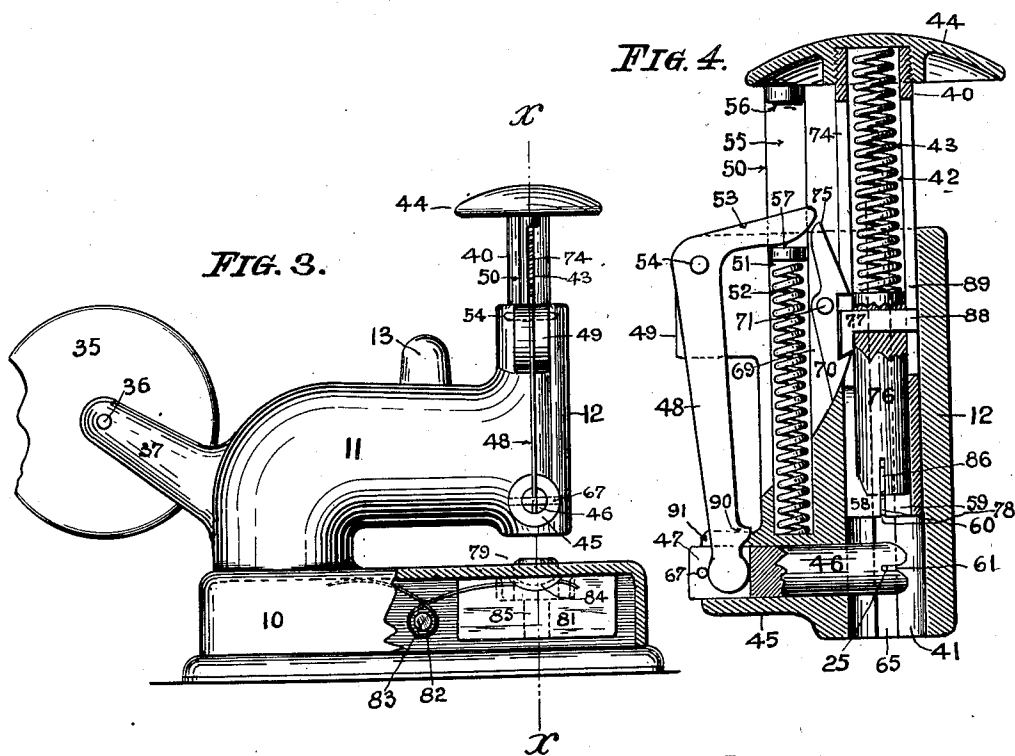
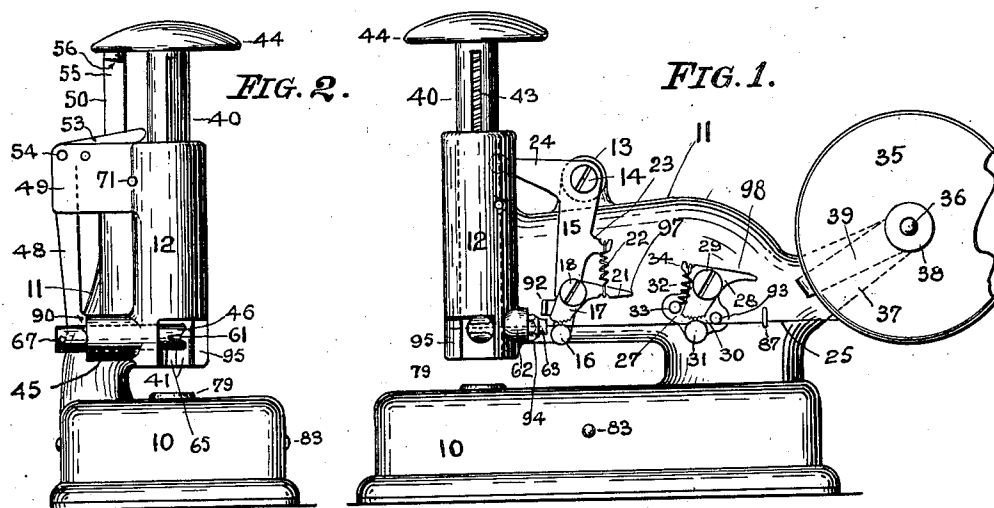


943,045.

2 SHEETS—SHEET 1.



Witnesses:

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UNITED STATES PATENT OFFICE.

WILLIAM CHARLES OSTERHOLM, OF CHICAGO, ILLINOIS.

WIRE-STAPLE FORMING AND SETTING MACHINE.

943,045.

Specification of Letters Patent.

Patented Dec. 14, 1909.

Application filed January 7, 1909. Serial No. 471,149.

To all whom it may concern:

Be it known that I, WILLIAM CHARLES OSTERHOLM, a citizen of the United States, and resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Wire-Staple Forming and Setting Machines; and I do hereby declare that the following description of my said invention, taken in connection with the accompanying sheets of drawings, forms a full, clear, and exact specification, which will enable others skilled in the arts to which it appertains to make and use the same.

This invention has general reference to wire-staple forming and setting machines, and its object is the production of a hand-operated device that may be placed upon any table, desk, etc., and operated by simply pushing a knob, similar to a hand-stamp.

It, therefore, consists in the novel and peculiar combination of parts and details of construction as hereinafter first fully set forth and described and then pointed out in the claims.

In the drawings already referred to, and which illustrate this invention more fully, Figure 1 is a front-elevation of this improved machine. Fig. 2 is an end-elevation of the same. Fig. 3 is a rear-elevation, and Fig. 4 a transverse sectional elevation of the head-portion of the machine taken on line *x x* of Fig. 3, and illustrating the staple-forming mechanism in its normal position. Fig. 5 is a longitudinal sectional elevation of a fragment of the machine showing the position of the staple-forming mechanism at the moment that the wire staple has been formed. Fig. 6 is a transverse sectional elevation of the device taken on line *x x* of Fig. 3, illustrating the position of the parts at the moment when the staple-setting ram or hammer starts on its way to force the staple through the papers and clench the same. Fig. 7 is a plan of the machine below the line *y y* of Fig. 5. Fig. 8 is a plan of the plunger inverted, and Fig. 9 is a plan of the catch detached.

Like parts are designated by corresponding symbols of reference in all the figures.

This machine comprises in its entirety the following instrumentalities: means for feeding the wire to the cutter; means for retarding the wire; means for cutting off of the wire; means for forming the wire into a staple, and means for driving the staple and

clenching the same, and in the following description I shall take up these elements serially, first describing the mechanism for feeding the wire.

10 in the drawings designates the base; 11 the arm, and 12 the head of this machine, these parts being preferably produced integral in the process of casting. On this arm 11 there is formed an upwardly-projecting boss 13, to which is pivoted by a screw 14, a bell-crank lever 15. This lever 15 has at its lower end a shouldered stud 16, and above this stud a second bell-crank lever 17, which lever is pivoted to the member 15 by a screw 18. One arm of the lever 17 has its lower edge curved and serrated or formed with sharp teeth 20, Fig. 5, while the other arm 21 has attached to it with one end a spiral spring 22, its opposite end being hooked onto a projection 23 on said member 15. The lever 15 has a forwardly-projecting member 24, the object of which will hereinafter more fully appear.

The object of the mechanism heretofore described is, as stated, to feed the wire into the machine to be cut and formed into staples, and this is accomplished by rocking the lever 15 back and forth. In its backward movement the lever 17 will slide with its serrated end over the wire 25; but as soon as the lever 15 starts on its return movement, the cam-shaped and serrated end 20 will impinge upon the wire 25 and cause it to move along for a distance equal to the length of wire required for a properly-formed staple 26.

In order to prevent the wire 25 from moving backward with the movement of the feeding-mechanism, I have provided the machine with a brake shown in detail in Fig. 1. This brake is pivoted to a boss 27, Figs. 1 and 7, and it consists of a bell-crank shaped member 28 pivoted to said boss 27 by a screw 29, the lower end of said member 28 being serrated at 30 the same as the member 19 on the feeding mechanism; an abutting-block 31 formed on the boss 27 and projecting therefrom being provided to act in conjunction with the serrations 30 to prevent the wire 25 from moving backward, a spiral spring 32, assisting in this operation. This spiral spring 32 is attached with one of its ends to a pin 33 in the projecting boss 27, and with its other end to a hook 34 on the member 28.

The wire 25 is wound upon a spool 35, re-

volving upon a stud 36, secured to a rearwardly-projecting member 37 on the arm 11, and this spool is removably retained upon said stud by a knurled thumb-nut 38. And in order to retard the movement of this spool, there is placed a blade-spring 39, between the spool 35 and the member 37, as shown in Fig. 7, to act upon the spool by frictional contact in an obvious manner.

Having thus described the wire-feeding mechanism and the brake or retarding device, I shall now proceed to describe in detail the wire-cutting and staple-forming mechanisms.

40 in the drawings designates the plunger which is slidably inserted into the cylindrical bore 41 of the head 12. This plunger has a cylindrical bore 42, Figs. 4 and 6, wherein is located a spiral spring 43, and it has at its upper end the usual knob 44 by means of which the plunger 40 is operated. Near the lower end of the head 12 there is a sidewise-projecting boss 45, wherein is slidably arranged a cylindrical forming-block 46, which forming-block has a transverse slot 47, at its outer end wherewith engages the actuating lever 48, said lever 48 being pivoted in rearwardly-projecting lugs 49 formed on the upper end of the head 12, by pivots 54.

To the knob 44, and parallel with the plunger 40, there is attached a downwardly-projecting rod 50, which rod slides within a cylindrical bore 51, running parallel with, and at the side of, the bore in the head 12, a spiral spring 52 being located in said bore 51 for the purpose of returning the plunger to its normal position in conjunction with the spiral spring 43 in the bore of the plunger, as will hereinafter more fully appear.

The lever 48 has an arm 53, projecting toward the bore of the head 12, and the rod 50 has part of its body cut away at 55, so that the cross-section through said rod is approximately a semi-circle, thereby forming an upper shoulder 56, and a lower shoulder 57, on said rod. Now, when the plunger 40 is depressed a sufficient distance, the upper shoulder 56 will come in contact with the end of the arm or member 53 and depress it, thereby moving the lower end of the lever 48 outwardly, and with it the forming-block 46, a stop-pin 67 near the said forming-block and traversing the slot 47 therein being provided for this purpose. When the plunger 40 returns to its normal position, the forming-block remains in its withdrawn position until the lower shoulder 57 on the rod 50 reaches the member 53 and pushing it upwardly, reverses the operation of the lever 48 and returns the forming-block 46 to its normal position.

I shall now describe the mechanism that forms the wire into U-shape on the forming-block 46: A portion of the lower end of the

plunger 40 is cut away at 58, Figs. 4, 6, and 8, and the lower end of the bore 42 in the plunger is formed rectangular at 59, and the opposite walls of this rectangular portion are grooved at 60, said cut-away portion of the plunger allowing the forming-block 46 to enter the bore 42 of said plunger. In the forward end of this forming-block there is a slot 61, which is directly in line with the wire 25 as it enters the head of the machine. Now assuming a piece of wire of sufficient length were passed into the slot 61 and the plunger depressed until its lower end has reached this wire, the two ends thereof projecting from the forming-block will be downwardly bent and thus complete the formation of the staple 26 which staple will remain in the slot 61 of the forming-block 46 until the latter is retracted and leave the staple suspended in the grooves 60 until forced into the papers and clenched therein as will be hereafter described. In this connection I shall now describe the mechanism that cuts off the wire to proper length for the staple 26. On the lower end of the head 12, and at right angles to the boss 45, there is a second boss 62, Figs. 1 and 5, which has an internal screw-thread to receive an externally-screw threaded cylinder 63 through the central bore of which the wire 25 passes, as clearly illustrated in Fig. 5. On the outside of the plunger 40 there is located a curved bar 64, slidably arranged in a longitudinal groove 65 in the bore of the head 12. The lower end of this bar is hardened and when passing the inner end of the tube 63 cuts off the wire 25. As soon as this portion of the wire has been cut off, the wire-feeding mechanism commences to retract its course, and in order to accomplish this movement there is formed in the plunger a longitudinal slot 66, Fig. 5, wherein the end 68 of the member 24 operates. When the plunger 40 has started on its downward movement and has reached a position where it has cut off the wire 25, the upper shoulder of the slot 66 reaches the end 68 of the member 24 and depresses it, thereby moving the lever 15 backward to take a new bite on the wire 25, and when the plunger 40 retraces its movement this lever 15 remains in its then occupying position until the lower shoulder of the slot 66 reaches the end of the member 24 and moves it upwardly thereby pushing a new length of wire into the head to be cut off when the various movements heretofore described are repeated.

The setting and clenching of the staple are performed by the following mechanism: In the slot 69, Figs. 4 and 6, wherein the lever 48 is pivoted there is also pivoted a catch 70, upon a pin 71. This catch has in its edge an excision which forms shoulders 72 and 73, Fig. 9, which protrude into a

slot 74 in the plunger 40, the upper end of this catch, 75, being in close proximity of the outer end of the member 53. In the interior, cylindrical, bore of the plunger 40 there is a cylindrical block 76, which has an outwardly-projecting nose 77 near its upper end, and a transverse groove 78, Figs. 4 and 8, in the face of its lower end, this groove being in line with the center line of the wire 25. In its normal position the shoulder 73 of this catch 70 is in engagement with the nose 77 so that when the plunger 40 is being depressed this cylindrical block 76, which hereinafter shall be termed hammer, will be prevented from moving by the said catch, while at the same time the spiral spring 43 above the hammer is being compressed. When the member 53 is moving downwardly and has retracted the forming-block the outer end of said member 53 comes in contact with the curved end 75 of the catch 70 and pushing the same toward the plunger, releases the nose 77, the position of the various parts at that moment being illustrated in Fig. 6. The spiral spring 43 will now expand and force the hammer downwardly, the lower face of the said hammer will engage the suspended staple with its groove 78, and drive the staple through the papers interposed between the lower end of the plunger and a yielding clenching-block 79 located in the base of the machine and having the usual indentations 80 in its face to turn the ends of the staple to cause them to clench upon the said papers. The yielding-block 79 is secured within a comparatively heavy metallic body 81 located within the base 10 and which body serves as an anvil to absorb the shock or blow when the hammer strikes the papers upon the clenching-block. This block is made to yield by being suspended upon springs 82 wound upon a transverse rod 83 and bearing with one end upon ears or projections 84 on the anvil 81, and with their opposite ends against the inner surface of the base 10, as clearly shown in Figs. 3, 5, and 6. The clenching-block 79 has a shank 85, by which it is held in the anvil 81, and it is, therefore, removable from said anvil should it become necessary to renew the face of said clenching-block. In the head 12 there is a cut-out 95 on its lower end whereby the end of the forming-block 46 is exposed and whereby access may be had to the lower end of the bore of said head should this become necessary for any purpose. In order that the groove 78 in the end of the hammer 76 may be renewed should wear require the same, I have slotted the lower end of said hammer and placed into this slot a hardened steel blade 86, Figs. 4 and 6, which blade when worn, may be readily removed and replaced by a new one at a trifling expense.

It is a well-known fact that the coiling of

the wire upon the spool 35 has a tendency to curve the wire and since this curvature may prevent the wire from properly entering the groove 61, I have placed onto the arm 11 a hook 87, Figs. 1 and 7, which hook tends to curve the wire in one direction so that in entering the bore of the head, the wire will bend backward so that the forming-block when moving into the bore will push the end of the wire forward and thereby bring it into alinement and proper position for forming; and in order that the end of the wire may readily enter into the groove in the forming-block, the forward ends of said groove are outwardly flared, as clearly illustrated in the drawings.

It will now be observed that when the plunger 40 commences its downward movement the wire-feeding mechanism starts backward to take a new bite in the wire. As soon as the end of the cutter 64 passes the die it cuts off a piece of wire long enough to form a staple. Still further descending, the plunger forms the staple on the forming-block which has in the meantime entered the bore of the head. Continuing its descent the forming-block is retracted, and when finally the plunger reaches the limit of its downward movement, it liberates the hammer to force the staple into the papers and clench the same. Returning to its normal position by the action of the spring 52, all the parts of the mechanism remain in their described position until the lower end of the slot 66 in the plunger reaches the end 68 of the feed-lever 15 and pushing it upward, moves a new length of wire into the bore of the head. The hammer 76 recedes with the plunger on account of the projecting end 88 of the nose 77 meeting the lower end of a slot 89 in the plunger 40, which slot 89 is located diametrically opposite the slot 74 already mentioned and lifting the hammer. As soon as the end of the hammer and the plunger have passed the forming-block 46, (now retracted,) the lower shoulder 57 on the rod 50 has reached the end of the member 53, and pushing it upward, brings the forming-block back into the bore of the head, and straightens the wire and places it into proper position as described. In its ascent the plunger now reaches the point where the nose 77 strikes the projection 72 on the catch 70 and swings the end 73 underneath the nose 77, thus completing its upward movement and returning all parts to their normal position ready for a repetition of the operations described.

The plunger 40 is prevented from ascending beyond its limit by a nose 90 on the lower end of the lever 48 meeting the end of the slot 91 in the boss 45, and the lower edge of the member 53 meeting the lower shoulder of the rod 50.

It will now be further observed that this

wire-staple forming and setting machine is very portable, occupying scarcely more space than a hand-stamp, seal-press or similar office-fixture, and that it is comparatively
 5 simple in construction, but little liable to getting out of order, and that it is so arranged that those parts which are liable to wear may be readily repaired or renewed at small cost. As far as possible all the parts
 10 entering into the construction of this apparatus are either punchings, or such as to be easily and cheaply produced in quantities by machinery and that they can be assembled in a very short time.

15 While I have heretofore described this apparatus as being operated by a hand pushing on the knob on the plunger, I desire it understood that I do not wish to confine myself exclusively to this method of operating the machine, and that a hand-lever or a treadle or a motor may be attached thereto without departing from the scope of my invention.

In order that the clamping-device for the
 25 wire on the feeding, as well as the retarding mechanism may be released to insert a new wire, or for any other purpose, I have provided the bell-cranks 17 and 28 with rearwardly-projecting finger-pieces 97 and 98
 30 respectively, (see Fig. 1,) which finger-pieces when depressed, will release the wire 25, or permit of its insertion into the breaking and the feeding-mechanisms in a manner readily comprehended. And in order
 35 that the movements of the bell-cranks 17 and 28 be so limited that the spiral springs 22 and 32 may not be strained beyond their elastic limit, I have formed on the member 15 a projection 92, Figs. 1 and 5, and on the
 40 projecting boss 27 the stop-pin 32 already mentioned and a further stop-pin 93, as illustrated in Fig. 1.

Having thus fully described this invention, I claim as new and desire to secure to me by
 45 Letters Patent of the United States—

1. In a wire-staple forming and setting machine, the combination, with a base, arm and head, said head having a circular main bore and a circular auxiliary bore located at
 50 a distance from said main bore and running parallel therewith and being closed at its lower end, of a circular plunger in said main bore; a circular rod in the auxiliary bore and in operative connection with said
 55 plunger; a spring in the auxiliary bore below said rod; there being a circular bore in said plunger; a hammer in said plunger and adapted to move vertically therein; means for suspending said hammer in said
 60 plunger; a spiral spring above said hammer, and means for releasing said hammer at a predetermined point in the descent of said plunger.

2. In a wire-staple forming and setting
 65 machine, a base, an arm, and a head, said

head having a main bore open at both ends, an auxiliary bore running parallel therewith and closed at one end and a tubular branch bore at the lower end of said head; a plunger in the main bore and adapted to reciprocate therein; a rod in the auxiliary
 70 bore and in operative connection with the plunger, said rod being flattened to afford upper and lower shoulders thereon; a bell-crank pivoted at the upper end of said head
 75 and having one member entering the auxiliary bore at the flattened portion of said rod; a slidable forming block in the branch of the main bore and adapted to be moved into and out of the path of the plunger by
 80 said bell-crank, the second member of said bell-crank being in operative engagement with said forming block.

3. A wire-staple forming and setting machine including a base, an arm, and a head,
 85 said head having a circular bore provided with an angular longitudinal groove and an internally screw-threaded tubular branch bore at the lower end; an externally screw-threaded tubular die in said branch bore and
 90 adapted to be revolved and laterally moved therein; a plunger in said bore; a cutter having a hook at its upper end, there being a transverse groove on the outer periphery of
 95 said plunger adapted to engage said hook, said cutter being loosely placed in said transverse groove and adapted to move in the longitudinal groove in said bore.

4. In a hand-operated wire-staple forming and setting apparatus, the combination,
 100 with the base, arm and head of said apparatus, of wire-feeding mechanism; means for cutting off a predetermined length of wire, and staple-forming means, the latter comprising a plunger within said head; a
 105 downwardly-projecting rod on said plunger, said rod being flattened for approximately one-half of its diameter to afford upper and lower shoulders on said rod; a crank-lever pivoted to said head and having
 110 one member adapted for engagement with the flattened portion of said rod at said shoulders, and a slidable forming-block in the lower end of said head and in operative connection with said crank-lever, said slidable forming-block being slotted at the end
 115 which projects into the bore of said head to receive the wire which is to be formed into a staple, the engagement of one member of said bell-crank with the shoulders on said
 120 rod being such that said bell-crank is actuated in one direction after the plunger has commenced its downward movement, and in the opposite direction at the beginning of its upward movement.

5. In a hand-operated wire-staple forming and setting apparatus, the combination,
 125 with wire-cutting off mechanism, of staple-forming means, and staple-driving means, said forming means comprising a laterally- 130

movable forming-block; means for reciprocating said forming-block; a plunger adapted to operate the means for reciprocating said forming-block; a hammer in said plunger; means for suspending said hammer in said plunger, comprising a pivoted catch and means on said plunger adapted to engage said clutch, and means for releasing said hammer, said means for releasing said hammer being part of the means for reciprocating said forming-block.

6. In a hand-operated wire-staple forming and setting apparatus, the combination, with the head, of a reciprocating plunger in said head; a rod on said head having upper, and lower shoulders; a crank-lever pivoted to said head and having an arm adapted to be engaged by said shoulders; a catch pivoted in said head and provided with projecting members as described, and its upper end in close proximity to the end of said arm; a hammer within said plunger, and a projecting nose on said hammer

adapted to engage the lower projection on said catch whereby said hammer is suspended in said plunger during part of its downward movement and released at the moment when the plunger completes its downward course.

7. In a wire-staple forming and setting machine, a hollow base; a yielding anvil in said base and including a block having lugs projecting from two opposite sides thereof; springs adapted to engage said lugs with one end and the base with the other end; an aperture in the top-surface of said base, and a clenching block movable in said aperture, and removably secured to said anvil-block.

In testimony that I claim the foregoing as my invention I have hereunto set my hand in the presence of two subscribing witnesses.

WILLIAM CHARLES OSTERHOLM.

Attest:

MICHAEL J. STARK,
A. G. PETERSON.