(No Model.)

5 Sheets—Sheet 1.

S. E. MOWER.

MACHINE FOR MAKING HAIR PINS.

No. 319,301. Patented June 2, 1885.

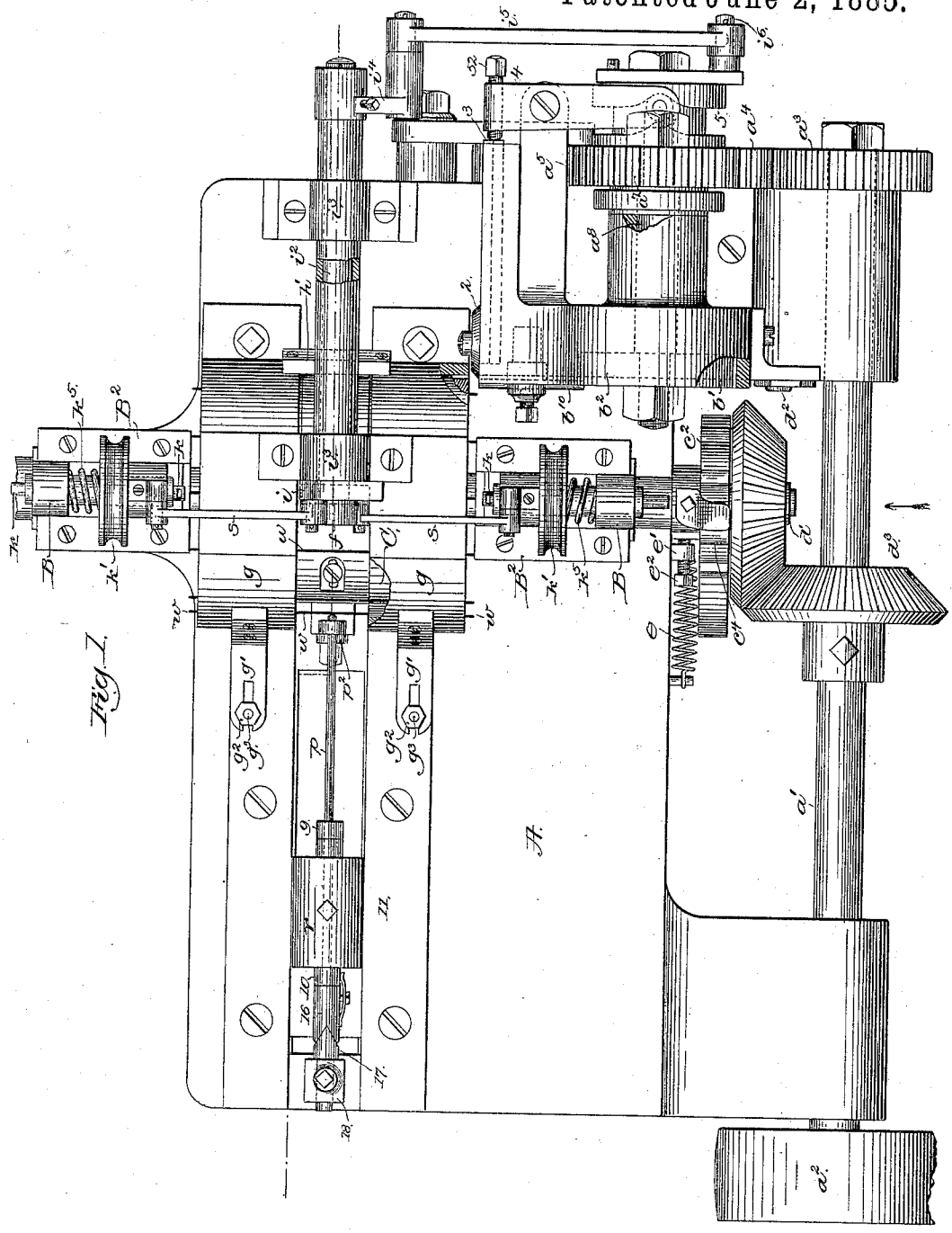


Fig. 1.

Witnesses.
John F. C. Printzlau,
Henry Marsh.

Inventor.
Samuel E. Mower.
by Crosby & Gregory
attys.

N. PETERS, Photo-Lithographer, Washington, D. C.

(No Model.)

5 Sheets—Sheet 2.

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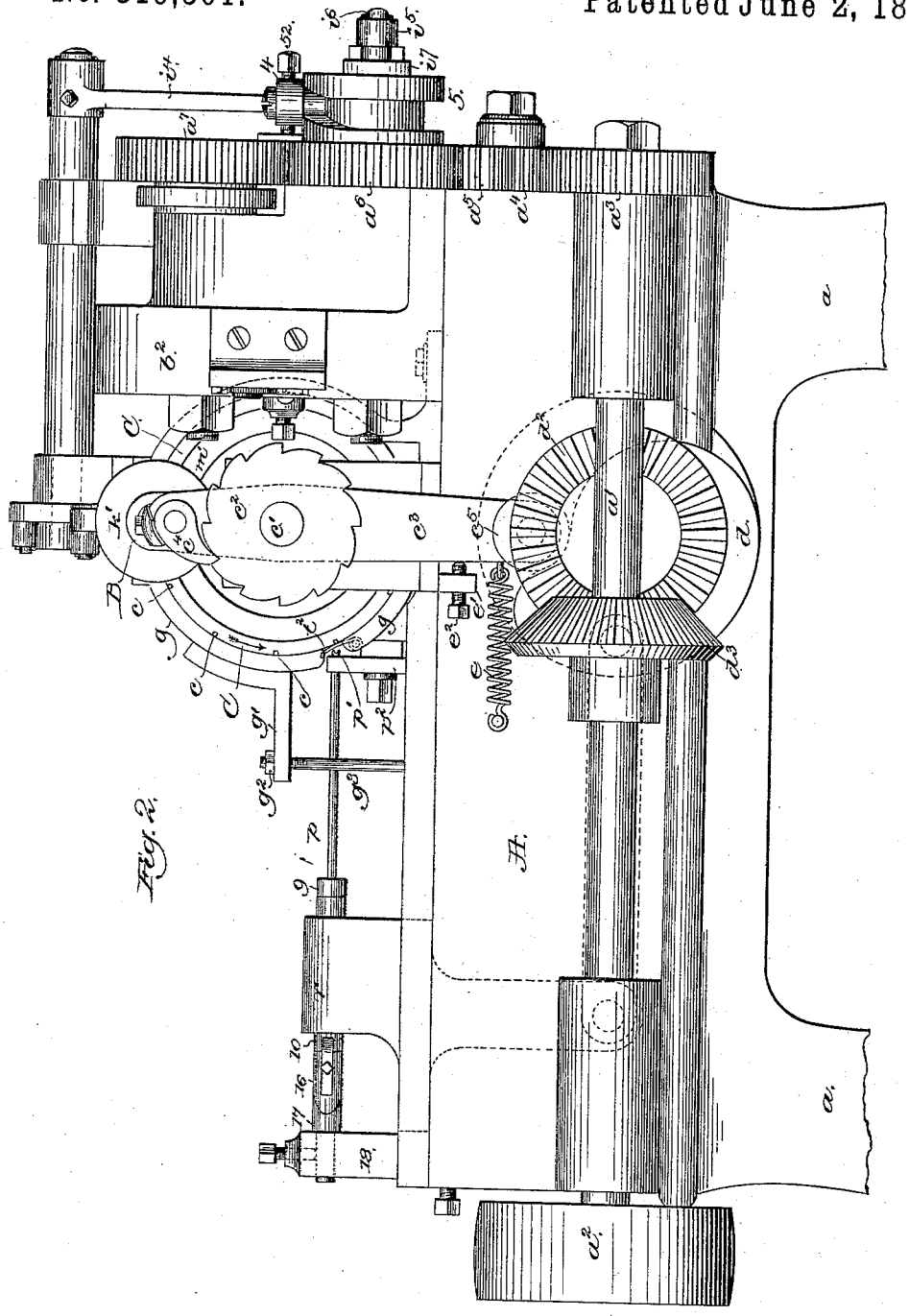


Fig. 2.

Witnesses.
John F. C. Printzlau
Henry Marsh.

Inventor.
Samuel E. Mower.
by Crosby & Gregory attys.

N. PETERS, Photo-Lithographer, Washington, D. C.

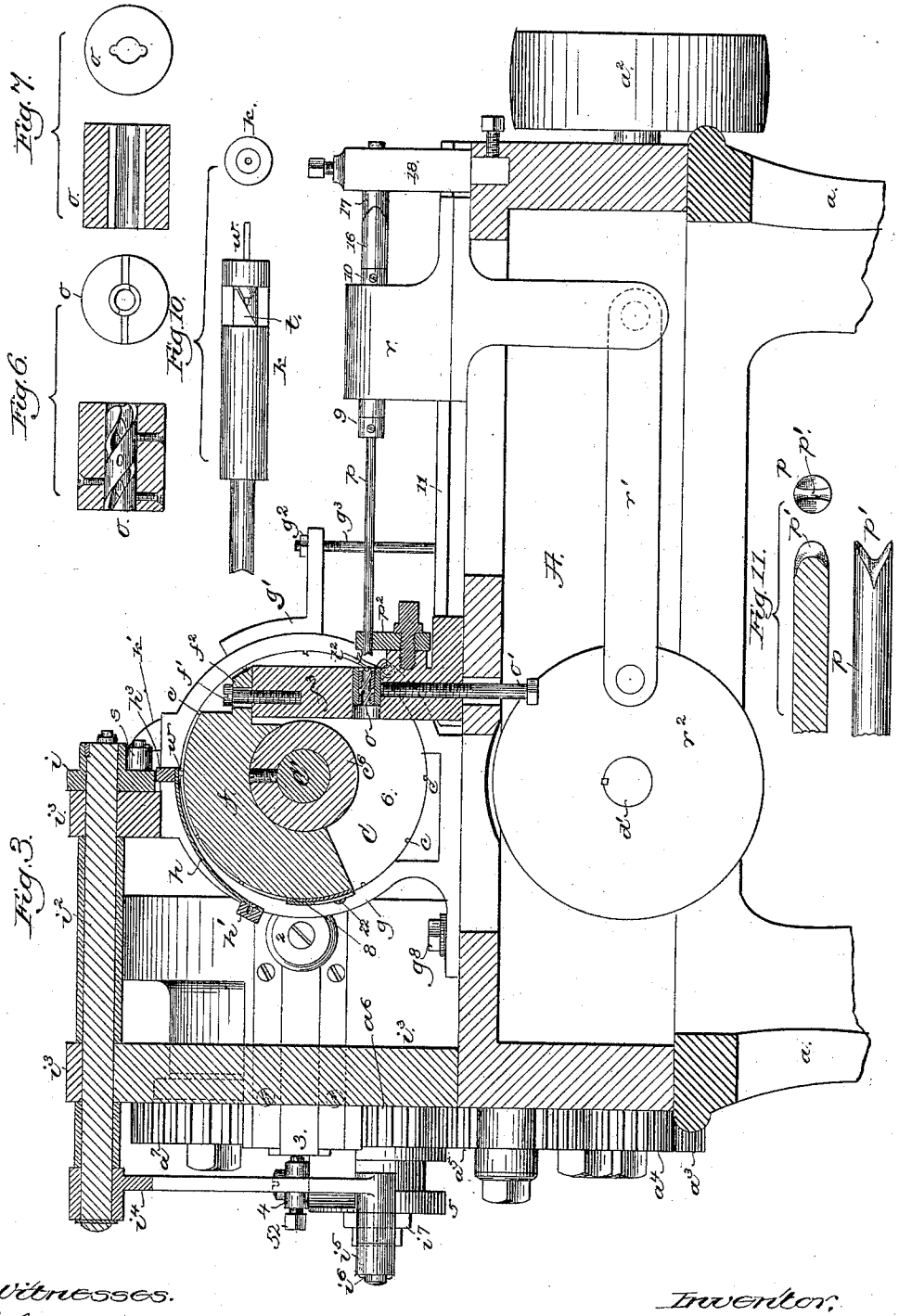
(No Model.)

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John F. C. Printhert.
Henry Marsh.

Inventor.
Samuel E. Mower.
by Crosby & Gregory
attys.

N. PETERS. Photo-Lithographer. Washington, D. C.

(No Model.)

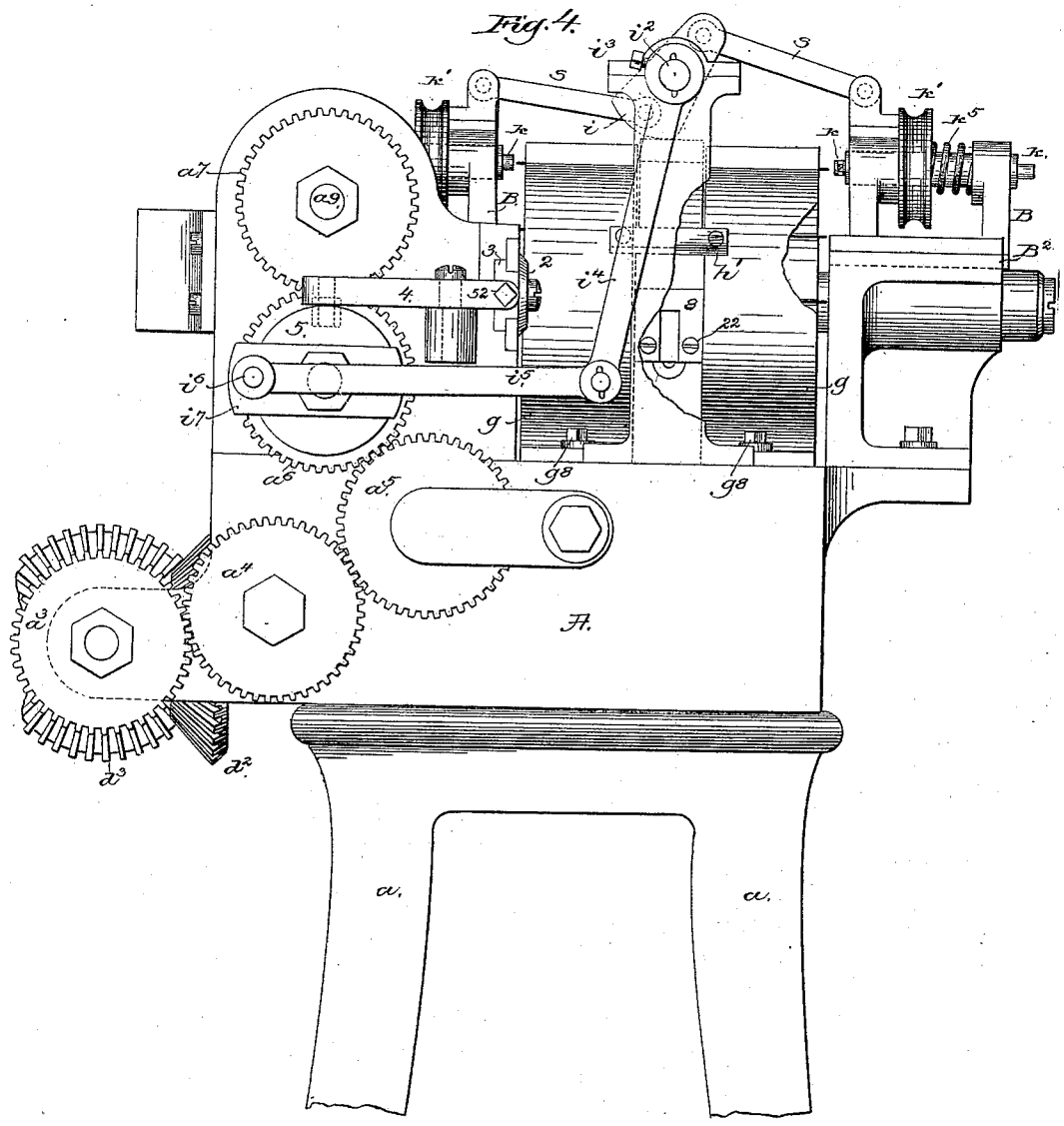
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Fig. 4.



Witnesses.
John F. C. Printert
Henry Marsh.

Inventor.
Samuel E. Mower.
by Crosby & Gregory
Attys

N. PETERS, Photo-Lithographer, Washington, D. C.

(No Model.) 5 Sheets—Sheet 5.

S. E. MOWER.

MACHINE FOR MAKING HAIR PINS.

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Fig. 9.

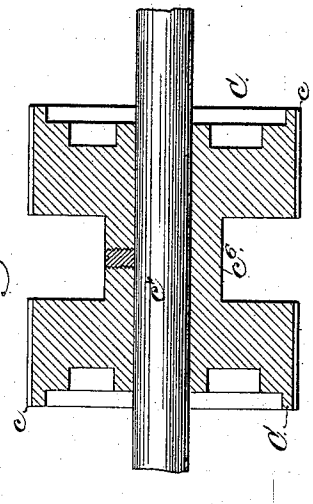


Fig. 8.

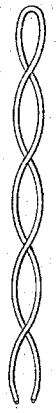
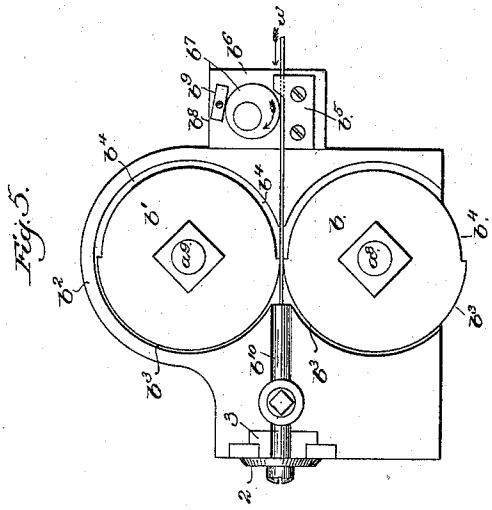


Fig. 5.



Witnesses.
John F. C. Printkert
Henry Marsh.

Inventor.
Samuel E. Mower.
by Crosby & Gregory
attys.

N. PETERS, Photo-Lithographer, Washington, D. C.

UNITED STATES PATENT OFFICE.

SAMUEL E. MOWER, OF NEW HAVEN, CONNECTICUT, ASSIGNOR TO HARRY GRANT THOMPSON, OF SAME PLACE, AND HENRY G. THOMPSON, OF MILFORD, CONNECTICUT.

MACHINE FOR MAKING HAIR-PINS.

SPECIFICATION forming part of Letters Patent No. 319,301, dated June 2, 1885.

Application filed May 5, 1884. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL E. MOWER, of New Haven, county of New Haven, State of Connecticut, have invented an Improvement in Machines for Manufacturing Hair-Pins, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

My invention has for its object the construction of a novel machine for the rapid production of hair-pins having either spirally-twisted or straight legs.

In my improved machine the wire, taken from a reel, is fed into grooves of a wire-carrier (shown as a cylinder) and cut off of the proper length. The pieces of wire, as the carrier is moved intermittingly, are presented successively to the action of point-forming devices, and are then struck centrally by a driver-bar or plunger and forced through a die or former, which gives to the wire the shape desired for the pin to be produced.

Figure 1 is a plan view of my improved machine for making hair-pins; Fig. 2, a side elevation of Fig. 1, looking at it in the direction of the arrow in Fig. 1; Fig. 3, an opposite side elevation of the same; Fig. 4, a rear elevation; Fig. 5, a detail showing in elevation the feed-rolls and some other parts to be referred to; Fig. 6, a front elevation and a longitudinal section of the die or former shown in Fig. 3; Fig. 7, a modified form of die or former. Fig. 8 shows a hair-pin such as may be made in the machine herein described; Fig. 9, a central longitudinal section of the wire-carrier; Fig. 10, details of one of the wire-pointing spindles, and Fig. 11 an enlarged detail of the end of the driver.

The frame A, of suitable shape to support the working parts, is provided with a driving-shaft, a', having a belt-pulley, a^2, from which motion is conveyed to the shafts a^8 a^9 of the feed mechanism (shown as rolls b b'.) through the train of gears a^3, a^4, a^5, a^6, and a^7, the latter two being respectively on the shafts a^8 a^9, to which the said feeding-rollers are attached.

The feeding-rollers b b', (shown in detail in Fig. 5,) arranged in the case b^2, attached to the frame A, operate to feed the wire w into the machine. The rollers b b' are cut away longitudinally, as at b^4, or shouldered, so as to leave an acting surface, b^3, which shall be equal in length about the roll to the length of the wire to be fed between them at each rotation thereof, the length of the surface b^3 depending on the length of the pin to be made. The rolls draw the wire intermittingly from a suitable reel, and in practice will draw the same through a suitable wire-straightener. (Not shown.) On the way to the feed-rollers the wire w is passed through a groove in the ear of a plate, b^5, secured to a bracket, b^6, attached to the case b^2, and between a serrated annulus, b^7, loose on a stud, b^8, of the said bracket b^6, and a serrated bar, b^9, placed above on the said serrated annulus, being held to the bracket in an inclined position with relation to the annulus, and acting to restrain the movement of the annulus in opposition to the arrow thereon, Fig. 5, but permitting it to be moved freely in the direction of the said arrow as the wire is fed into the machine, such devices serving as a stop or check to prevent backward movement of the wire. Beyond the feed-rolls b b' the wire w is passed through a tube, b^{10}, connected with the case b^2, as clearly shown in Fig. 5, and from the said tube the wire is passed into one of the longitudinal grooves, c, cut in the face of the wire-carrier C, (shown as a cylinder,) (see Figs. 1 and 2,) until the end of said wire projects beyond the opposite side of the said carrier, when a circular cutter, 2, is forced against and severs the wire at the delivery end of the tube b^{10}.

The cutter 2 (see Figs. 3 and 4) is secured to a slide, 3, held in a rigid part of the frame, and the slide is moved by the pivoted lever 4, having a roller stud or pin, which enters the cam-hub 5 on the shaft a^8. The pivoted lever 4 has an adjusting-screw, 52, which abuts against the end of the slide 3, to regulate the throw or movement of the slide-bar carrying the circular cutter. A suitable coiled spring (not shown) will be inclosed within the frame A, back of the slide 3, and, engaging a stud on said slide-bar, will withdraw the circular

cutter from the tube b^{10} after the wire has been severed, as described.

The shaft c' of the transversely-grooved carrier C, held in the frame A, is provided with a fixed ratchet, c^2, which is engaged and rotated by a pawl, c^4, on a pawl-carrier, c^3, having its fulcrum on the shaft c', and provided at its lower end with a roll, c^5, which runs upon the cam-wheel d, made fast to the shaft d', the latter having a bevel-gear, d^2, which is engaged by the bevel-gear d^3 on the driving-shaft a', the whole operating to move the carrier C intermittingly for a sufficient distance to successively bring the transverse grooves c of the carrier in line with the bore of the tube b^{10}, to permit the wire to be fed through it and into the grooves c.

A coiled spring, e, attached to the frame A and to the pawl-carrier c^3, serves to hold the roll c^5 in engagement with the cam-wheel d. An adjustable stop-screw, e^2, in the stud e', fast to the frame A, limits the movement of the pawl-carrier in the direction of the spring e.

The carrier C is provided with an annular groove near the center of its length, leaving merely the small hub c^6, which encircles the shaft c', as indicated in Figs. 3 and 9. A wire-support, f, made as a sector, partially surrounds the said hub c^6, and has its periphery substantially flush or even with the bottom of the grooves c in said carrier, as shown in Fig. 3, the said support f being secured in fixed position by a set-screw, f', passed through the countersunk and slotted portion f^2 of the said support, and into the die or former holding post f^3, which in turn is placed in the annular groove cut into the said carrier, and is firmly fastened to the frame A.

A spring-guide, 8, is attached to the rear of the support f by screws 22 at a point opposite where the wire w is fed into the grooves of the carrier, so as to guide the wire into the grooves at that end of said carrier farthest removed from the feed-rolls, the spring-guide allowing the wire to be taken from beneath it as the carrier is rotated.

The mouths of the grooves c may be made flaring, if desired, to facilitate the passage of the wire into them.

Hoods g, attached at their rear ends to the frame A by bolts g^8, surround the grooved periphery of the carrier C, and slotted brackets g', secured to the free front ends of the said hoods, receive screw-threaded rods g^3, secured to the frame-work, and thumb-nuts g^2 on the said rods g^3 enable the hoods to be held more or less closely against the grooved periphery of the carrier, thereby generating sufficient friction to prevent any backward movement of the carrier, which may be induced by the pawl c^4 moving over the ratchet c^2, and also retaining the wires in the grooves c thereof.

A spring-presser, h, attached to a strip, h', secured to the hoods, is extended along above the support f, (see Fig. 3,) and has a clamping-block, h^3, fastened to its forward or free end. This block is acted upon by a lever, i, secured to a rock-shaft, i^2, held in bearings i^3 i^3, the said rock-shaft having attached to it an arm, i^4, connected by link i^5 with a crank-pin, i^6, of the plate i^7, adjustably attached to the cam-hub 5, the latter serving to rock the lever i and force the clamping-block h^3 and presser downward to hold the wire firmly while the same is being pointed at both ends, as will be described, the pressure at which the said wire is clamped at such time being determined by adjusting the plate i^7 and crank-pin i^6 on the hub 5.

Sliding carriages B, arranged in suitable guideways, B^2, of the frame-work, sustain wire-pointing spindles k, provided with pulleys k', which receive suitable belts, by which to rotate them, the belts being preferably operated by independent pulleys on a suitable shaft overhead or at the ceiling, the said spindles in practice having a speed of about two thousand five hundred rotations per minute. These carriages are connected by links s with pins at opposite sides, and near opposite ends of the lever i, the latter in its vibrations moving the carriages B simultaneously in and out to force the ends of the pointing-spindles against the ends of the wire (shown by heavy black lines) projecting beyond the ends of the carrier. As the carriages are moved forward the pointing-spindles, recessed at their inner ends, (see Fig. 10,) pass over the ends of the wire, and cutting-blades t—one in each spindle—act to point the wire. The spindles k are free to slide in their bearings in the carriages, and are surrounded by spiral springs k^5, which latter enable the spindles to stop when the points of the wire strike the rotating blades t, notwithstanding the carriages continue to move toward the carrier C. The pointing-spindles are thus held against the wire to be pointed by a yielding or spring pressure.

Referring to Fig. 3, o represents a spirally-grooved die or former firmly held in a slot in the die-holding post f^3 by means of an adjusting screw-bolt, o', it holding the die in the line of the longitudinal axis of the reciprocating driver-bar p. The driver-bar p, notched at p', (see Fig. 11,) is passed through a guide, p^2, secured to the post f^3, and the rear end of the said driver-bar is extended through a cross-head, r, in which it is retained loosely by the collars 9 10, attached to the driver by suitable screws. The cross-head r is reciprocated in the ways 11 of the frame A by means of the connecting-rod r', fastened to the cross-head and to the disk r^2 on the shaft d', hereinbefore mentioned. If desired, the spirally-grooved tube may be formed, as shown in Fig. 6, by means of spiral plates held in a smooth-bored tube by means of screws, the spaces between the plates forming the grooves; and, further, a straight groove is cut across the face of the tube to aid in holding and guiding a wire when being forced into the tube.

The outer or rear end of the driver-bar is

provided with a notched block, 16, which, in the return-stroke of the driver-bar, engages the wedge-shaped block 17, secured to the post 18, to insure the proper position for the notched front end of the driver-bar when it is again started forward to engage the wire, which latter is held across the opening at the mouth of the die or former by means of springs t^2, connected with the hoods $g\ g$ at either side of the die or former o. (See Figs. 2 and 3.)

By the partial rotation of the carrier a wire retained in one of the grooves c is brought across the opening of the die or former o, in which position it is held by the springs t^2 until, by the forward movement of the driver-bar p, the wire is caught at the middle of its length by the notched end of said driver, and is bent and forced into and through the spirally-grooved die or former, the driver during each operation being rotated by the action of the wire in the spiral groove of the stationary die, thus producing a spiral hair-pin, which, upon the return of the driver, is stripped from the latter and drops into a suitable receptacle provided for that purpose.

If a common straight hair-pin is to be formed, the grooves in the die or former will be straight, instead of spiral, as in Fig. 7. The machine is so speeded that the feed-rolls feed a length of wire to the grooved cylinder or carrier while the latter remains at rest, and the wire having been fed into the said grooves, the circular cutter is moved and actuated to sever the wire.

When the feed mechanism supplies one groove with wire, the ends of a piece of wire previously fed into and yet held in one of the grooves of the carrier, and held clamped therein, are being pointed, and at the same time yet another length of wire is being forced into the former o by the driver p to complete a hair-pin.

As the carriages B are moved backward, the presser h is lifted, and immediately thereafter the carrier is moved forward to bring an unfilled groove, c, in line with the tube b^{10}, which having been done, the feed mechanism is operated to move the wire, the slide 3 is retracted or drawn back to remove the circular cutter 2 from the end of the tube b^{10}, and as soon as the said empty groove of the carrier has been filled the slide 3 is moved forward to cut off the wire, and the carrier is again moved forward one step.

Instead of the rollers $b\ b'$, for feeding the wire intermittingly into the grooves c of the carrier, any other usual or suitable wire-feeding mechanism might be employed.

I claim—

1. In a machine for forming hair-pins, a rotating carrier, and feed mechanism to feed the wire intermittingly into grooves of the said carrier, combined with a cutter to sever the wire fed into the said grooves, substantially as described.

2. In a machine for forming hair-pins, the carrier grooved for the reception of lengths of wire, the spring 8 connected therewith, and means to operate the carrier intermittingly, combined with feeding mechanism to feed the wire into the grooves of the carrier, and with a cutter to sever the said wire, substantially as described.

3. The intermittingly-rotated carrier, grooved for the reception of short lengths of wire, and grooved annularly, combined with the sector f, and with a spring-presser to act upon and hold the lengths of wire in the grooves of the carrier, substantially as described.

4. The intermittingly-rotated carrier, grooved for the reception of short lengths of wire, and grooved annularly, as described, combined with the die-holding post, and with the die or former o set therein, with its wire-receiving opening inside the circumference of the said carrier, combined with the reciprocating driver provided with a notched end to act upon the wire and drive it through the die, substantially as described.

5. In a machine for forming spiral hair-pins, a spirally-grooved die or former, and a reciprocating carriage and loosely-attached driver-bar notched at its front end to engage the wire, whereby the said driver-bar is left free to rotate as its acts to force the wire through the die in the formation of the pin, substantially as described.

6. The die-holding post, the die or former, and reciprocating carriage, combined with the driver-bar, and with a guide, p^2, for the front end of the latter, substantially as described.

7. The die or former and the reciprocating carriage and loosely-held driver-bar notched at its front end and provided with the notched rear end, 16, combined with the wedge-piece 17, to insure the correct presentation of the notched front end of the driver to the wire, substantially as described.

8. In a machine for making hair-pins, a wire-carrier, and springs t^2 to hold the short lengths of wire therein, and a die or former having a spiral groove or way, combined with a reciprocating carriage, and a connected driver-bar, p, notched at its front end to strike the wire, draw it from the carrier and springs, and force it into the said die or former, all substantially as described.

9. A movable carrier to receive short lengths of wire, and a die or former located near the center of the length of the carrier, and to which the carrier presents the said wire, combined with a driver-bar to double and force the said wires into the said die, substantially as described.

10. In a machine for making hair-pins, the die or former and driver-bar, and the movable carrier, grooved at c, to receive and present lengths of short wire to the action of the die and driver-bar, combined with mechanism, substantially as described, for feeding the wire into the groove of the carrier, and a cutter to sever the said wire into short lengths, and with mechanism for operating the cutter and car-

rier, substantially as and for the purpose described.

11. A spirally-grooved die or former, a driver-bar, and a carrier grooved to receive and feed lengths of wire to the die or former, combined with mechanism, substantially as described, for pointing the ends of lengths of wire held by the carrier before said wire is presented to the die or former, as set forth.

12. The combination, with a carrier grooved to receive short lengths of wire, and mechanism, substantially as described, arranged at opposite sides of the carrier, for simultaneously pointing or sharpening both ends of the wire, moved by the carrier into position between the ends of the pointing mechanism, of clamping mechanism, substantially as described, arranged to clamp the wire in fixed position while its opposite ends are being pointed, substantially as and for the purpose set forth.

13. In a machine for making spiral hair-pins, a rotating carrier adapted to carry lengths of wire, and having a central cut-away portion, a spirally-grooved die or former projecting more or less into the cut-away portion of the said carrier, with the mouth of the die or former at or about the circumferential line of the cylinder, a driver-bar, and a spring or springs adapted to successively hold the lengths of wire across the mouth of the die or former, substantially as set forth.

14. The combination, with an intermittingly-rotating carrier, C, grooved to receive and carry lengths of wire, and having a central peripherally cut-away portion, and mechanism for feeding wire into the said grooves successively, of a yielding guide, 8, and support *f* to engage the wire at the cut-away portion of the carrier and direct it into the groove *c* of the carrier at the opposite side of the said centrally cut-away portion of the carrier, substantially as set forth.

15. The rotating carrier, grooved to receive and carry short lengths of wire, combined with the hoods *g* and means to press the same against the carrier with more or less force, as and for the purpose set forth.

16. The shouldered feed-rolls *b b'*, arranged one above the other, and means to move them, combined with a rotating carrier, grooved longitudinally, as at *c*, to receive the wire, and with a cutter to sever the wire after the same has been fed into the grooves of the said carrier, substantially as set forth.

17. In a machine for forming hair-pins, the rotating carrier, feeding-rollers to feed wire into the grooves of the carrier, and wire-cutting mechanism, combined with the sliding carriages provided with rotating spindles to point both ends of the wire, substantially as described.

18. The rotating carrier and the reciprocating carriages provided with rotating end-pointing spindles, combined with the springs upon the spindles, and with means to slide the carriages, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

SAMUEL E. MOWER.

Witnesses:

HENRY G. THOMPSON,

ARTHUR G. THOMPSON.