

No. 698,533.

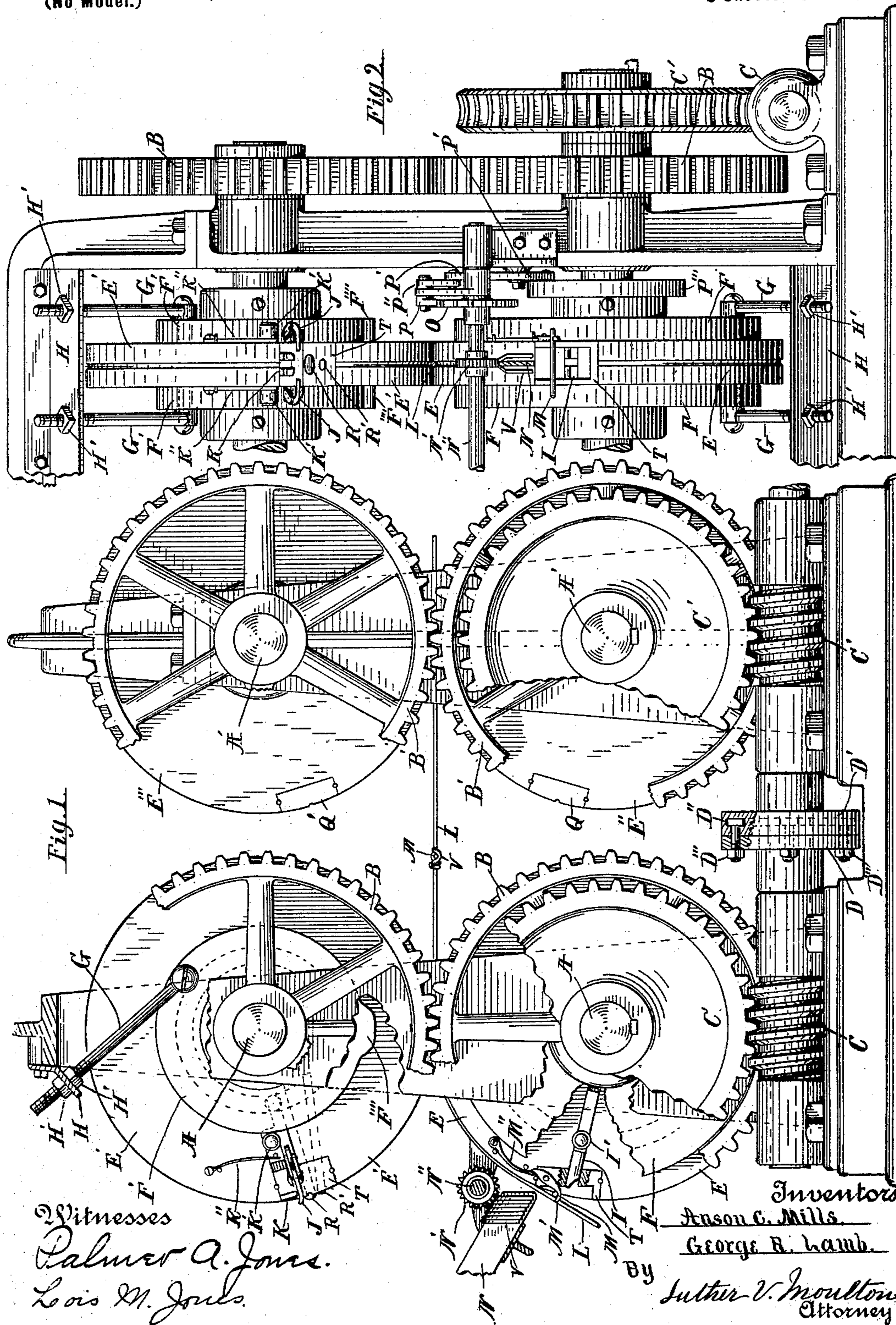
Patented Apr. 29, 1902.

A. C. MILLS & G. R. LAMB.  
WIRE FENCE MACHINE.

(Application filed Dec. 13, 1901.)

(No Model.)

2 Sheets—Sheet 1.



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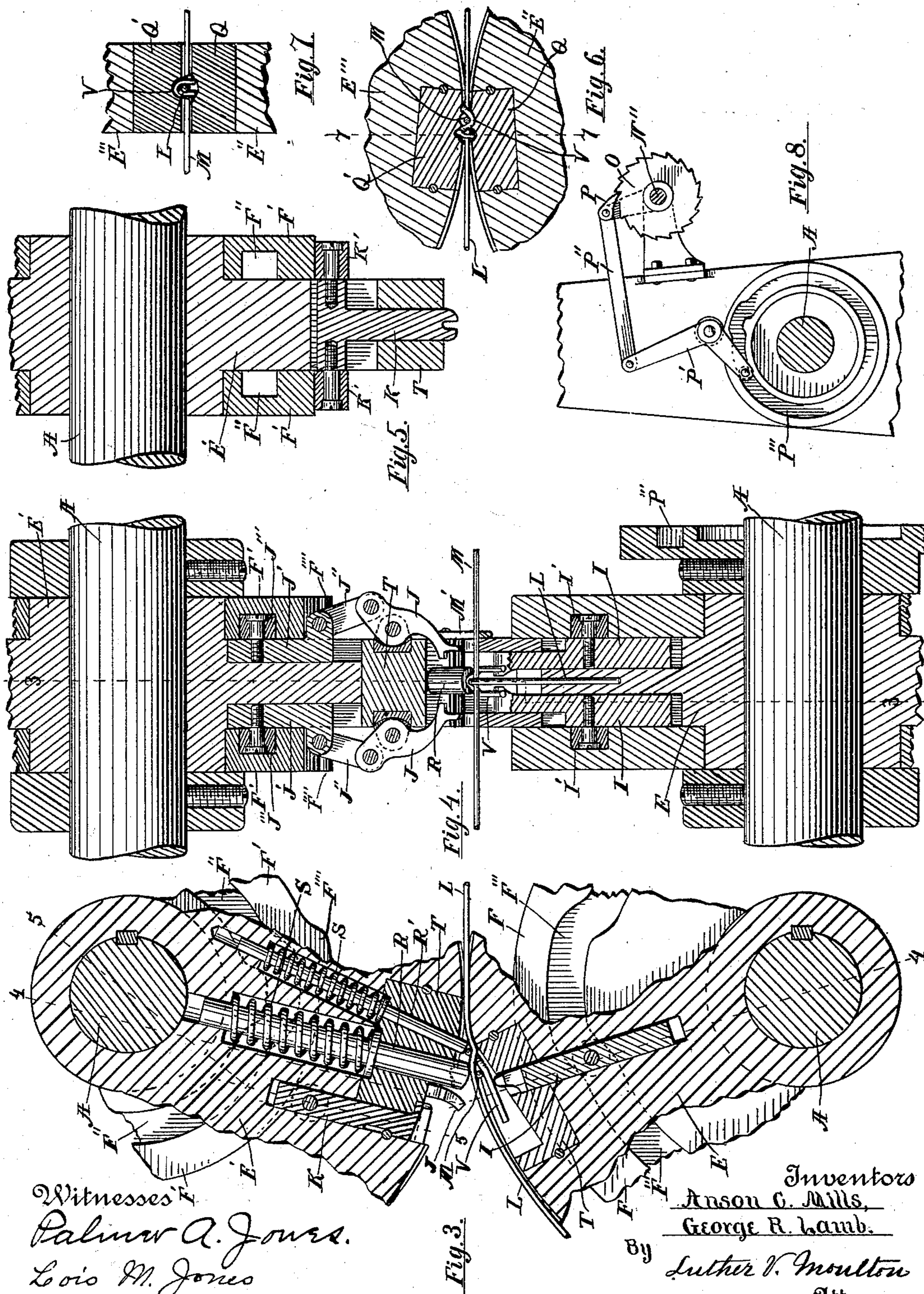
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Witnesses  
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# UNITED STATES PATENT OFFICE.

ANSON C. MILLS, OF JACKSON, AND GEORGE R. LAMB, OF HUDSON,  
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## WIRE-FENCE MACHINE.

SPECIFICATION forming part of Letters Patent No. 698,533, dated April 29, 1902.

Application filed December 13, 1901. Serial No. 85,786. (No model.)

*To all whom it may concern:*

Be it known that we, ANSON C. MILLS, residing at Jackson, county of Jackson, and GEORGE R. LAMB, residing at Hudson, in the  
5 county of Lenawee, State of Michigan, citizens of the United States, have invented certain new and useful Improvements in Wire-Fence Machines; and we do hereby declare the following to be a full, clear, and exact de-  
10 scription of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Our invention relates to improvements in machines for making wire fence, and more  
15 particularly to a machine for attaching at the intersection of the wires of a fence the fastenings shown in United States Patent to George R. Lamb, No. 636,535, dated November 7, 1899, on wire-fence locks; and its object is to provide a machine for rapidly and automatically  
20 attaching said fastenings to a wire fence and to provide the device with certain new and useful features, hereinafter more fully described, and particularly pointed out in the  
25 claims.

Our device consists, essentially, in providing rolls arranged in pairs, between which the wires forming the fence are passed, and means coacting with these rolls to bend and form the  
30 fastenings in place at the intersections of the wires, together with means for placing the blanks of which these fastenings are formed in place to be operated upon, and in the combination and arrangement of the various ele-  
35 ments of the machine, as will more fully appear by reference to the accompanying drawings, in which—

Figure 1 is a side elevation of a device embodying our invention, with parts broken  
40 away to show the construction; Fig. 2, an end elevation of the same; Fig. 3, an enlarged detail in vertical section on the line 3 3 of Fig. 4; Fig. 4, the same at right angles to Fig. 3, taken on the line 4 4 of Fig. 3; Fig. 5, a detail in section on the line 5 5 of Fig. 3; Fig.  
45 6, a detail of the finishing-dies, taken in vertical section at right angles to the shaft; Fig. 7, the same in vertical section on the line 7 7 of Fig. 6, and Fig. 8 a detail of the means for  
50 operating the blank-feeding means.

Like letters refer to like parts in all the figures.

Journaled in a suitable frame are two pairs of shafts A and A', each pair being connected by gears B and B'. The respective pairs of  
55 shafts are operated by means of worm-gearing C and C', and the shaft on which the respective worms are mounted is divided and connected by an adjustable coupling consisting of the flanges D D', one of which is pro-  
60 vided with an annular T-slot D'', in which slot are adjustably inserted the heads of bolts D''', which bolts pass through openings in the flange D, whereby the flanges may be adjusted and held in fixed relation to each other. On  
65 the shafts are two pairs of rolls E E' E'' E''' for each longitudinal wire of the fence, it being understood that the shafts shown are of suitable length and journaled in the frame at both ends and the rolls shown, together with the  
70 mechanism coacting therewith, duplicated for each longitudinal wire in the fence. These rolls are all fixed on the respective shafts and rotate therewith and are provided with circumferential and transverse grooves to re-  
75 ceive and guide the various wires comprising the fence. At the respective sides of the rolls E E' are adjustable and non-rotative cams F and F'. These cams are held and adjusted by rods G, pivoted to the cams at one  
80 end and extending through openings in plates H, fixed on the frame. These rods are provided with adjusting-nuts H' to longitudinally adjust the rods in the plates. The cams F are provided with grooves F''' for operating  
85 a former I, radially movable in the roll E and provided with studs and rolls I' to engage the said grooves. The cams F' have similar grooves F'' to operate the grippers J by means of slides J', radially movable in the roll E'  
90 and provided with studs and rolls J'', engaging said grooves and connected to the grippers by suitable connecting-rods J''. These grippers J consist of levers pivoted in suitable yokes at the opposite sides of the rolls E'  
95 and adapted to move toward and from each other at their outer ends. Said cams F' also have projections F'''' on their peripheries to operate a former K, radially movable in the roll E' and provided with rolls K' to engage  
100

said projections and a retracting-spring K'' to move the former inward. The formers I and K are each bifurcated at their outer ends to pass each side of the longitudinal wires L of the fence being made.

M represents one of the transverse wires of the fence, which wires are supplied to the machine in any convenient manner and are received upon a yielding hook M', pivoted on the roll E and yieldingly held in place by a spring M''. The blanks are staple-formed pieces of wire and are fed to the machine opposite each pair of rolls upon slides N, upon which they are retained and released, one by one, by means of a spur-wheel N', having teeth adapted to pass between the respective blanks and mounted on a shaft N'', extending across the machine and intermittently rotated by means of a ratchet-wheel O on the shaft N'' and having the same number of teeth as the wheel N', a pawl P engaging the wheel O and operated to move the same one tooth at a time by means of a lever P', pivoted intermediate its ends and having one end connected to the pawl by a rod P'' and provided at the other end with a stud and roll engaging a groove in a cam P''' on the shaft A.

In the roll E' is a radially-movable presser R to engage and hold the wires at their point of intersection during the process of forming the fastening around the same. In said roll is also a presser R', arranged at an inclination to the presser R and also spring-actuated to engage the top of the blank and hold it from slipping out of place when being formed. SS are the springs for operating these pressers. To enable the insertion of these various moving parts in the rolls and to furnish suitable bearings for the same, detachable die-blocks T are provided, having suitable recesses and openings, as shown.

The rolls E'' E''' are the finishing-rolls and for this purpose are provided with suitable dies Q Q', suitably recessed to properly finish the formation of the fasteners V. We have shown one set of elements coacting with the rolls. This would space the transverse wires the circumference of the rolls apart. It is obvious that these coacting parts in the rolls could be duplicated and the cams changed to correspond and the wires spaced closer without changing the essence of our invention.

The operation of our device is as follows: By adjusting the coupling-flanges D D' the respective pairs of rolls are adjusted to properly engage the fastenings with the dies of the finishing-rolls, and by properly adjusting the various cams the following operations will be performed: As the transverse wire M, held by the hooks M', reaches the position shown in Fig. 1 the cam P''' turns the wheel N' one tooth and drops a blank astride the longitudinal wire and behind the transverse wire M. When the parts reach the position shown in Fig. 3, the pressers R R' engage the wires and blank and hold them

firmly during the forming process of these rolls, the first movement of which is that the former I is moved out by the cam F and held out for a time, or during the next two movements. This carries the ends of the fasteners outward at each side of the longitudinal wire and outside the same, bending the fastener laterally when it contacts the transverse wire. The grippers J now approach each other as the cam-grooves F'' force the slides J' outward. This crosses the ends of the fastener outside the longitudinal wire L. The former K is now moved outward by the projections F''' and engages the ends of the fastener, carrying them downward at each side of the longitudinal wire. The fastener now passes to the finishing-rolls, when the dies Q Q' therein engage it and clench the ends of the fastener beneath the longitudinal wire and press the entire fastener into the finished form.

The described operation of the machine is continuously repeated one or more times at each revolution of the shafts, according to the number of sets of devices and cam movements associated with the rolls.

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

1. In combination with means for holding crossed wires, oppositely-moving formers adapted to pass at the respective sides of one of said wires, grippers moving transversely to the movement of the formers, and means for operating the formers and grippers, substantially as described.

2. In combination with means for holding crossed wires, an upwardly-acting former, horizontally-acting grippers, a downwardly-acting former, and means for operating the formers and grippers, substantially as described.

3. The combination of spring-actuated pressers to hold crossed wires and a staple-shaped fastening, an upwardly-acting reciprocating former, horizontally-acting grippers, a downwardly-acting reciprocating former, and cams to operate the formers and grippers, substantially as described.

4. In combination with means for holding crossed wires and a staple-shaped fastener, a former moving at each side of one of said wires to bend the ends of the staple in one direction, grippers moving toward each other to cross the ends of the fastener, a former acting oppositely to the first-named former to bend the ends of the staple in the other direction, and means for operating said formers and grippers, substantially as described.

5. The combination of a pair of rolls, means for rotating the rolls simultaneously, a spring-actuated presser in one of the rolls, radially-movable and oppositely-acting formers in the respective rolls, transversely-acting grippers mounted on the rolls, and non-rotating cams to operate the formers and grippers, substantially as described.

6. The combination of a pair of rolls having circumferential and transverse grooves to engage crossed wires, radially-reciprocating formers in the respective rolls adapted to  
5 operate in succession and in opposite directions, a pair of transversely-acting grippers pivoted on one of said rolls and operating intermediately of the formers, and cams adapted to operate the formers and grippers, substantially as described.

7. The combination of a pair of rolls having circumferential and transverse grooves to engage crossed wires, spring-actuated pressers in the upper roll to engage the wires and a  
15 fastener-blank, a radially-movable former in the lower roll, grippers pivoted on the upper roll, a radially-movable former in the upper roll, non-rotative cams to operate the formers and grippers, and means for adjusting and  
20 holding the cams, substantially as described.

8. The combination of a pair of rolls adapted to engage crossed wires, formers and grippers for bending the fasteners mounted on said rolls, non-rotative cams for operating  
25 said formers and grippers, means for supplying fasteners to the rolls, a second pair of rolls, finishing-dies in the last-named rolls, and means for synchronizing the rotation of the respective pairs of rolls, substantially as  
30 described.

9. In combination with a pair of rolls adapted to engage crossed wires, a detachable block in one of said rolls, and reciprocating formers and pressers extending through said  
35 block, and retained in place thereby, substantially as described.

10. The combination of a pair of rolls having fastener-forming means attached, a second pair of rolls having finishing-dies attached, worm-gearing to drive each separate  
40 pair of rolls, separate shafts to operate the respective worm-gears, a collar on one shaft having an annular T-slot, a collar on the other shaft having openings, and bolts passing through the openings in said collar and  
45 having heads adjustably engaging the T-slots in the other collar, substantially as described.

11. The combination of a pair of rolls having circumferential and transverse grooves,  
50 spring-actuated pressers in the upper roll to engage the wires and a fastener, radially-movable formers in the lower roll having out-

wardly-projecting studs, non-rotating cams engaging the studs, means for adjusting said  
55 cams, grippers pivoted on the upper roll, radially-movable slides in said roll and having outwardly-projecting studs, rods connecting the slides and grippers, non-rotative cams engaging the studs, means for adjusting said  
60 cams, a radially-movable former in the upper roll and having a bifurcated outer end and laterally-projecting studs, and projections on the last-named cam to engage the said studs, substantially as described.

12. The combination of a pair of rolls having circumferential grooves to engage a longitudinal wire, a hook on the lower roll to engage a transverse wire, a slide to convey staple-shaped fasteners, a shaft near the  
70 slide, a spur-wheel on the shaft and engaging the fasteners, a ratchet-wheel on said shaft, a reciprocating pawl engaging said wheel, and a cam to operate the pawl, substantially as described.

13. The combination of a pair of rolls, reciprocating formers and grippers mounted on said rolls, non-rotating and adjustable cams to operate the formers and grippers, rods pivoted to the cams at one end, and extending  
80 through fixed plates at the other ends, and adjusting-nuts on said rods, whereby the cams are adjusted, substantially as described.

14. In a wire-fence machine the following means for forming and attaching a fastener:  
85 a spring-actuated presser to hold the fastener-blank, a reciprocating former to bend the ends of the blank laterally in one direction, another reciprocating former to bend the ends of said fastener laterally in the opposite direction, a pair of grippers to cross  
90 the ends of the fastener after the first bending and before the second bending, a pair of finishing-dies to clench the ends of the fastener and finish forming the fastener, and means for operating the formers, grippers, 95 and dies, substantially as described.

In testimony whereof we affix our signatures in presence of two witnesses.

ANSON C. MILLS.  
GEORGE R. LAMB.

Witnesses:

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