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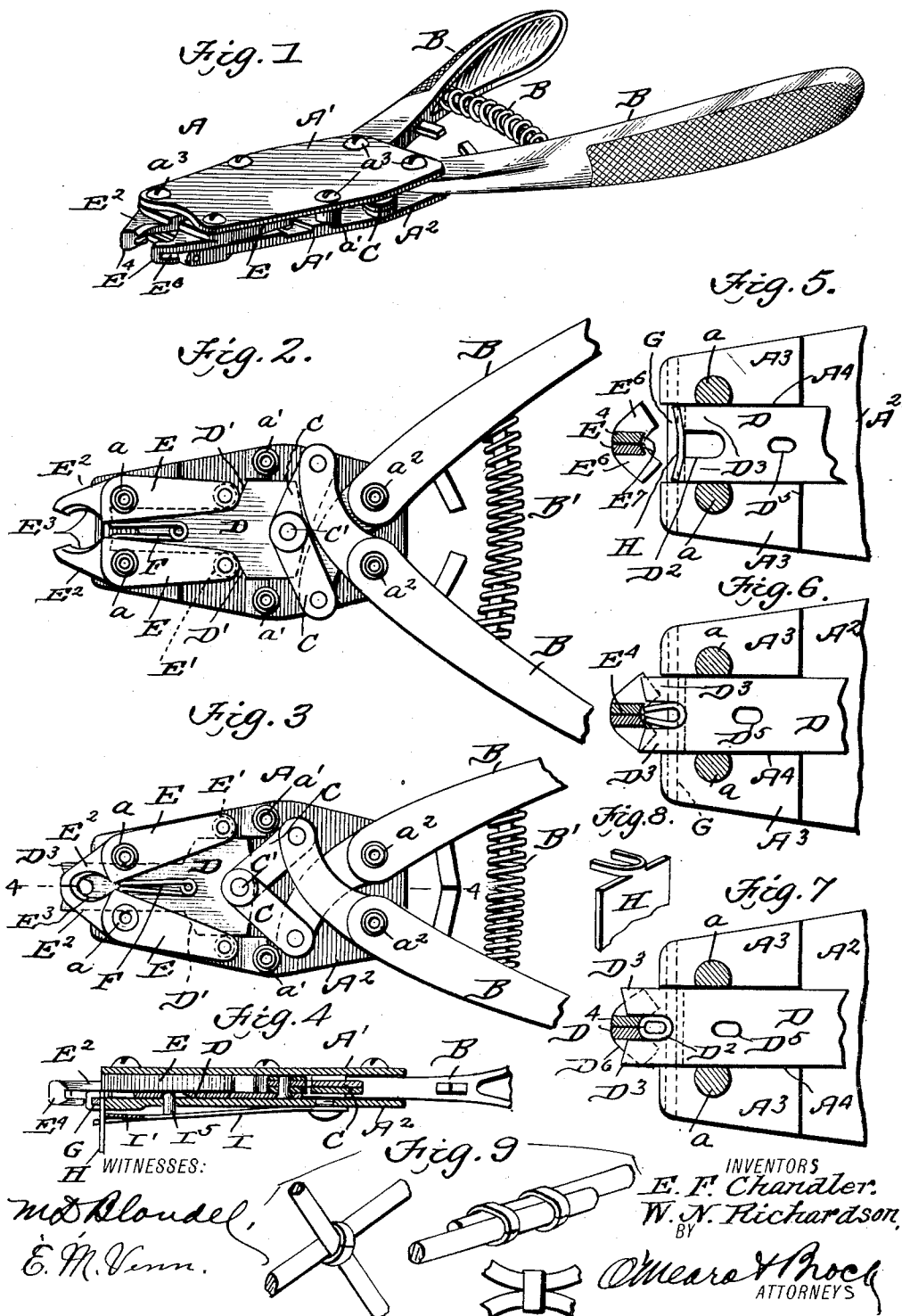
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PLIERS FOR CUTTING, FORMING, AND CLENCHING STAPLES.

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2 SHEETS—SHEET 1.



UNITED STATES PATENT OFFICE.

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PLIERS FOR CUTTING, FORMING, AND CLENCHING STAPLES.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that we, EDWARD FARRINGTON CHANDLER, residing at Brooklyn, in the county of Kings, and WILLIAM NEWTON RICHARDSON, residing at New York, in the county of New York, State of New York, citizens of the United States, have invented a new and useful Improvement in Pliers for Cutting, Forming, and Clenching Staples, of which the following is a specification.

This invention relates to an improvement in stapling-pliers, and particularly to a device for cutting, forming, and clenching staples around cross-wires at the point of intersection to securely and permanently lock them together.

The object of the invention is to provide a cheap, simple, strong, and durable tool that will cut a thin strip or bar from the end of a piece of metal, form it into a staple, and clench the staple around two or more wires.

Further objects of the invention are to provide an automatic feeding device for feeding the piece of metal into position to be operated upon by the cutter, to hold the metal against accidental displacement, and to limit its movement, so that the same breadth or thickness of all the loops is assured.

Still a further object is to provide an arrangement in which any one of the parts may be readily replaced should it become worn or broken and without the necessity of disturbing the remaining parts or causing the complete loss of the entire tool.

With these objects in view the invention also possesses certain novel features of construction and peculiar combination and arrangement of parts, as will be fully set forth in the following specification and pointed out in the claims, reference being had to the drawings, in which—

Figure 1 is a perspective view of a tool constructed in accordance with our invention. Fig. 2 is a plan view of the same with one of the plates of the head removed. In this view the clenching-arms are shown open and the cutting-blade withdrawn into the head. Fig. 3 is a similar view to Fig. 2, showing the clenching-arms and the cutting-blade moved to its extreme forward position. Fig. 4 is a longitudinal section drawn on the line 4 4 of Fig. 3. Figs. 5, 6, and 7 are detail diagram-

matic views illustrating the various steps in cutting a piece of metal and showing the manner in which the severed piece is clench-
Fig. 8 is a detail view of a portion of the piece of metal illustrating the staple before it has been entirely severed from the body portion of the metal. Fig. 9 shows details of various methods of clamping two wires together. Fig. 10 is a plan view of the head and of the opposite side to that shown in Fig. 1, illustrating the feed device. Figs. 11 and 12 are sectional side views drawn on the irregular line 11 12 of Fig. 10 of the drawings. Fig. 13 is a detail perspective view of the forward end of one of the plates of the head. Fig. 14 is a detail perspective view of the feeding device. Figs. 15 and 16 are detail views of the clenching-arms, and Fig. 17 is a detail perspective view of the cutting-blade.

In constructing a pair of pliers in accordance with our invention we provide a head A, which is formed of two elongated plates A' and A², between which are held the various parts of the device for cutting, forming, and clenching the staples. The plates are held some distance apart by sets of stud posts or bolts a a' a², which are preferably formed upon the plate A² and have their ends reduced to provide shoulders over and upon which rests the plate A', and the latter is securely held in position by screws a³, threaded into the posts.

Operating-lever handles B B are journaled intermediate their ends upon the posts a² at the rear end of the head, and to their extreme forward ends is connected one end of links C C, whose opposite ends are held upon a stud-bolt C', carried by a cutting-blade D. The blade D is of a greater width at its rear end than at its forward end to provide shoulders D' upon each side thereof, said shoulders acting as cams to operate clenching-arms, to be explained later on. The extreme forward end of the blade is bifurcated, as at D², to provide two cutting-fingers D³ D³, the ends of which are slightly beveled to produce a sheering cut when first engaging a piece of metal from which the staples are formed.

Pivottally held upon the posts a at the forward end of the head are clenching-arms E E, whose rear ends are apertured to receive the shanks of antifriction rollers or disks E' E',

which are normally held in engagement with the sides of the cutting-blade by a spring F, held between the arms and engaging them at points directly forward of the center of their pivots. The forward ends E² of the arms are reduced in thickness to provide nose portions, and each nose portion is tapered upon its outer edge and recessed upon its inner edge, as at E³, the said recesses providing a space for the wires to be clamped when the nose portions are brought together. Upon one side and at the extreme ends the nose portions are increased in thickness, as at E⁴, and each thickness is slotted to provide a throat or passage-way E⁵ for the fingers D³ of the blade when the latter is projected forwardly and after the fingers have severed the end of the piece of metal and when clenching the staples. The abutting ends of the nose portion provide an abutment for the end of the staple, and each is slightly recessed, as at E⁷, to provide a guide to prevent the ends of the staples buckling or being twisted out of alignment when being clenched.

The head-plate A² extends slightly beyond the plate A¹ at its forward end and is reinforced upon its inner face and upon each side edge of the plate, as at A³, and the space between the reinforcements forms a guide A⁴ for the forward end of the cutting-blade. The said end is also reinforced upon its outer face, and the front edge is recessed at A⁵, and communicating therewith are non-circular bores A⁶, formed in the extreme ends of the reinforcements. Fitting in the bores is a non-circular die-bar G, which with the end of the head-plate forms a guide-slot G' for the piece of metal H. In practice we propose to make the bore and the die-bar perfectly square in cross-section, so that the bar may be removed and turned when one edge becomes dull, and thereby utilizing all four edges of the bar.

To automatically feed the piece of metal H through the slot and into position to be operated upon by the cutting-blade, we employ a feeding device, (best illustrated in Figs. 10, 11, 12, and 14 of the drawings,) and from which it will be seen it comprises a spring-plate I, that is securely connected at one end to the plate A², preferably by a screw i, and at its forward end the plate is slotted at I' I' to produce a central gripping-tongue I² and two guide-fingers I³ I³, the latter extending beyond the end of the tongue and having their inner edges recessed, as at I⁴, into which fits the piece of metal H, so that the tongue will engage the broad surface thereof.

The plate I carries a pin I⁵, which extends through a slot I⁶ in the head-plate A² and normally rests in a slot D⁵ in the cutting-blade when the latter is in its rearmost position. The purpose of this peculiar arrangement and the general operation of the device will be best understood from the following general description.

A piece of metal H of even dimensions throughout its length is inserted in the end of the plate I and through the slot G' and is pushed therethrough until the end engages the clenching-arms. The tool is then ready for operation, and by grasping the handles B and inserting the nose portions of the clenching-arms over the wires to be fastened and pressing the handles together the cutting-blade is first brought into engagement with the sides of the end of the strip of metal H, which cuts and bends the ends forwardly. At the moment the cutting-blade is moved forwardly the shoulders will engage the anti-friction rollers or disks of the clenching-arms and throw the inner ends outwardly and the nose portions into engagement with one another and are held in this position against the tension of the spring F by the rollers engaging the broad end of the cutting-blade. As the blade continues to move forwardly the sides of the strip of metal are completely severed and the ends of the strip are bent forwardly into U-shape staples and remain in this position with the parallel portions resting against the inner edges of the fingers D. Then upon a continued movement of the blade the edge at the end of the bifurcation will engage the central portion of the metal and gradually shear it from the body portion. This action also bends the outer ends of the staple toward each other and throws them into position to engage the abutting ends of the nose portions. Now upon a continued movement of the blade the central portion will be completely cut off, and as the fingers project into the guideways or throats the staple will be formed into a complete loop, as shown in Fig. 7, and thus tightly clenching around the wires and securely clamping them together.

At the moment the edges of the metal are first cut and bent over the die-bar G the rear end of the slot D⁵ in the cutting-blade will engage the pin I⁵, carried by the plate I, which will throw the latter outwardly and move the tongue I² along the side of the body of the strip H, and the moment pressure is relieved upon the operating-handles the spring B' will throw them apart, which withdraws the cutting-blade into the head, and the spring F will throw the clenching-arms to open their outer ends, and when the slot D⁵ comes opposite the pin I⁵ the plate I will spring to its normal position and move the piece of metal H through the slot and into position, so that its extreme end may be again severed by the cutting-blade. From this it will be seen that the moment the end of the piece of metal is cut and the ends extended over the die-bar it is securely locked in position and will not be moved through the friction of the tongue when the latter is moved along its surface and into position to again feed the strip through the slot.

In Fig. 8 we show the end of the piece of metal after the ends have been cut and bent forwardly into U-shape form.

Having thus fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. A tool of the kind described comprising a cutting-blade, clenching-arms operated by the blade, and lever-handles operatively connected with the blade.
2. A tool of the kind described comprising a movable cutting-blade, clenching-arms operated by and coacting with the blade, lever-handles for operating the blade, and a feeding device operated substantially as specified.
3. A tool of the kind described comprising a movable cutting-blade, clenching-arms operated by the blade, lever-handles for operating the blade, and a feeding device operated by the blade and adapted for moving a piece of metal into the path of the cutting-blade.
4. A tool of the kind described, comprising a cutting-blade, arms coacting with the blade to clench a staple after it has been cut and formed by the cutter, lever-handles for operating the blade, and a feeding device operated by the blade.
5. A tool of the kind described comprising a head, a cutting-blade operating therein, lever-handles pivotally supported by the head and operatively connected with the cutting-blade, and clenching-arms operated by and coacting with the blade.
6. A tool of the kind described comprising a head, a cutting-blade operating therein, lever-handles pivotally supported by the head and connected to the blade, clenching-arms pivoted within the head and operated by and coacting with the cutting-blade, and a feeding device supported by the head and operated by the said blade.
7. A tool of the kind described comprising a head, having guideways therein, and a die-bar supported in one end, a cutting-blade movably retained in the guideways, lever-handles pivotally supported by the head and connected with the blade through the medium of links, clenching-arms pivotally held in the head, said arms being adapted for operation by and coacting with the cutting-blade, and a feeding device for feeding a strip of metal against the die-bar and in the path of the cutting-blade.
8. A tool of the kind described comprising a head, a cutting-blade slidably retained therein, lever-handles supported by the head for operating the cutting-blade, clenching-arms pivotally connected to the head and coacting with the cutting-blade, and means for feeding a piece of metal into the path of the cutting-blade.
9. A tool of the kind described comprising a head having a guide-slot therein, a cutting-blade operating in the head, lever-handles for

operating the blade, clenching-arms coacting with the blade, and means for feeding a piece of metal through the guide-slot and into the path of the cutting-blade.

10. A tool of the kind described comprising a head having a guide-slot, a blade slidably retained within the head, said blade having its forward end terminating in cutting-fingers, lever-handles for operating the blade, clenching-arms coacting with the blade, and a feeding device adapted for feeding a piece of metal through the guide-slot and into the path of the cutting-blade.

11. A tool of the kind described comprising a head having a guide-slot therein, a blade slidably retained within the head and having one end terminating in cutting-fingers, lever-handles for operating the blade, clenching-arms operated by and coacting with the blade, and a feeding device operated by the blade and adapted for feeding a piece of metal through the slot into the path of the cutting-blade.

12. A tool of the kind described comprising a head having a recess in its forward end and apertures communicating with the recess, a die-bar held in the apertures and forming with the end of the head a slot adapted to receive a strip of metal, a cutting-blade slidably retained within the head and having one end terminating in cutting-fingers and its opposite end enlarged to provide cam-surfaces, lever-handles pivotally connected to the head, links connected to the handles and the blade, clenching-arms pivotally held in the head and having one end adapted for engagement with the sides of the cutting-blade, said arms being adapted to coact with the cutting-blade, and a feeding device operated by the blade for feeding a piece of metal through the guide-slot.

13. A tool of the kind described comprising a head consisting of two plates which are held apart by stud-bolts, one of the said plates having a guideway therein, a die-bar held in the plate and forming with the end of the latter a guide-slot adapted to receive a piece of metal, a cutting-blade slidably retained in the guideway, said blade having one end terminating in cutting-fingers, lever-handles pivotally retained between the plates, links connecting the handles and cutting-blade, clenching-arms pivotally held between the plates and having their forward ends extending beyond the end of the head and terminating in nose portions, and their rear ends provided with antifriction-rollers which engage the sides of the cutting-blade, and a feeding device operated by the blade, substantially as specified.

14. A tool of the kind described comprising a head having a guide-slot adapted to receive a piece of metal, a blade operatively held within the head, clenching-arms carried by the head and operated by and coacting

with the blade, said arms having nose portions at one end which are provided with passage-ways, cutting-fingers formed upon the blade and adapted for engaging a piece of metal to cut and form a staple and press it into engagement with the said nose portion of the arms to bend or clench the said staple, and lever-handles for operating the blade.

15. A tool of the kind described comprising a head having a guide-slot formed therein, a cutting-blade operatively held in the head, clenching-arms operated by and coacting with the blade, levers for operating the blade and a feeding device carried by the head and adapted for feeding a piece of metal through the guide-slot, said feeding device comprising a spring-plate having a central tongue portion at one end which is adapted to engage a piece of metal, guide-recesses to receive the side edges of the metal, and a pin carried by the plate and projecting into the head and into a slot formed in the blade.

16. A tool of the kind described comprising a head having a guide-slot, a blade operating in the head and having one end terminating in cutting-surfaces, clenching-arms pivotally held in the head and having their forward ends terminating in nose portions which are extended beyond the end of the head and coact with the cutting-surfaces of the blade as specified, cam-surfaces formed upon the blade for operating the arms, lever-handles for operating the blade, and a feeding device operated by the blade.

17. A tool of the kind described comprising a head having one end provided with non-circular bores which communicate with a recess formed in one end of the head, a non-circular die-bar held in the bores and extending across the recess to form a guide-slot, a cutting-blade slidably retained in the head and adapted to move across the guide-slot, clenching-arms held in the head, said arms being operated by and coacting with the cutting-blade for the purpose specified, lever-handles carried by the head for operating the cutting-blade, and a feeding device operated by the blade and adapted for moving a piece of metal through the guide-slot.

18. A tool of the kind described comprising a head consisting of two plates, one of which has a series of stud-bolts projecting therefrom, and to which the opposite plate is held, one of the said plates being reinforced at one end, and the central portion cut out, a die-bar held in the said end and extending across the cut-out portion to form, with the end of the plate a slot that is adapted to receive a piece of metal, a cutting-blade slidably retained in the head, lever-handles pivotally held in the head for operating the said blade, clenching-arms pivotally held in the head and having their forward ends terminating in nose portions which are provided with guideways and their rear ends provided

with rollers to engage the sides of the cutting-blade, cam-surfaces formed upon the sides of the blade, a spring for holding the rollers in engagement with the side of the head, and a feeding device carried by the head and operated by the cutting-blade.

19. A tool of the kind described comprising a head, a cutting and staple-forming blade operating therein, and a feeding device for feeding a strip of metal to the cutting-blade, said feeding device comprising a plate of spring metal which is secured at one end to the head and having guideways at its opposite end, a spring-tongue that is adapted for engagement with the strip of metal, and a pin for engagement by the cutting-blade, substantially as set forth.

20. A tool of the kind described comprising a head having a cutting and staple-forming blade operating therein, and a feeding device for feeding a piece of metal to the blade and from which the staples are formed, said feeding device comprising a plate of spring metal having a tongue portion and guides for engagement with the metal, and means operated by and coacting with the said cutting and staple-forming blade for clenching the staple, substantially as specified.

21. A feeding device for pliers of the kind described, comprising a plate of spring metal having one end slotted to produce a central tongue portion, and two side fingers which are of a greater length than the tongue portion and having recesses upon their inner edges at the end of the tongue.

22. A tool of the kind described comprising a head having a guide-slot that is adapted to receive a strip of metal, a cutting-blade operating in the head and adapted for severing the end of the metal and forming it into a staple, a pair of clenching-arms coacting with the cutter, said arms having their outer ends provided with guideways to receive the ends of the cutter, and also having abutting surfaces to engage the ends of the staple when pressed into engagement therewith by the cutter.

23. A tool of the kind described comprising a head, a pair of arms journaled therein and adapted for holding two cross-wires together at the points of their intersection, a cutting-blade adapted for cutting the end of a piece of metal and forming it into a staple and bending the said staple around the wires at the points of intersection, said blade also coacting with the arms for clenching the staple.

24. A tool of the kind described, comprising a head that is adapted to receive a strip of metal, arms pivotally held in the head and having their ends extending beyond the head, their outer edges tapered and their inner edges recessed and beveled, said arms being adapted to encircle and hold two cross-wires at their points of intersection, a

cutting-blade operating in the head, said blade having one end provided with two cutting-fingers, and handles for operating the blade to sever the end of the metal and bending the severed end in U-shaped staples, passing the staples around the wires at their points of intersection and coacting with the arms to clench the staples.

25. A tool of the kind described comprising a head adapted to receive a strip of metal, arms pivotally held in the head and having one end projected beyond the end of the head, the inner edges of said arms being recessed and adapted to encircle two cross-wires at their points of intersection when the outer ends of the arms are brought together, a blade operating within the head and having fingers that are adapted to sever the end of the piece of metal and bend the severed ends over the wires at the points of intersection, the said blade being adapted to entirely sever the end of the metal after the ends have been extended over the wires and coacting with the arms for clenching the staple around the wires, and means for operating the cutter.

26. A tool of the kind described, comprising a head adapted to receive a strip of metal, arms pivotally held in the head, said arms having one end projected beyond the head and the projected ends being recessed upon their inner edges, a blade operating within the head and adapted for operating the arms to bring their outer ends together, said blade having cutting-fingers which are adapted for first cutting the end of the metal upon opposite sides and bending the severed portions into parallel relation, said blade being also adapted to completely sever the end to form a staple and coacting with the arms to clench the staple, substantially as specified.

27. A tool of the kind described, comprising a cutting-blade, clenching-arms operated by and coacting with the blade, and means for operating the said blade.

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Witnesses:

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