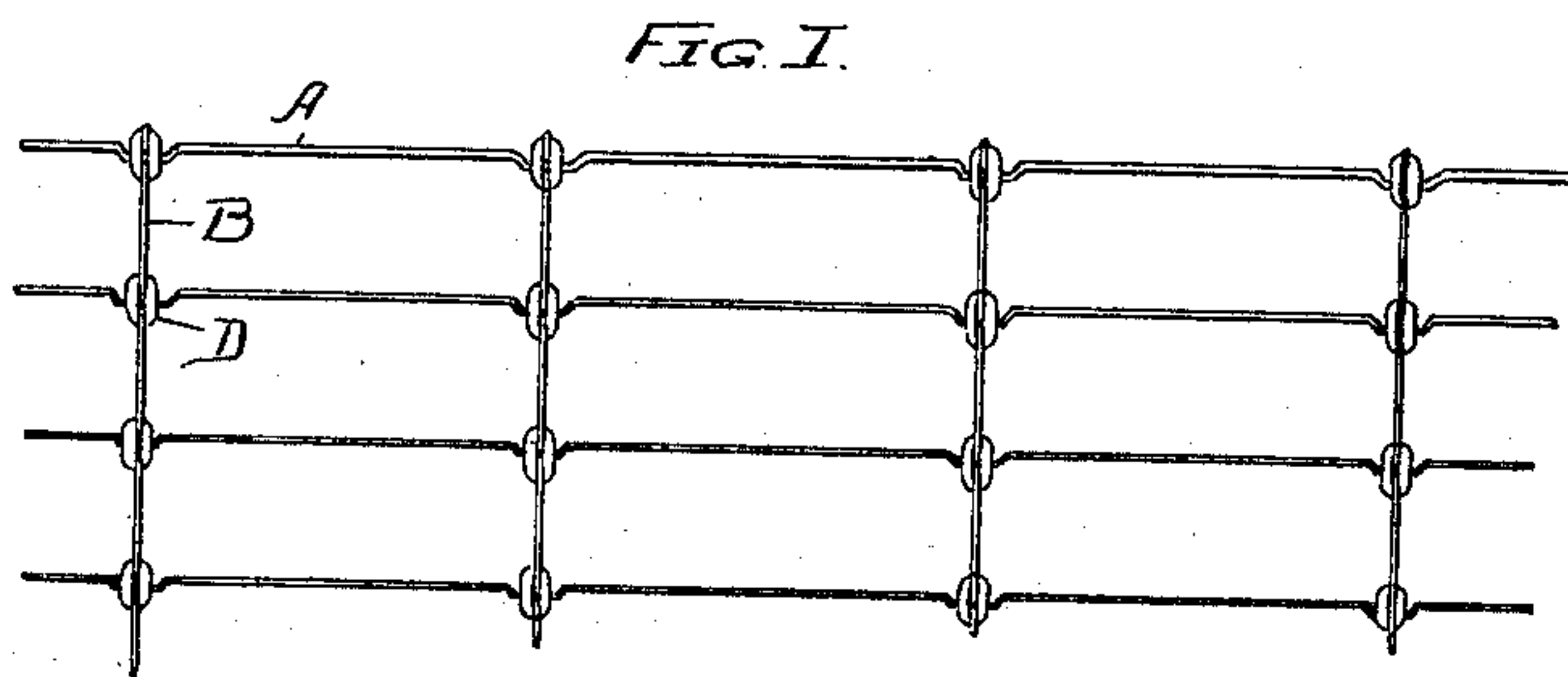
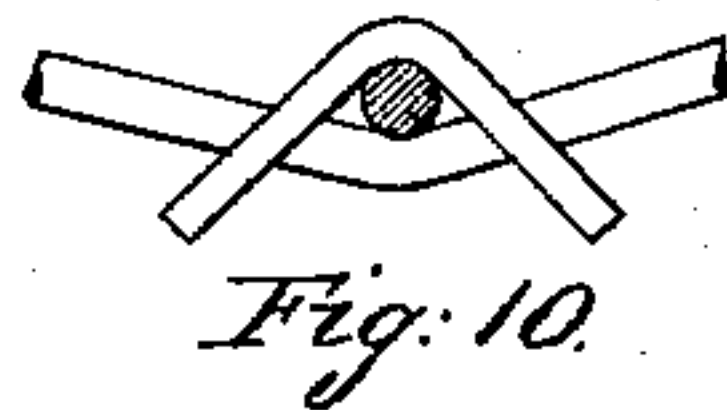
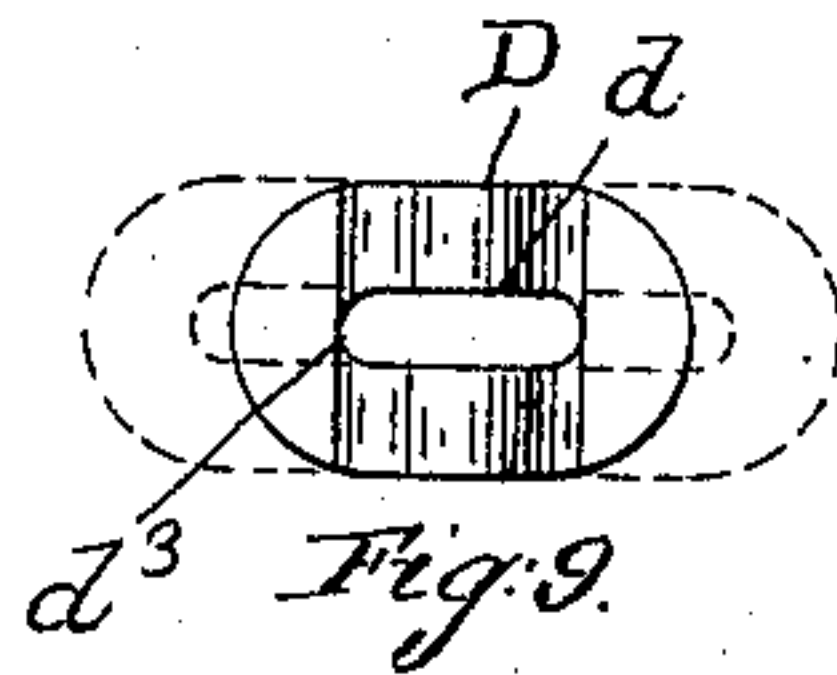
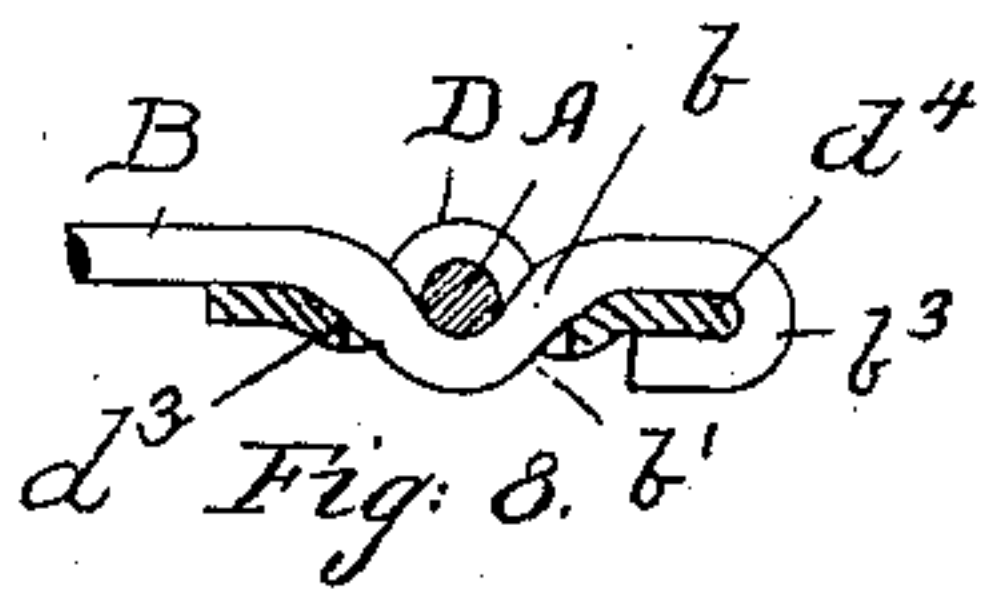
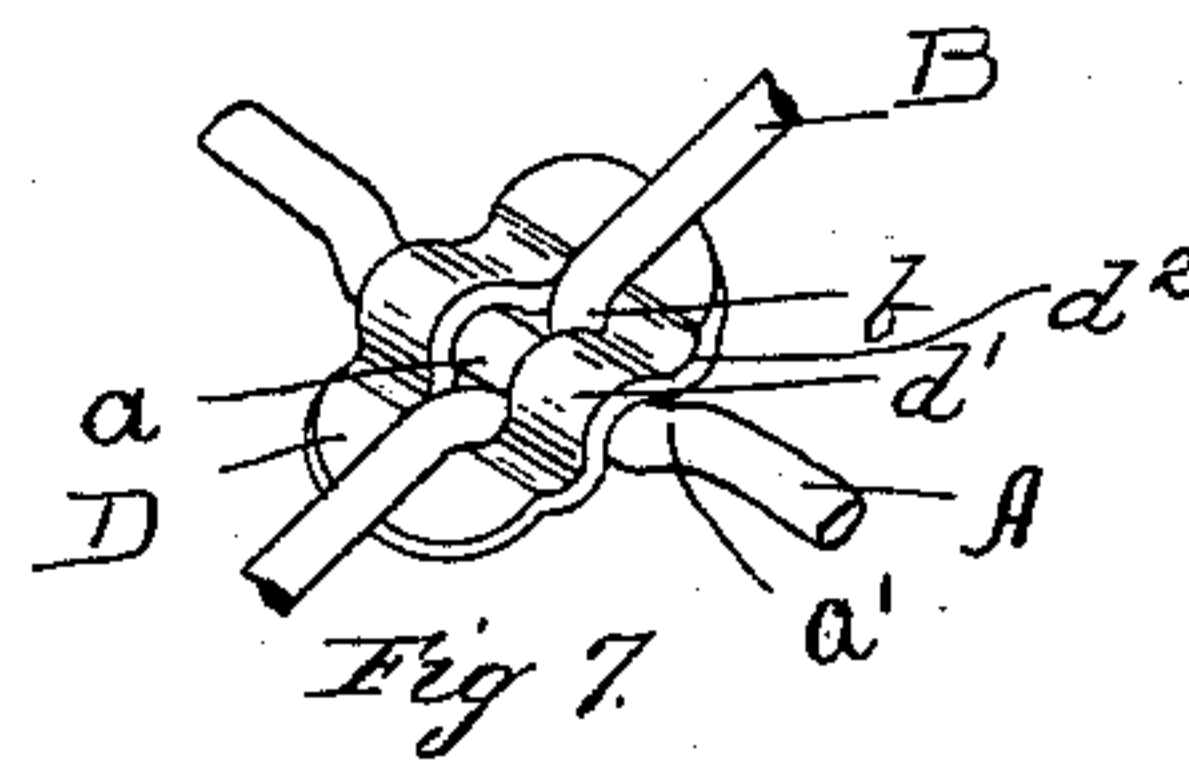
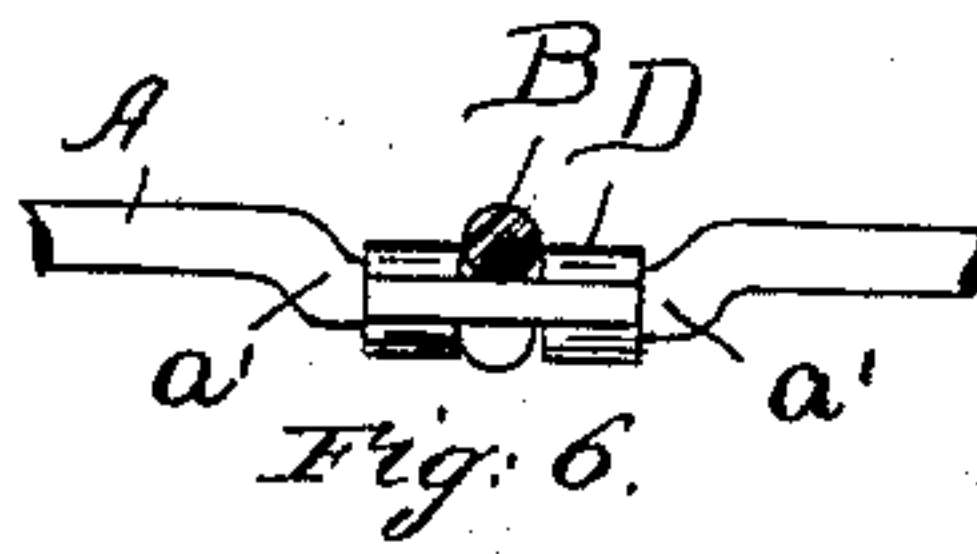
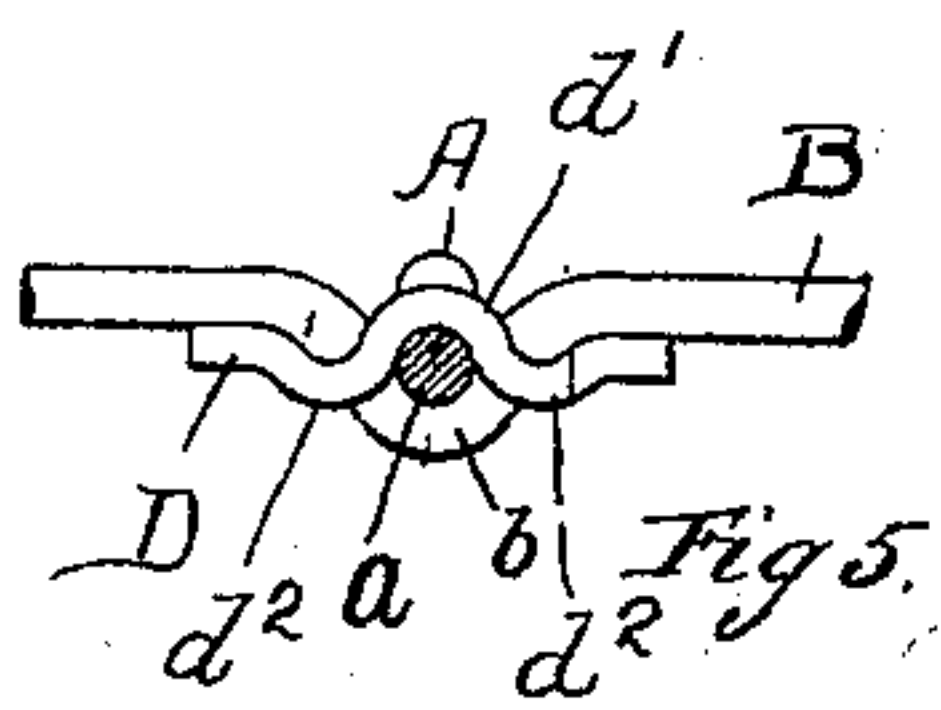
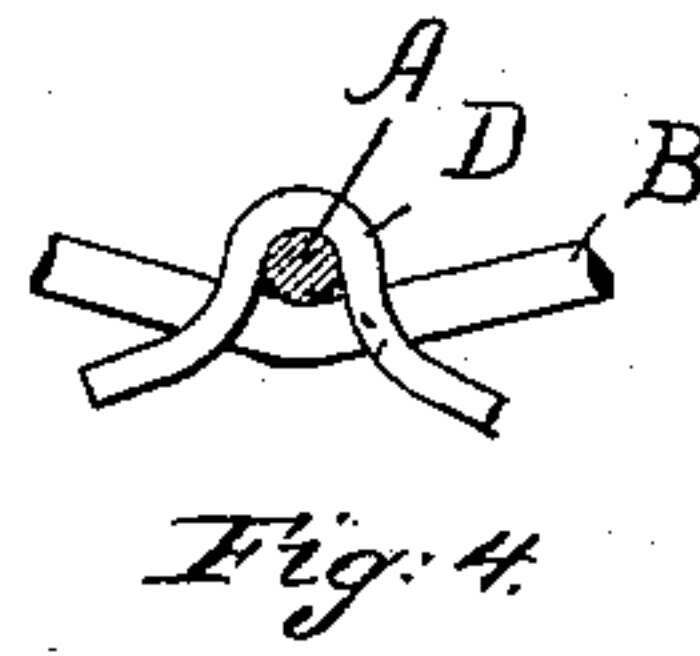
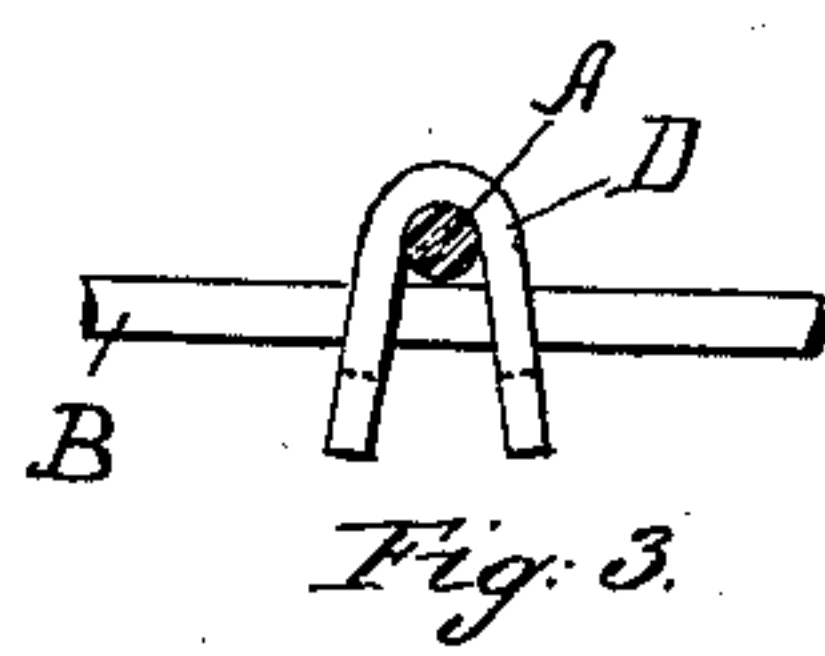
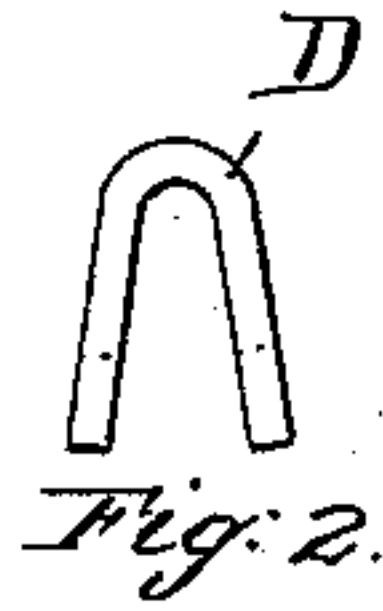
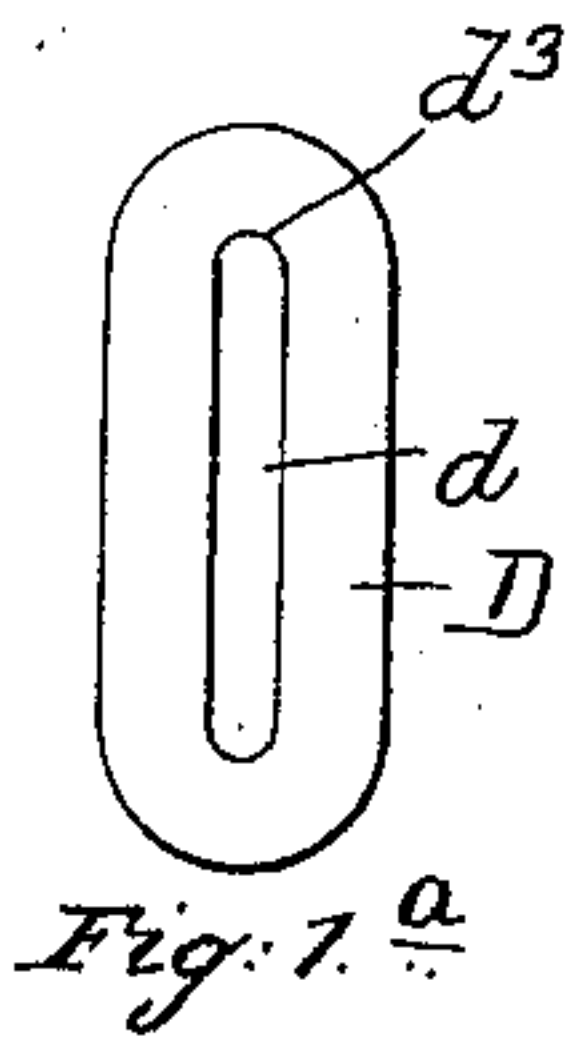


(No Model.)

C. E. ROBINSON.  
WOVEN STAY WIRE FENCE.

No. 596,544.

Patented Jan. 4, 1898.



Witnesses:  
H. M. Munday,  
Geo. C. Curtis

Inventor:  
Cory E. Robinson.  
By Munday, Everts & Adcock,  
his Attorneys.



# UNITED STATES PATENT OFFICE.

CORY E. ROBINSON, OF CHICAGO, ILLINOIS.

## WOVEN STAY WIRE FENCE.

SPECIFICATION forming part of Letters Patent No. 596,544, dated January 4, 1898.

Application filed May 15, 1897. Serial No. 636,782. (No model.)

*To all whom it may concern:*

Be it known that I, CORY E. ROBINSON, a citizen of the United States, residing in Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Woven Stay Wire Fences, of which the following is a specification.

My invention relates to improvements in woven or stay wire fences, and more particularly to improvements in the particular kind of woven or stay wire fences wherein the upright crossing or stay wires are secured to the longitudinal or stringer wires by sheet-metal clips. The utility and efficiency of such fences depend in a very large degree upon the firmness and rigidity with which the longitudinal and stay wires are secured or clamped together at their crossings, because if firmly and rigidly clamped together all the wires, upright and longitudinal, will mutually coöperate and support, strengthen, and stiffen each other, and thus produce a structure as a whole of great strength and rigidity. While, on the other hand, if the wires are not firmly and rigidly clamped together at their crossings, the fence or structure as a whole will be loose and shackly and easily distorted out of shape and its utility and efficiency as a fence greatly impaired.

The object of my invention is to provide a simple and efficient construction of stay-wire fence capable of being rapidly and cheaply manufactured by automatic machinery, wherein the stay and longitudinal wires are secured together at their crossings by metal clips and in which the stay and longitudinal wires will each and both be firmly locked in every direction from moving, slipping, or turning in respect to the other and in which the metal clips will embrace and clamp together with great firmness, strength, and rigidity the stay and longitudinal wires, so that the fence or structure as a whole will possess great strength and effectiveness and not be liable to be injured or distorted out of shape to whatever force or violent action it may be subjected in use. With the metal-clip stay-wire fences heretofore known if, for example, a person should attempt to climb up or over it by stepping up on the successive longitudinal wires, as one climbs up or over an ordinary board fence, the result

would be to distort the wires out of shape, owing to the looseness of the joints or crossings of the wires; but in my improved fence the construction of the metal clips and of the wires and their crossings is such as to clamp and bind the wires together with great firmness and rigidity, so that each and every wire supplements the others, and no injury or distortion of the fence or fabric as a whole can take place under any ordinary usage to which it may be subjected. To secure these important results and at the same time enable the fence to be capable of being rapidly and cheaply manufactured by automatic machinery, I construct it as follows, and herein my invention consists: The metal clip is provided at its middle portion with a U-shaped bend partially encircling and embracing the fence-wire and a longitudinal slot at right angles to the U-shaped bend through which a kink or bend in the stay-wire projects. The fence-wire is provided with angular bends at each edge of the metal clip, and the clip is provided with a reverse curve at each side of the U-shaped bend therein to shorten the length of the clip and cause the ends of the slot to firmly, shortly, and closely embrace the bend or kink in the stay-wire, the parts being all firmly stamped or pressed together. By this means the central slot in the metal clip may be made long enough to allow sufficient play or margin to readily admit of the stay-wire being fed through it by automatic machinery, so that the fence may be rapidly and cheaply manufactured, while at the same time the clip is locked from moving in either direction on the longitudinal wire and from turning at an angle in respect thereto, and the clip is locked from sliding or moving in either direction in respect to the stay-wire or from turning at an angle in respect thereto, and the fence-wires are locked from moving or turning in any direction in respect to each other, and all the parts are firmly and rigidly clamped and secured together, so that there is no looseness of any sort at the joint either in respect to a slipping or to a turning or angular movement of the several parts in respect to each other. All the parts of the fence—all the longitudinal wires, all the stay-wires, and all the metal clips—at all the crossings being thus firmly and rigidly united to-



gether, each and every wire or part of the fence reinforces, strengthens, and stiffens every other wire or part by the mutual coöperation of the parts together, thus producing a fence or structure as a whole of great strength, rigidity, and effectiveness.

In the accompanying drawings, forming a part of this specification, I have shown at Figure 1 in side elevation a short section of a woven or stay wire fence embodying my invention. Fig. 1<sup>a</sup> is a detail plan view of the sheet-metal clip in the flat. Fig. 2 is a detail edge view of the clip, showing its form at the time it is placed astride of the fence or longitudinal wires and the stay or upright wires threaded through its longitudinal slot. Fig. 3 is a detail view showing the form of the parts just after the stay-wire is threaded through the sheet-metal clip. Fig. 4 is a view similar to Fig. 3, showing the parts after the clip is partially bent or spread out and the kink or bend partially formed in the stay-wire. Fig. 5 is a detail view of the completed joint, the fence or longitudinal wire being shown in cross-section. Fig. 6 is a view of the completed joint, the stay-wire being shown in cross-section and the fence-wire in elevation. Fig. 7 is a perspective view of the completed joint. Fig. 8 is a detail view similar to Fig. 5, showing the finish or joint at the top of the fence, the free upper end of the stay-wire being bent over the upper edge of the clip. Fig. 9 is a diagrammatic view illustrating by the dotted lines the shortening of the clip by the operation of producing the reverse curves therein. Figs. 10 and 11 are diagrammatic views intended to illustrate the inevitable weakness and looseness at the joint resulting from an omission of the reverse curves in the metal clip.

In said drawings, A A represent the longitudinal or fence wires, B B the upright or stay wires, and D D the sheet-metal clips by which the stay-wires are secured together. The fence-wires A are provided with an easy bend at each stay-wire crossing, comprising a straight portion *a* equal in length to the width of the clip D and two angular or curved portions *a'* *a'* at each side thereof extending from the edge of the sheet-metal clip. The stay-wire B, as will be readily seen from Fig. 5, is provided at each crossing with the fence-wires with a sharp bend or kink *b*, fitting and embracing the fence or longitudinal wire and corresponding in curvature to the diameter or curvature of the fence-wire itself in cross-section, as will be readily understood from Figs. 5 and 6. The metal clip D is provided with a central longitudinal slot *d*, with a U-shaped transverse bend *d'* at its middle fitting and embracing the fence or longitudinal wire A and corresponding in curvature to the size of the fence-wire. The sheet-metal clip D is further provided with two opposite or reverse curves *d<sup>2</sup>* *d<sup>2</sup>* on its opposite face, one at each side of the middle U-curve *d'*. The fence-wire A, as will be seen by reference to Figs.

5 and 8, is thus completely encircled or embraced by the U-bend *d'* in connection with the reverse curve *d<sup>2</sup>* *d<sup>2</sup>* in the metal clip and by the bend or kink *b* in the stay-wire. The fence-wire is thus snugly and firmly hugged or clamped on one side by the sheet-metal clip D and on the opposite side by the stay-wire, while at the same time the shortening of the clip by the production of the reverse curves *d<sup>2</sup>* *d<sup>2</sup>* therein firmly draws the ends or shoulders *d<sup>3</sup>* *d<sup>3</sup>* of the slot *d* rigidly and firmly against the outer face or shoulders *b'* *b'* of the kink or bend *b* in the stay-wire, so that the longitudinal or tensile strength of the clip serves to reinforce and firmly clamp the opposite limbs or wings of the bend or kink *b* about the fence-wire. The clamping force of the bend *b* in the stay-wire B about the fence-wire A is thus not dependent upon the flexure strength of the stay-wire, but upon the tensile strength of the clip D; and as will be readily understood from Figs. 3, 4, and 5 the act of forcing, stamping, or pressing the parts from the form shown in Figs. 3 and 4 into that shown in Fig. 5 produces a wedging, crowding, or drawing action of all the parts firmly together, so that a very great and rigid clamping or binding effect is produced as the parts are forced into their final form, as illustrated in Figs. 5 and 8. It will also be understood by those skilled in the art that the bends *a'* *a'* in the fence-wire lock the clip from slipping or moving in the direction of the fence-wire; that the bend *d'* in the clip locks the clip from moving on the fence-wire in the opposite direction; that the longitudinal slot *d*, which in width is only about the diameter of the stay-wire, locks the clip from moving laterally in respect to the stay-wire or the stay-wire laterally in respect to the clip; that the kink or bend *b* in the stay-wire in connection with the reverse bends *d<sup>2</sup>* *d<sup>2</sup>* in the clip and the shoulders or ends *d<sup>3</sup>* *d<sup>3</sup>* of the longitudinal slot *d* locks the clip from any movement in the direction of the length of the stay-wire, and that these several parts all combined securely lock all the parts—clip, stay-wire, and fence-wire—from any turning or angular movement in respect to each other. The parts are therefore all clamped and secured together with great strength, firmness, and rigidity.

As illustrated in Fig. 8, the upper free end *b<sup>3</sup>* of the stay-wire B is folded or bent over the upper end *d<sup>4</sup>* of the clip D. This produces an additional lock between the stay-wire and the clip, and also makes a neat finish for the top of the fence.

The difference in construction, strength, and effectiveness between my improved fence, where the slotted metal clips D are given the reverse bends or kinks *d<sup>2</sup>* *d<sup>2</sup>* to draw the shoulders *d<sup>3</sup>* *d<sup>3</sup>* firmly and rigidly against the shoulders or limbs of the sharp bend or kink *b* in the stay-wire, and thus reinforce the same, and a construction where these reverse curves are omitted and the fence-wires clamped at



only a few points or short arcs of its circumference will be readily understood by those skilled in the art by reference to Figs. 10 and 11, which illustrate a construction where these reverse curves  $d^2 d^2$  are omitted.

I claim—

1. A stay-wire fence comprising in combination a series of longitudinal or fence wires, a series of upright or stay wires and a series of sheet-metal clips uniting the fence and stay wires at their crossings; the fence-wires having at each crossing a gradual bend comprising a straight portion  $a$  and angular or curved portions  $a' a'$ ; the stay-wires having at each crossing a short or sharp bend or kink  $b$  fitting and embracing the circumference of the fence-wire on one side; and the clips D having each a central longitudinal slot  $d$  corresponding substantially in width to the diameter of the stay-wire, a U-shaped bend  $d'$  at its middle fitting and embracing the circumference of the fence-wire and two reverse curves  $d^2 d^2$  one on each side of said U-bend  $d'$  to cause the shoulders or ends  $d^3 d^3$  of the longitudinal slots  $d$  to hug and embrace the outer faces or shoulders of the bend  $b$  in the stay-wire; whereby the fence-wires, stay-wires and clips are all firmly and rigidly clamped together and locked one by another from any slipping or turning in any direction, substantially as specified.

2. A stay-wire fence comprising in combination a series of longitudinal or fence wires, a series of upright or stay wires and a series of sheet-metal clips uniting the fence and stay wires at their crossings; the fence-wires having at each crossing a gradual bend comprising a straight portion  $a$  and angular or curved portions  $a' a'$ ; the stay-wires having at each crossing a short or sharp bend or kink  $b$  fitting and embracing the circumference of the fence-wire on one side; and the clips D having each a central longitudinal slot  $d$  corresponding substantially in width to the diameter of the stay-wire, a U-shaped bend  $d'$  at its middle fitting and embracing the circumference of the fence-wire and two reverse curves  $d^2 d^2$  one on each side of said U-bend  $d'$  to cause the shoulders or ends  $d^3 d^3$  of the longi-

tudinal slots  $d$  to hug and embrace the outer faces or shoulders of the bend  $b$  in the stay-wire; whereby the fence-wires, stay-wires and clips are all firmly and rigidly clamped together and locked one by another from any slipping or turning in any direction, the upper end  $b^3$  of the stay-wire being bent or folded over the upper edge of the upper clip, substantially as specified.

3. In a stay-wire fence the combination with a series of longitudinal or fence wires having each a series of easy or gradual bends therein, with a series of upright or stay wires, having each a series of sharp bends or kinks  $b$  therein, and a series of metal clips D, having each a central longitudinal slot  $d$ , a transverse U-shaped bend  $d'$ , and two reverse curves  $d^2 d^2$  therein to cause the shoulders or ends  $d^3 d^3$  of the slots  $d$  to hug or embrace the kink or bend  $b$  in the stay-wire and thereby firmly and rigidly clamp and unite together and lock against movement in all directions said clips and fence and stay wires, substantially as specified.

4. In a stay-wire fence the combination with a series of longitudinal or fence wires having each a series of easy or gradual bends therein, with a series of upright or stay wires, having each a series of sharp bends or kinks  $b$  therein, and a series of metal clips D, having each a central longitudinal slot  $d$ , a transverse U-shaped bend  $d'$ , and two reverse curves  $d^2 d^2$  therein to cause the shoulders or ends  $d^3 d^3$  of the slots  $d$  to hug or embrace the kink or bend  $b$  in the stay-wire and thereby firmly and rigidly clamp and unite together and lock against movement in all directions said clips and fence and stay wires, said fence-wires at the bends therein being surrounded and embraced on the one side by the bends in the clip D and on the opposite side by the bend in the stay-wire B, and the upper end of the stay-wire being bent or folded over the upper clip, substantially as specified.

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Witnesses:

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