No. 621,416. Patented Mar. 21, 1899.

G. L. HOXIE.

DEVICE FOR TYING INTERSECTING WIRES.

(Application filed Oct. 8, 1898.)

(No Model.)

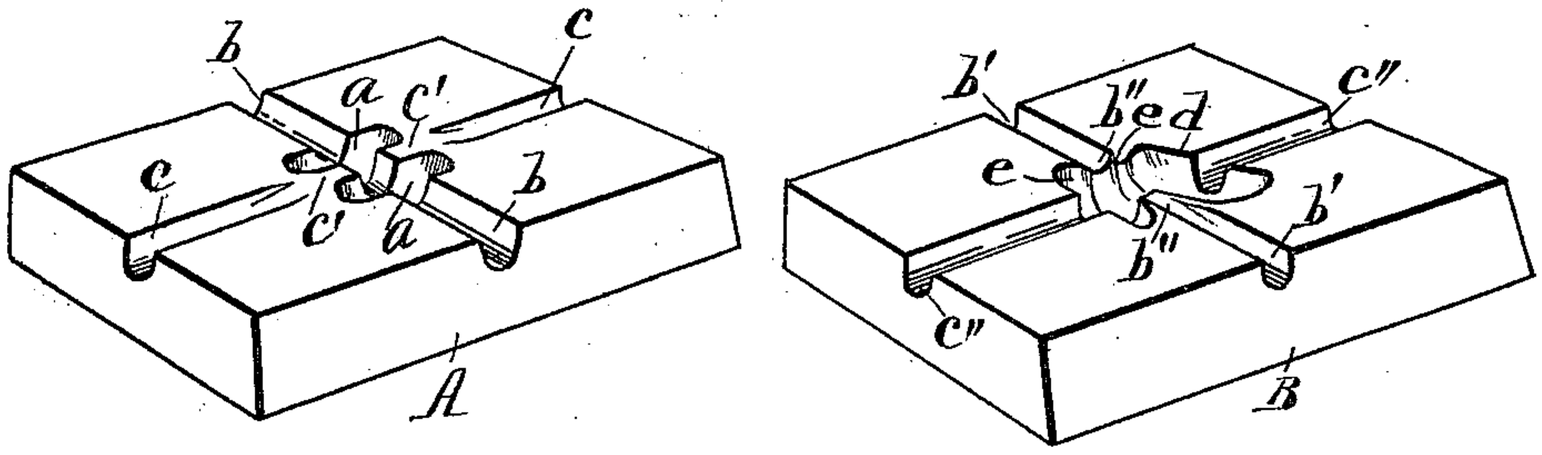

Fig. 1.

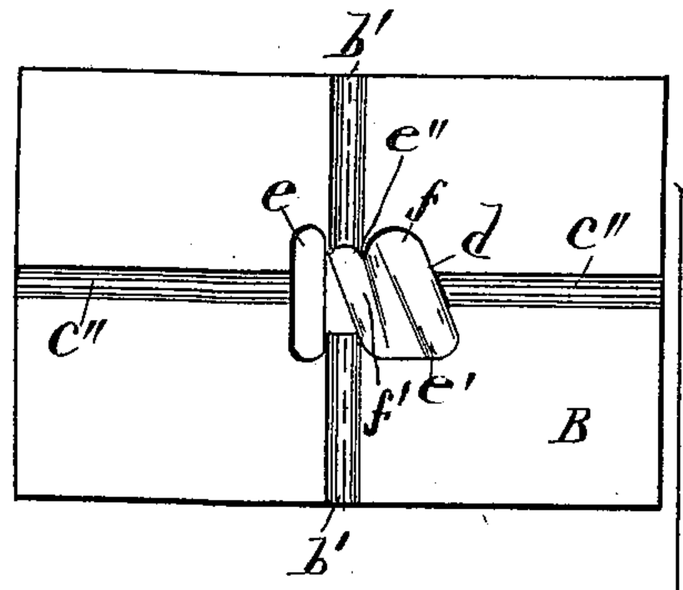

Fig. 2.

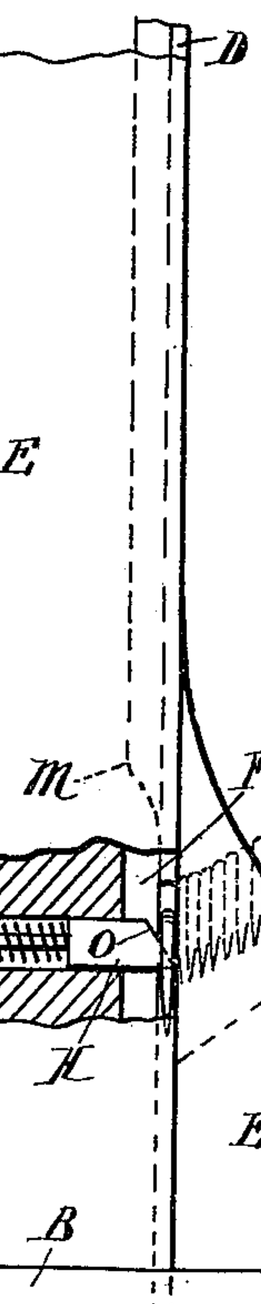

Fig. 5.

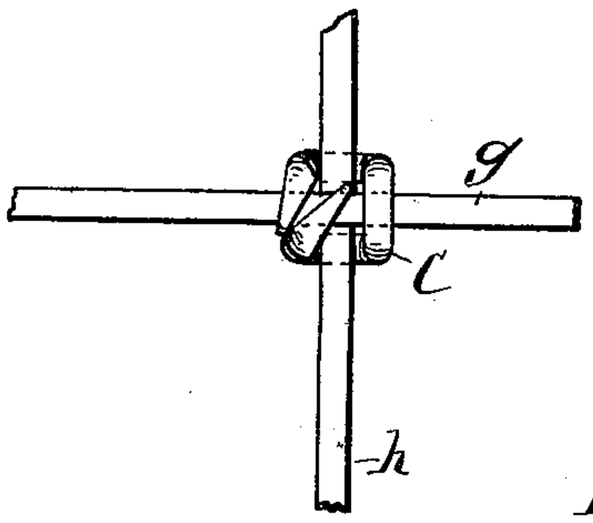

Fig. 6.

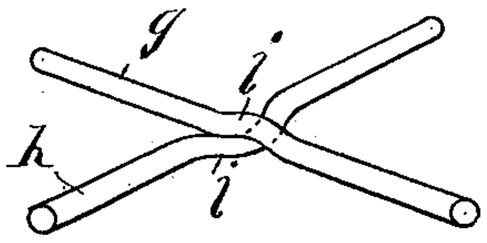

Fig. 7.

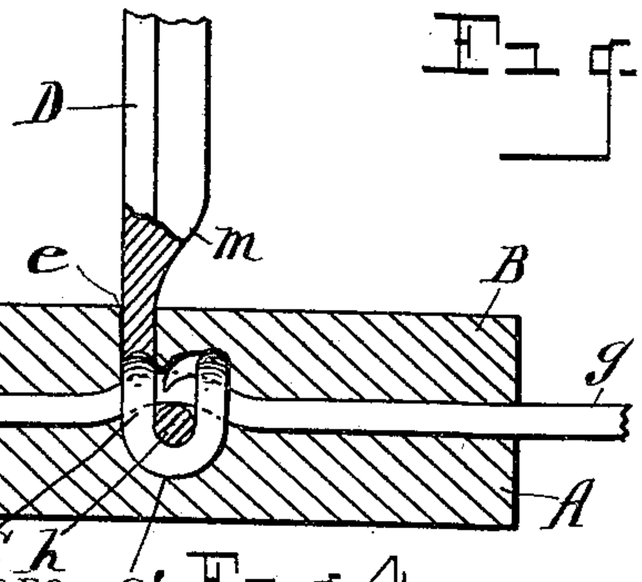

Fig. 4.

WITNESSES

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UNITED STATES PATENT OFFICE.

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DEVICE FOR TYING INTERSECTING WIRES.

SPECIFICATION forming part of Letters Patent No. 621,416, dated March 21, 1899.

Application filed October 8, 1898. Serial No. 692,978. (No model.)

To all whom it may concern:

Be it known that I, GEORGE L. HOXIE, a citizen of the United States, residing at Adrian, in the county of Lenawee, State of Michigan, have invented certain new and useful Improvements in Devices for Tying Intersecting Wires; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to wire-working; and it consists in providing novel means for tying intersecting wires, as hereinafter more fully set forth, and pointed out particularly in the claims.

The objects of the invention are to provide simple and efficient means for crimping the intersecting wires in a wire fence or other wire fabric and in forcing a staple or looped blank around said wires at their point of crossing in such manner as to firmly unite them and obviate any lateral movement thereof. These objects are attained by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a perspective view of the lower die employed in uniting the intersecting wire strands, showing its upper recessed face. Fig. 2 is a like view of the upper die, showing its under recessed face, which is adapted to lie contiguous to and register with the upper face of the lower die. Fig. 3 is a plan view of the under face of the upper die shown in Fig. 2. Fig. 4 is a sectional view through the dies placed with their recessed faces together, showing the wire strands crossing between said dies, the tying or uniting staple forced around said strands at their point of crossing, and the reciprocatory plunger employed to force said staple into position. Fig. 5 is a detail in elevation, parts of which are broken away, showing the forming-dies in position and a vertically-movable standard to which the upper die is attached, showing the staple-driving plunger mounted in said standard, the feeding of the staples into the path of said plunger, and a spring-actuated detent mounted in said standard and adapted to arrest each successive staple and retain it in the path of said plunger. Fig. 6 is a plan view illustrating the result of the operation of my device, showing two strands of wire crossing at right angles and tied at their point of crossing. Fig. 7 is a view showing the cross-strands of wire crimped at their point of crossing by the operation of bringing the dies together prior to the tying of said cross-wires by means of the staple.

Referring to the letters of reference, A designates the lower die, which is preferably formed of a block of steel rectangular in shape and may be mounted upon any suitable support. (Not shown.) Formed in the upper face of said die, near the geometric center thereof, are two approximately parallel recesses *a*, oblong in form and having a semicircular bottom, as shown at *a'* in Fig. 4.

Crossing the face of the die A at right angles are the half-round channels *b* and *c*, respectively. The channel *b* crosses the recesses *a* centrally, while the channel *c* crosses between said recesses. It will be noticed that as the channel *c* reaches the line of intersection of the channel *b* it gradually decreases in depth until at a point *c'* between the recesses *a* the bottom of said channel is flush with the face of said die, the purpose of which, in conjunction with the operation of the upper die hereinafter explained, is to crimp the cross-wire lying in the channel *c*.

The upper die B is provided in its under face with a single central recess *d*, a portion of which recess stands at an angle to the square of said dies. Crossing the under face of the die B at right angles are the channels *b'* and *c''*, which when the dies are placed with their forming-faces together are adapted to coincide with the channels *b* and *c* and together with said channels form confining-ways which receive the cross-wires of the fabric. The channel *c''* crosses centrally through the recess *d*, while the channel *b'*

crosses said recess near one end thereof and adjacent to the slot *e*, passing through said die, said channel *b'* decreasing in depth as it approaches said recess until at a point *b''* it becomes very shallow or quite extinct, the purpose of which is to crimp the wire lying in the channel *b'* when the dies are brought together with the cross-wires between them.

The recess *d* in the under face of the die B is concave, so as to render its opposite walls rounding, and said recess is partially divided by the raised beads or ribs *e' e''*, projecting from opposite sides of said recess, forming a diagonal way *f* at one end of said recess and a diagonal way *f'* at the opposite end thereof.

The slot *e*, passing through the die B, communicates with the recess *d* and is adapted to receive the staple and direct it downward, with its legs astride of the cross-wire *g*, lying in the way formed by the union of the channels *c c''* in the opposed faces of said dies.

In the operation of this device the dies are brought together upon the crossed strands of the wire, so that said strands are confined in the ways formed by the coinciding channels *c c'' b b'* in the meeting faces of said dies. The dies are caused to so register as to bring the slot *e* in the upper die in alinement with one end of the opposed recesses *a* in the lower die, so that when the staple C is entered in said slot its legs will strike the curved walls at one end of said recesses, so that when forced downward by the following plunger D the legs of said staple are caused to follow the curve of the recesses *a* and are thereby directed upward around the cross-wire *h* and astride of the cross-wire *g*. The legs of the staples as they turn upwardly are directed into the recess *d* in the upper die, one of said legs entering the diagonal way *f* at one side of said recess and the other leg entering the diagonal way *f'* at the opposite side of said recess, so that the extreme ends of the legs of the staple in following said ways are folded over the cross-wire *g* in opposite directions, so as to lap past each other, as clearly shown in Figs. 3 and 4, whereby by the downward stroke of the plunger D said staple is caused to form itself around said cross-wires in the manner described, tying them firmly together. Said cross-wires having been previously crimped at their point of crossing, as shown at *i*, by the operation of bringing the dies together are not only firmly united by the tying-staple, but are held firmly against lateral displacement.

In carrying out my invention I prefer to attach the upper die B to a standard E, which is adapted to have vertical movement, so as to separate said dies to enable the passing of the fabric thereunder and again bring said dies together to crimp the wires between them, said standard being provided with an extended wing E', to which said upper die is attached to more firmly support it in its operation. In the face of the standard E is a way F, in which the plunger D is adapted to reciprocate vertically, being operated by any suitable means. Communicating with said way F is an inclined plane G, which affords a slide down which the staples C are directed against the spring-actuated detent H, mounted in said standard and having its beveled point *o* projecting into the path of the plunger D. The detent arrests the staple, so as to be engaged and carried downward by the plunger D, traveling in the way F. As said plunger moves downward the inclined shoulder *m* thereon engages the beveled end of the detent H and crowds said detent out of its path. Upon the return of said plunger the detent is forced outward by the spring H', so as to engage the succeeding staple and hold it in position to be carried downward by the next descent of said plunger.

It will be understood that a series or gang of dies and plungers may be employed to operate simultaneously, so that a number of intersecting strands may be tied at one operation.

Having thus fully set forth this invention, what is claimed is—

1. In a device for the purpose set forth, the combination of the lower die having in the upper face thereof two oblong recesses spaced some distance apart and provided with rounded bottoms, the upper die having a central concaved recess in its under face divided by diagonal ribs, said upper die being also provided with a slot therethrough which communicates with one end of said central recess, said slot in said upper die registering with one end of the oblong recesses in the lower die to direct the legs of the staples therein.

2. In a device for the purpose set forth, the combination of the lower die having a recess therein and transverse channels crossing its face at right angles, the upper die having a recess in its under face and transverse channels crossing its under face and said recess at right angles, said recess provided with a diagonal way at each end thereof, said upper die having a slot formed therethrough at one end of said recess.

3. In a device for the purpose set forth, the combination of the opposed dies having in their meeting faces right-angled channels adapted to register one with the other, one of said channels in the face of each die being of lesser depth near its longitudinal center whereby said dies are adapted to embrace and crimp cross-wires lying between them at their point of crossing, said dies having recesses in their opposed faces through which said channels pass adapted to receive and direct a staple around said wires.

4. In a device for the purpose set forth, the combination of the upper and lower die adapted to receive and confine cross-wires and having recesses in their opposed faces adapted to receive a tying-staple, a vertically-movable standard having the upper die mounted there-

on, said standard having a way therein, a vertically-movable plunger in said way, said plunger having an inclined shoulder, a staple-feeding device for delivering staples into the path of said plunger, a spring-actuated detent adapted to arrest and maintain said staples in the way of said plunger, which detent is adapted to be depressed by a downward movement of the plunger and returned to its normal position as the plunger is withdrawn.

In testimony whereof I sign this specification in the presence of two witnesses.

GEORGE L. HOXIE.

Witnesses:
IRA WATERMAN,
WILLIAM H. SHEARSON.