgewater, Plymouth county, all in the State of Massachusetts, have invented certain Improvements in Machines for Forming and Driving Staples for Leather-Work; and we do hereby declare that the following, taken in connection with the drawings which accompany and form part of this specification, is a description of the invention sufficient to enable those skilled in the art to practice it.

United States Letters Patent No. 136,340 were granted to Samuel W. Shorey, relating to a machine for forming and driving staples to unite parts of leather-work, and the present invention relates particularly to improvements in machines embodying to a greater or less extent the organization shown and described in said patent. The improvements have reference to the method of feeding the work, the method of severing and pointing the staple-forming lengths of wire, the method of twisting the staple-points, and the method of setting the twisted points into or against the under surface of the work. The invention also embraces other details of organization, to be set forth in the description of the drawing and of the operation of the mechanism.

The drawing represents a machine embodying the invention.

Figure 1 shows the machine in side elevation. Fig. 2 is an elevation of a portion of the opposite side thereof. Fig. 3 is a front elevation of the machine, the upper detail at the right of this figure showing the top part of the machine not shown in the main figure. Fig. 4 shows the cutters for severing and pointing the staple-lengths.

a denotes the frame-work and stand of the machine; *b*, the bed upon which the work rests; *c*, the feed-wheel that feeds the wire; *d*, the anvil or former over which the wire is bent to make the staple; *e*, the fork or bender that bends the wire over the former; *f*, the driver that drives the staple. *g h* denote the nippers and cutters that gripe, twist, and trim off the staple-points. *i* denotes the main shaft, through which the respective movements are imparted to the respective parts. At the front end of the main frame is the swinging head *k*, with which the wire-feeding, wire-severing, staple-forming, and staple-driving mechanisms are connected, this head swinging to effect the feed of the work, as shown in said patent. The wire-feed wheel *c* is also actuated as shown in said patent. The end part of the wire, when fed, passes between two cutters, *l m*, arranged one over the other, so that the wire is severed by a vertical movement of the cutting mechanism, such vertical movement and the cutting effected thereby resulting in forming V-shaped points on the staple, the points being shaped like the points of a brad-awl, and the edges being parallel instead of in line. The lower cutter is shown as stationary, and the upper one is made movable, and descends upon the wire presented between the cutters to be severed. The cutters shown are disk-cutters, and the upper one is hung upon a pin extending from an arm, *n*, jointed at *o*, held up normally by a suitable spring, and thrown down by the arm *p* of a lever, *q*, the upper arm of said lever having extending from it a pin, *r*, acted upon (to throw the lever-arm *p* against the cutter-arm *n*, to depress the cutter) by an incline, *s*, on the bender-bar *t*, the movement of the lever in the opposite direction being produced by a suitable spring. The staple-points made by this method of cutting are shown in the details marked B, and differ from the staple formed by side-pointing, which staple is shown in the details marked C, the details showing each kind of staple in front view and edge view. The wire is fed through a suitable throat-plate and between the cutters, and is presented over the former *d*, which makes the rest for the center of the staple-forming length of wire, and as the bender descends it strikes the wire just as or before the incline *s* strikes the lever-pin *r*, the former then holding the wire while the cutters sever it. The bender-bar is jointed

by a link, j, to a crank-pin, u, extending from the wire-feed cam v on the driving shaft, receiving a positive vertically-reciprocating movement by such connection. The bender-bar t is slotted from the top, and in the slot slides the driver-bar w, the driver f extending from its foot, and through the bender-bar into the bender-fork x. The upper part of the driver-bar slides in a suitable bearing, and has extending from it a pin, y, straddled by a fork at the end of the horizontal arm of a lever, z, whose vertical arm carries a pin actuated by a face-cam on a cam-wheel, a^2, on the driving-shaft, a suitable spring, b^2, raising the driver-bar, and keeping the lever against the face of the cam-wheel, and the cam imparting the downward movement to the driver-bar against the stress of the spring. After the bender has moved wholly or partially down and formed the staple, the driver starts down to drive the staple, and as the staple is supported by the inclined end of the former, said former must withdraw as the staple descends, as described in said patent. To effect this withdrawal, the former is fixed to the end of the lower arm of a vertical lever, c^2, whose upper arm has an inclined slot, d^2, into which a pin extends from the driver-bar, the descent of the driver-bar actuating the lever c^2, to draw back the former as the staple descends under the action of the driver. When the work is clamped between a foot, e^2, (extending from the bender-bar,) and the work-plate b, preparatory to driving the staple, the head k is swung to feed the work, and in order that there shall be uniform movement of both parts of the work, (or no slip of one part relatively to the other,) the work-plate is made to move with the swing-head. For this purpose the work-plate is made as an extension from a slide, f^2, moves horizontally on a guide-rail, g^2, a vertical pin, h^2, extending down from the swing-head through the slide, the head and work-plate being thus joined and moving conjointly in a lateral direction. The work is held thus clamped during the feed of the work and during the driving of the staple, and as the points of the staple emerge from the under surface of the work, they pass through a slot in a thin plate forming part of the work-plate, the projecting ends passing between the two points i^2 k^2 of the nippers and cutters g h. These nippers are adjustably fixed to levers m^2, jointed at n^2, and having arms o^2, which are normally held against an annular incline, p^2, at the upper end of a vertical sleeve, q^2, sliding on a vertical shaft, r^2, to the top of which the nippers are jointed. This shaft is supported upon a step, s^2, extending from a vertical slide-bar, t^2, (sliding in vertical guide-ways in the frame a,) a collar, u^2, fastened upon the shaft resting upon the step s^2.

The work-plate slides upon a horizontal rail at the top of this vertical slide, and the shaft r^2, nippers g h, and work-plate have, therefore, a coincident and coequal vertical movement; but the sleeve q^2 has an independent vertical movement to actuate the nippers, to produce which movement a fork, v^2, projecting from a vertical slide-rod, w^2, extends into a slot, x^2, cut around the sleeve, this rod, and with it the sleeve, being pressed down normally by a suitable spring, y^2, and extending through the step s^2, and down to a horizontal wheel, z^2, carrying a cam, a^3, a roll at the bottom of the rod resting upon the wheel, and the cam striking the roll as the wheel rotates, and raising the sleeve to close the nippers upon the wire. Before the cam leaves the roll a rise, x^3, of the cam elevates the sleeve q^2 a step farther, and sufficiently to close the nipper-edges together, and sever the extreme or redundant and untwisted points of the staple. When the cam has passed the roll the spring throws the sleeve down, and the spring opens the nippers.

To twist the wire the nippers are rotated, and to effect such rotation the wheel z^2 meshes into and drives a pinion, b^3, on the shaft r^2, the gear z^2 being driven by a gear, c^3, on a vertical shaft, d^3, and an intermediate, e^3, and the shaft d^3 being driven from the main shaft through bevel-gears f^3 g^3. The work-plate slide b^2 is thrown down positively (to free the work-plate for its back movement) by a connection, as follows: On the back of the plate is a vertical ratchet-bar, h^3, against which is pressed a spring-pawl, i^3, jointed to one arm of a lever, k^3, the other arm of which has a pin extending from it, and resting upon a cam-wheel, l^3, on the shaft d^3. After the staple has been driven, the cam l^3 strikes the lever-pin and throws down the pawl-arm thereof, the pawl, by contact with the ratchet-bar, throwing down the work-plate and the mechanism connected therewith, a suitable spring, m^3, raising the same when the cam projection has passed the lever-pin. Another lever, n^3, is jointed to the work-plate slide b^2, which lever, by depression by hand, draws down the work-plate independently from the lever and pawl mechanism, for insertion of the work or other purpose, the spring m^3 returning the work-plate to normal position when the lever n^3 is released.

After the staple has been driven and its points twisted, the twisted points are driven against or embedded into the stock, as follows: Extending centrally through the shaft r^2 is a setting-rod, o^3, the top of which, in normal position, lies just beneath the nipper-points, held there normally by the stress of a suitable spring. The bottom of the rod extends below the pinion b^3, and in the path of movement of a cam projection, q^3, on the gear z^2. As the gear rotates, the cam strikes the rod o^3, and, lifting it, presses it against the twisted points, driving them into the stock, the pin being thrown down by the stress of the spring as soon as the cam passes it.

In the patented machine above referred to, the nippers rise to their highest position before commencing to gripe and twist the staple-points, in consequence of which the heads of the staples have to be left by the driver pro-

jecting beyond the upper surface of the work, and the twisting drives the bow of the staple too deeply into the work.

In the present machine, the nippers gripe the staple-points before the nippers reach their highest position, and then rise as they twist, thereby taking the metal for the twist from the staple-shanks without strain upon the staple bows or heads.

In uniting the parts of leather-work, when the staples are driven in line, and near one edge of the work, their points, if parallel to the edge, being supported upon one side more than upon the other, have a tendency to deflect, and toward the unsupported edge; but by making the points as shown at B, or with edges right angular to the edge of the work, the points will not deflect in driving, being equally supported upon both sides; and if they could deflect, the points will only move in the plane of the line of staples, which would be unobjectionable.

In severing the staple-forming length, the cutters form two V-shaped points—one for the wire severed, and the other for the wire next to be severed.

We claim—

1. In combination with the wire feeding and bending mechanism, the severing-cutters, acting against the top and bottom surfaces of the wire, substantially as described.

2. In a machine for forming seams, a pair of twisting-nippers, actuated to have an upward motion during the twisting operation.

3. The combination of the rotary cam a^3, cam-rise x^3, shaft r^2, and sleeve q^2, for imparting the inward movements to the nippers, substantially as described.

4. In combination with the cam a^3, the spring w^2, for imparting the downward movement to the sleeve, substantially as described.

5. The continuously-rotating shaft r^2, in combination with the nippers, and for imparting to them their twist movement, substantially as described.

6. In combination with the driving-shaft, the shaft d^3 and gears b^3 z^2 c^3 e^3, for actuating the nipper-shaft r^2, substantially as described.

7. In combination with the twisting mechanism, the set o^3, for bending the twisted staple-points, substantially as described.

8. In combination with the set o^3, the cam q^3 and spring for imparting to it its respective movements, substantially as described.

9. In combination with and for operating the former d, the lever c^2, with its slot d^2 and the pin projecting from the driver-bar w, substantially as described.

10. The lever z, cam a^2, and spring b^2, for operating the driver-bar w, substantially as described.

11. The crank-pin u, link j, and bender-bar t, combined and operating substantially as described.

12. The cutter-lever p, operated by the incline s and a spring, substantially as described.

13. The swinging head k and vertically-moving work-support plate b, moving laterally together, substantially as described.

14. The cam l^3, lever k^3, and spring m^3, combined and operating to actuate the work-plate vertically, substantially as described.

15. The vertical slide-plate t^2 and horizontal slide-plate f^2, connected, and having relative movements and movements in common, substantially as described.

16. The method of making a staple-seam, by forming the staples with the parallel V-shaped points, and driving said staples in line, so that the edge of each staple-point stands at a right angle to the plane of the seam as it enters the work, substantially as described.

17. A staple having the wedge-shaped points, with the edges of the two points inclined, substantially as described.

Executed this 2d day of February, A. D. 1874.

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