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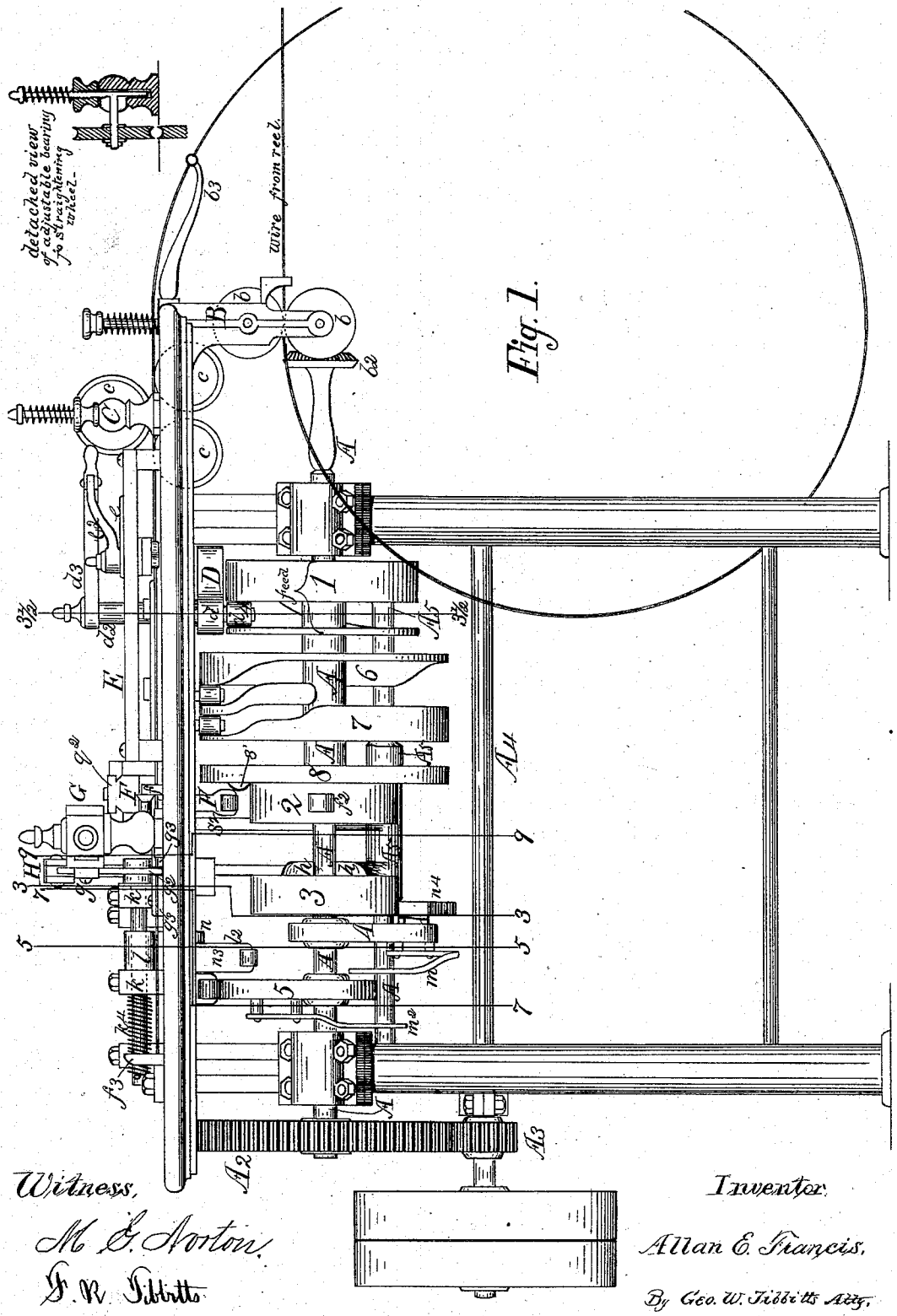
A. E. FRANCIS.

MACHINE FOR MAKING WIRE CLOTHES PINS.

No. 276,575. Patented May 1, 1883.



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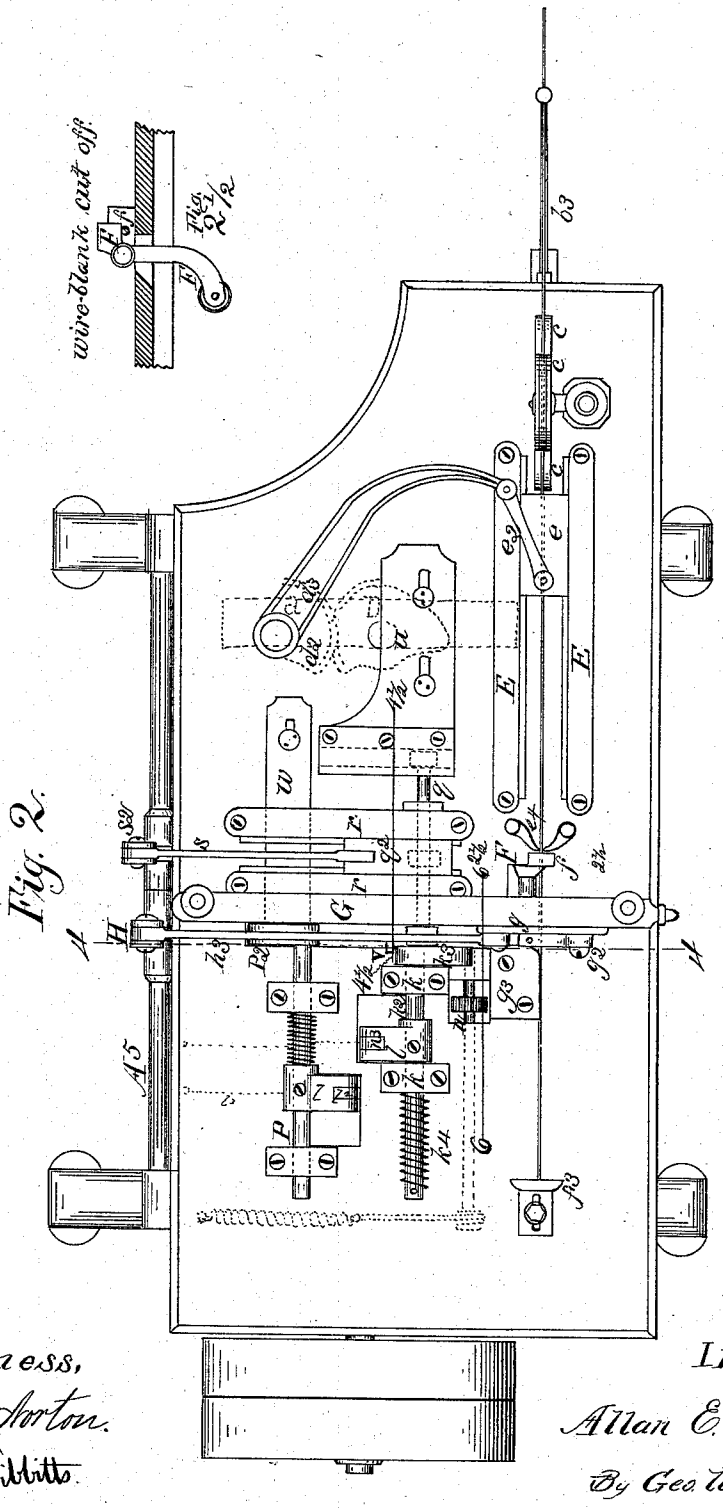

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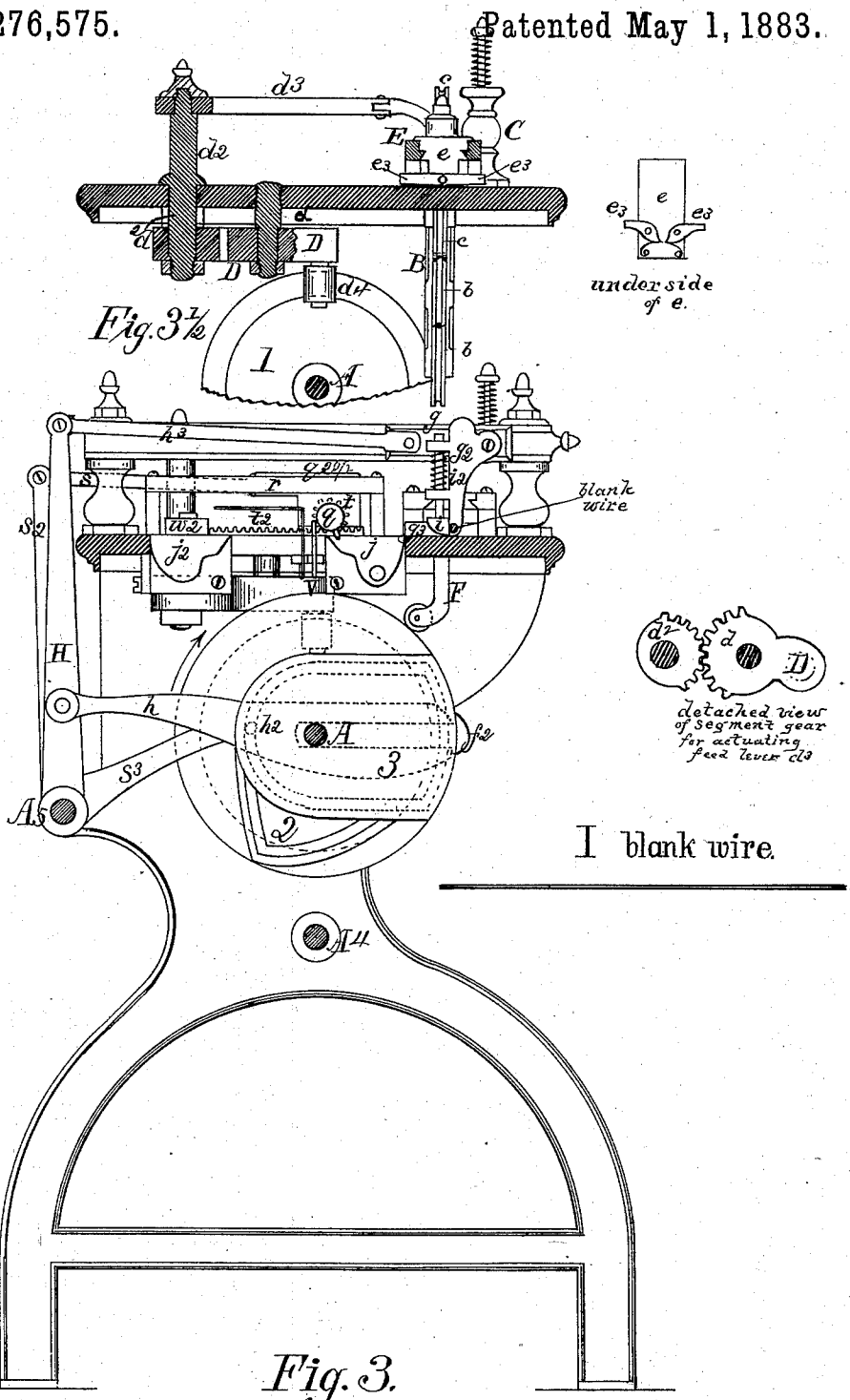

Fig. 3.

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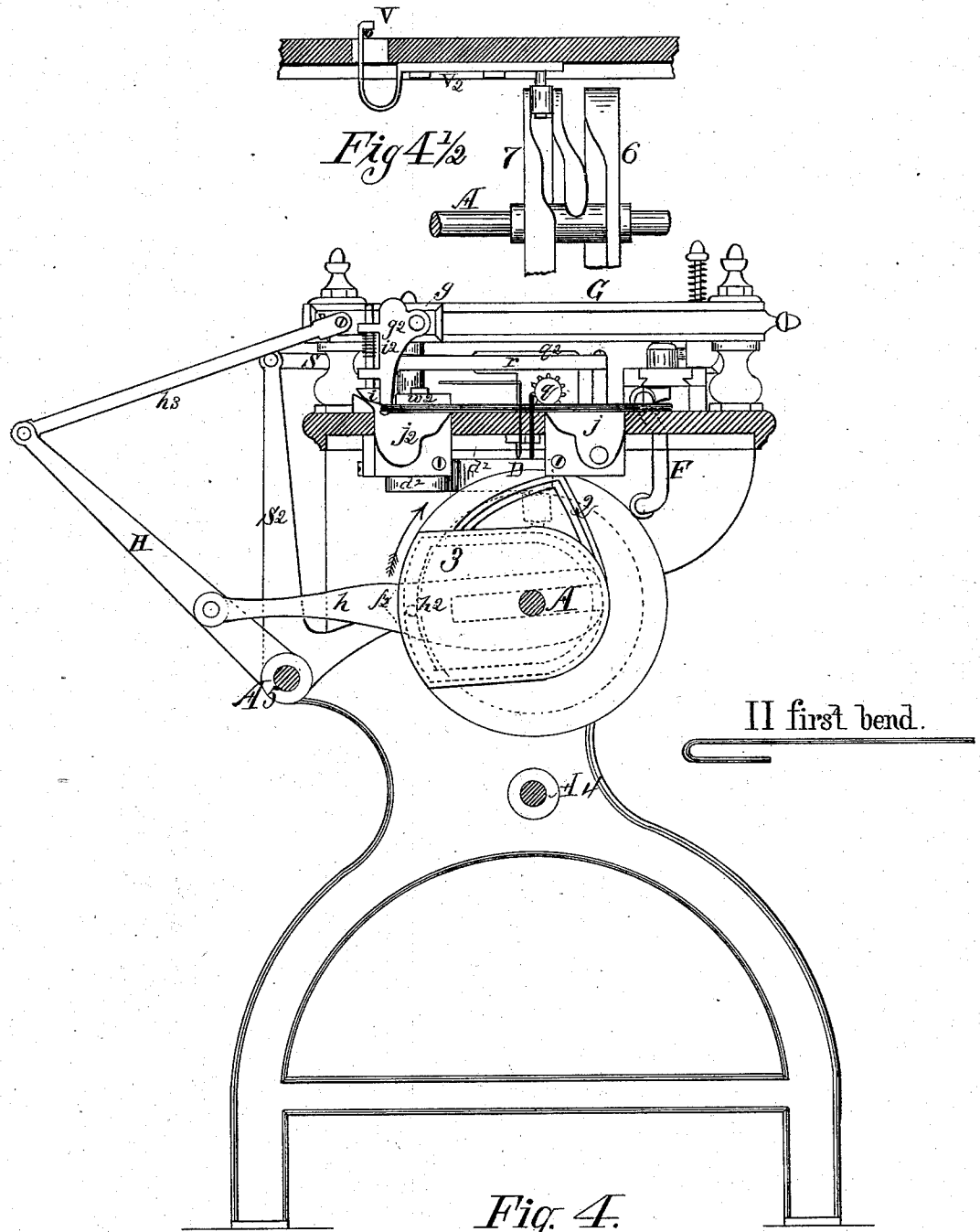

Fig. 4.

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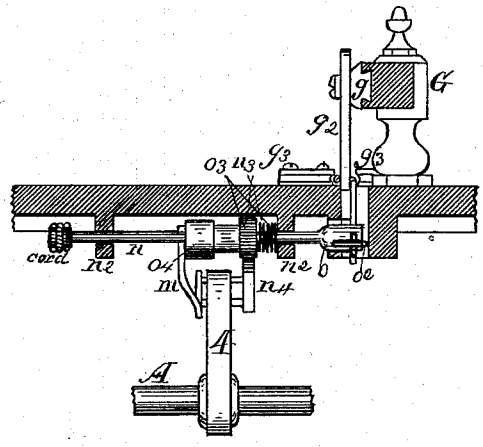
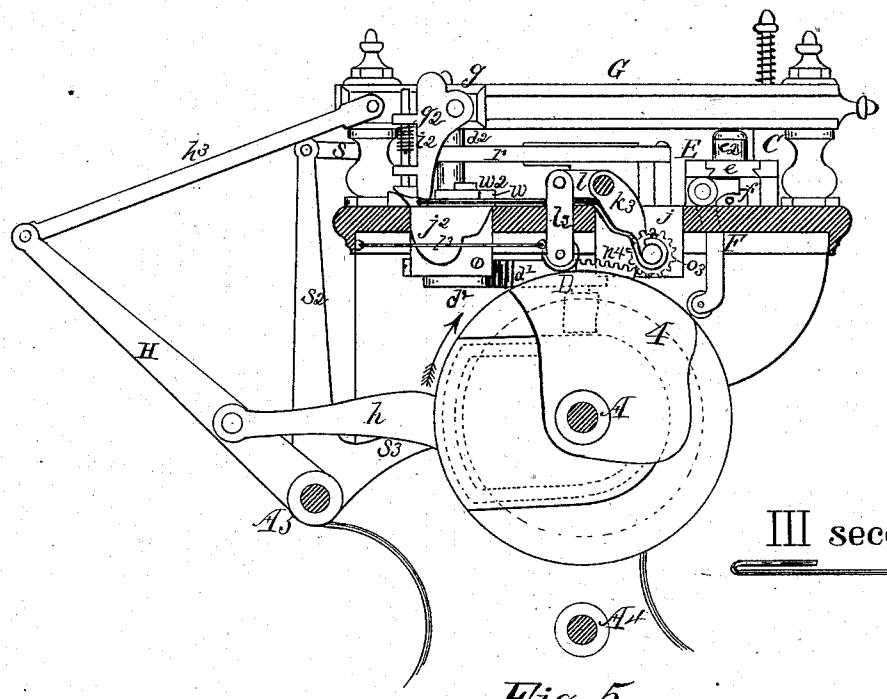


Fig 6.



III second bend

Fig. 5.

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MACHINE FOR MAKING WIRE CLOTHES PINS.

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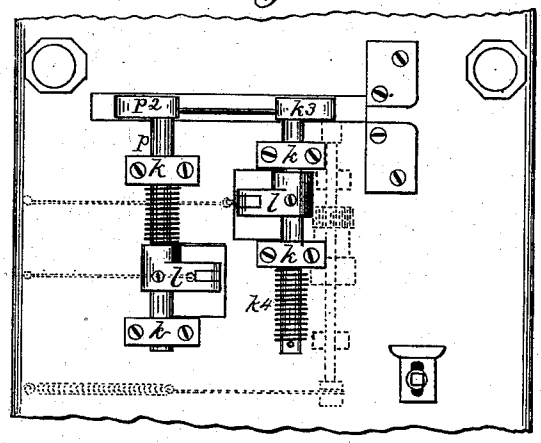
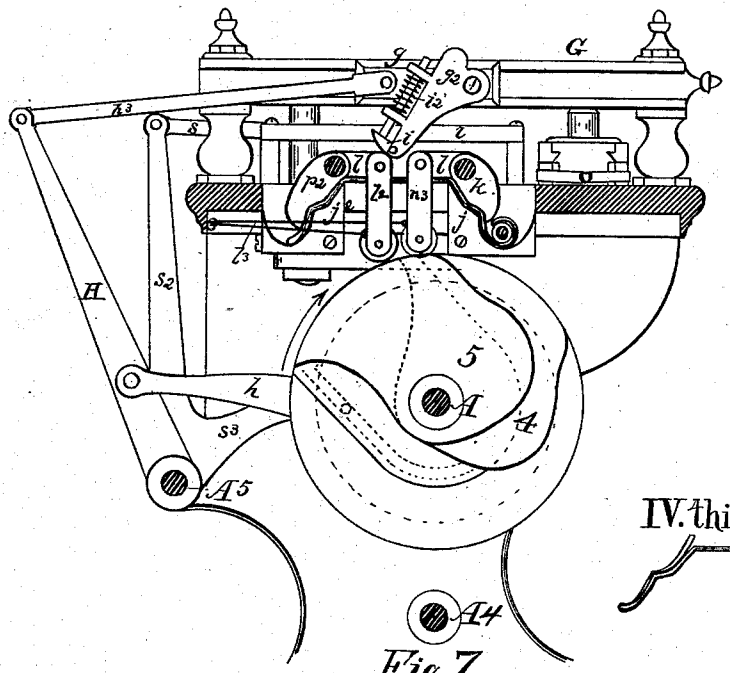
Fig. 8.





IV. third bend

Fig. 7

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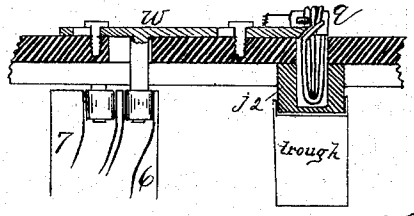


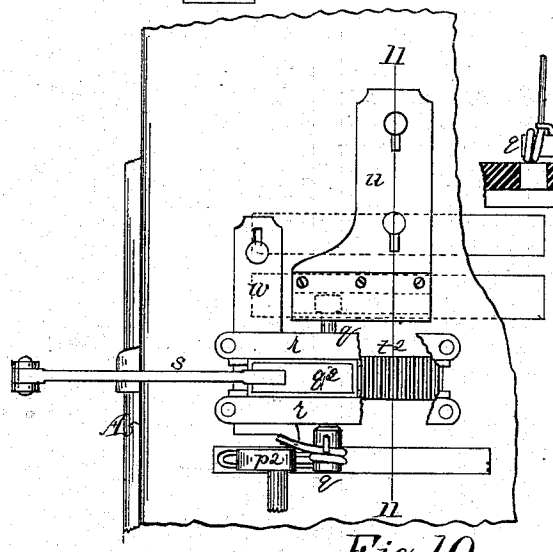


Fig. 10.

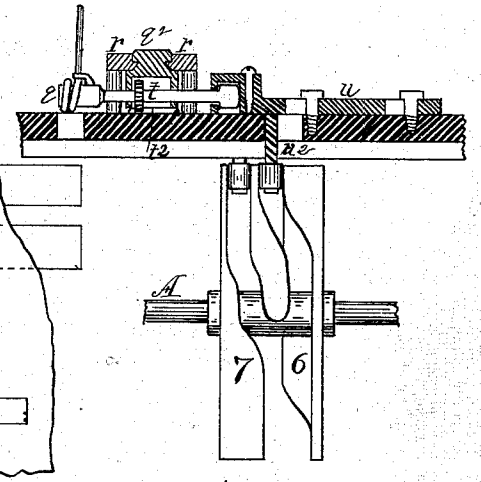


Fig. 11.

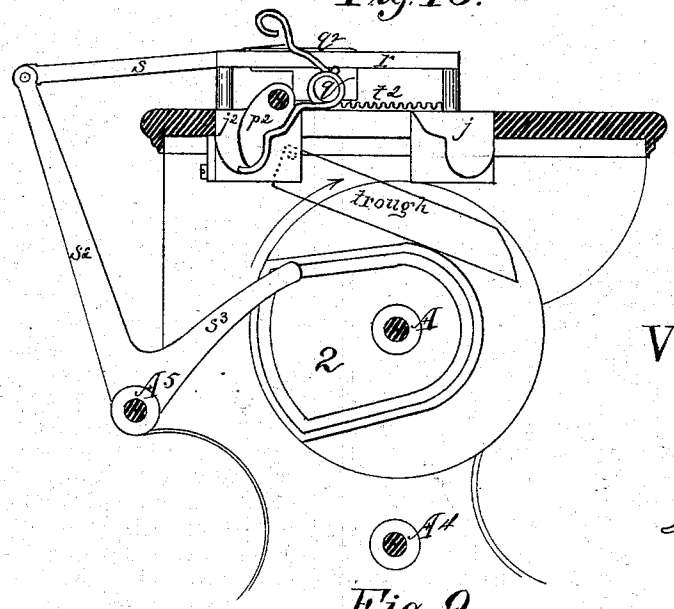
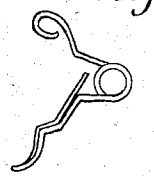


Fig. 9.

VI
Completed pin.

V *coiling.*



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UNITED STATES PATENT OFFICE.

ALLAN E. FRANCIS, OF CLEVELAND, OHIO.

MACHINE FOR MAKING WIRE CLOTHES-PINS.

SPECIFICATION forming part of Letters Patent No. 276,575, dated May 1, 1883.

Application filed November 3, 1881. (No model.)

To all whom it may concern:

Be it known that I, ALLAN E. FRANCIS, of Cleveland, in the county of Cuyahoga and State of Ohio, have invented a new and useful Machine for Making Wire Clothes-Pins, of which the following is a specification.

The nature and objects of this invention will fully appear from the subjoined description, when considered in connection with the accompanying drawings.

This machine takes the wire directly from the reels and discharges the pins complete, performing the various operations of cutting off the blanks and bending and coiling said blanks into the forms successively, as hereinafter described and claimed.

In the drawings, Figure 1 is a side elevation of the machine, showing the several shafts and the several cams on the main driving-shaft, and the feeding mechanism, with the wire as seen taken from the reel. Fig. 2 is a top or plan view of same. Fig. 2½ is a section in line 2½ 2½ on Fig. 2 of the blank-cut-off device. Fig. 3 is a vertical section in line 3 3 on Fig. 1, showing the cam with projection f^2 which operates said blank-cut-off F, the lever and pitman operating the devices which give the first bend to said blank wire. Fig. 3½ is a section in line 3½ 3½ on Fig. 1, showing the cam and the feeding device which intermittently carries forward the wire previous to the cutting off of the blank wire. Fig. 4 is a vertical section in line 4 4 on Fig. 2, showing the cam, the lever, and pitman operating the device which gives the first bend to the blank wire, said device having been moved across the top of table to perform said operation, showing said blank in second position lying over the forming-dies j j^2. Fig. 4½ is a section in line 4½ 4½ on Fig. 2, showing holding device operated by cam 7, for holding the wire down in place while the carrying device moves back across the table. Fig. 5 is a vertical section in line 5 5 on Fig. 1, showing cam operating link n^3, which throws down forming-die k^3, giving the second bend to the blank wire. Fig. 6 is a vertical section in line 6 6 on Fig. 2, showing the cam with looping device for giving the loop-bend on one end of said blank wire. Fig. 7 is a vertical section in line 7 7 on Fig. 1, showing the cams and link which throws down forming-die p^2, giving the third bend to the blank. During these bending operations the carrier moves backward to its original place, ready to receive the next blank Fig. 8 is a top view of the aforesaid forming-dies and the links and levers which are connected to them. Fig. 9 is a vertical section in line 9 9 on Fig. 1, showing the cam, lever, and coiling device which coils said blank between the two aforesaid bends. Fig. 10 is a top view of the same. Fig. 11 is a vertical section in line 11 of Fig. 10, showing the cam, the sliding plate u for pushing forward the coiling-spindle, the cam, and sliding plate w for bending the end of wire after the coiling is completed.

I is the blank piece of wire for making into the clothes-pin as cut from the wire fed from the reel. II shows said blank after first bend. III shows same after second bend. IV shows same after third bend. V shows same after it has nearly passed through the coiling operation. VI shows the completed pin. These operations are performed by the parts of the machine illustrated in the several figures, in connection with the several forms shown, in rapid succession, as follows:

A in the several figures is a shaft, on which are placed a series of cams which operate the several devices for producing the several successive results before stated. By each complete revolution of said shaft one complete pin is made. The said shaft A is set in suitable bearings under the table of the machine, which table also supports all the working parts. Shaft A is operated by a gear-wheel, A^2, attached to one end and located outside of the table-supports, being connected with a pinion, A^3, on a parallel shaft, A^4, located lower down in the said table-supports, and having the driving-pulley from which the machine derives all of its movements. A permanent shaft, A^5, is arranged at one side of the machine, the use of which will hereinafter appear.

The first movement of the machine is the feeding and straightening of the wire from a reel. The feeding device consists of a pair of feed-wheels, b b, set in a bracket, B, depending from the right-hand end of the table-top. These wheels are operated by a bevel-gear, b^2, on an extension of shaft A, and have a con-

stant but slow and steady movement, taking the wire from a reel. (Not shown.) The wire, after passing through said feed-wheels, is passed through a guide-arm, b^3, extending outward from the table; thence between straightening-wheels *c c c*, arranged near the right-hand end and front corner of the table. The upper of said wheels *c* is set in a post, C, with an adjustable bearing, for the purpose of regulating the tension of said wheels upon the wire and presenting a straight wire for the first operation in forming the clothes-pin. From the straightening-wheels the wire is fed by an intermittent movement produced by means of a device as follows: To the under side of the table is pivoted a lever, D, having a segment-gear, *d*, meshing with and operating a companion segment-gear on a turning post, d^2, extending upward through the table and carrying a curved arm, d^3. The said lever D is operated by the cam 1 on the shaft A. This cam 1 consists of two wheels having their inside opposing rims constructed with inclines for moving the said lever D at the proper times, the end of the lever operated by said cam having a friction-roll, d^4, playing in the space between the rims of said double wheel 1. On the top of the table are fixed ways E, in which a sliding cross-head, *e*, plays and is operated by means of a link, e^2, connecting it with the moving end of the curved arm d^3. The under side of said cross-head is provided with grippers e^3, which grip the wire and carry it forward in the forward movements, but release the wire in the backward movements. The wire is thus fed forward successively at suitable intervals from the slack wire between the feed-wheels and the straightening-wheels. A pair of grippers, e^4, are located at the side of block *f*, which catch and hold the main wire when the feeding-grippers e^3 are moving back. This is to prevent the wire being withdrawn from the block *f*.

At F is located a cutting device consisting of a short lever pivoted in a slot in the table, and having a cutting-edge playing against the face of a small block, *f*, attached to the table, near the end of the ways E, and through which the wire passes. The lower end of said lever F is struck by a projecting pin or lug, f^2, on the cam 2, whereby the blank for each pin is cut off at suitable intervals. An adjustable stop, f^3, on the table serves to prevent the blank from flying or jumping when cut off. At this stage the blank is carried by the first bending device, which forms the first bend, as seen at II in connection with Fig. 4, in the following manner:

G are ways located crosswise of and above the table, in which a sliding block, *g*, plays, and which carries a pivotal arm, g^2, that carries the blank wire with it when it moves across the table. This movement makes the first bend by carrying the wire between two blocks, g^3, secured to the top of the table. This operation is performed by the following means: To the side shaft, A^5, is attached a vibrating lever, H, operated by a pitman, *h*, attached by a pivotal joint, said pitman being bifurcated in its forward end, and straddles the shaft A, as seen in Fig. 3. Upon the shaft A is a cam, 3, in the side of which is a groove of the shape of the cam, in which a pin, h^2, on the side of the pitman *h* plays. To the top end of the tilting lever H is attached a connecting-rod, h^3, connecting said lever H with the sliding block *g*, by means of which the said sliding block is operated. The arm g^2 has a notch in its lower end, covered by a latch, *i*, consisting of a small rod playing in lugs on the side of the said arm, and provided with a spring, i^2, which keeps the latch down. The wire, as it is carried forward by the feeding device before described, is passed through the said notch in arm g^2, and is held therein by the latch; then the blank, having been cut off, as before stated, is carried across the table, and at the same time, receiving its first bend, is now located in the slot opening in said table, and lies over the dies $j j^2$, attached to the under side of the table and at each end of said slot. The said blank wire is now ready for the next operation. This consists in forming the bend and curling the end of said blank, as seen at III in connection with Fig. 5, by the following means: On the top of the table are secured two blocks, *k k*, in which a spindle, k^2, is placed, having a forming-die, k^3, attached on the end next to the aforesaid slot-opening in the table, and arranged to operate, in conjunction with die *j*, for forming the bend in the III stage of the operations. On said spindle, between the blocks *k k*, is fixed a short crank-arm, *l*, and on the spindle outside the block is placed a spring, k^4, for the purpose of drawing the spindle back, as hereinafter shown. To the crank-arm *l* is pivoted a link, l^2, which is held in a perpendicular position by a second wire link, l^3, connecting it to the side of the table. This allows the link l^2 to have an up-and-down movement for operating the spindle and its die, which movement is performed by the cam 4 on shaft A. It is provided with a side leaf, *m*, which serves to push the spindle and die forward over the die *j* by the said leaf engaging with the link l^2. Then the cam engages with the link, and, raising it, brings the forming-die k^3 down onto the wire and forces it into the said die *j*, thereby forming the bend and crook, as shown in form III. The coil in the end of the wire is performed by the same cam, operating a spindle, *n*, fixed on the under side of the table in bearings n^2. It has a segment-gear, o^3, by means of which it is given a half-revolution by a short segmental rack, n^4, attached to the cam 4. Said spindle has a small round head, *o*, having a hook, o^2, which catches the end of the wire when the said spindle is pushed into the die *j*, and as it revolves turns the end of the wire over, as seen in form III. As soon as this turn is made the leaf and rack release the spindle, which immediately flies back by the force of the spring o^3 placed onto it for that purpose. The opposite end of spindle *n* has a

small wheel, on which is wound a cord, n^5, having its end attached to a spring, n^6. This cord is wound on the wheel as the bend is being made in the wire, and when the rack releases the spindle the tension of the spring rotates the spindle back again, ready for repeated operation. During this operation of turning the end of the wire the forming-die still holds the wire down until this end of the wire is finished.

The next operation is to form the bend and crooks in the opposite end of the wire—the next stage of the operation. This is performed by another cam, 5, of similar construction to cam 4, operating a second spindle and forming-die p p^2, of like construction to the one already described, the former one working in advance of the latter. In the meantime, also, the carrier-block g, with its pivotal arm g^2, is carried back across the table, ready to receive the next blank wire. At this stage another operation takes place—that of coiling the central portion of the wire, as seen in form V, the device for which consists of a spindle, q, set in a sliding block, q^2, playing in the ways r r, set above and across the table, in like manner to that of G. The said sliding block q^2 is operated by means of a connecting-rod, s, connecting it with a tilting lever, s^2, having an angle-arm, s^3, operated by a cam, 2, on shaft A. The spindle q has on its central part a pinion, t, meshing with a broad rack, t^2, secured to the top of the table, the object of which is to revolve the spindle as it is carried over it. This spindle also has a lateral movement for the purpose of carrying the coiling end over to the wire to be coiled at this stage of the work. To accomplish this lateral movement the end of the spindle q has a head on the end, which plays in a groove in the end of a sliding plate, u, arranged on the top of the table, which plate has a depending arm, u^2, through a slot in said table, and has a friction-roll, and is operated by a cam-wheel, 6, on shaft A. Previous to this operation, and just as the first forming-die releases the wire, a wire-holding device, V, holds the wire for the coiler to take it. This holder consists of an arm, v, attached to a sliding plate, v^2, located on the under side of the table, and which is operated by cam-wheel 7, in like manner to that of plate u. The cam-wheels 6 and 7 have their rims so constructed as to move the said plates at the proper times and length of time to perform their functions. Thus when the coil in the wire has been completed the said holder and coiler are withdrawn and the coiler is carried back across the table, ready for a repetition of its work. After the said coiler has completed the coil, and before the forming-die releases the pin, a plate, w, arranged on the top of the table, is operated in a similar manner to plate u by a side projection on cam-wheel 8, which gives a quick short movement to said plate w, which has a projecting point, w^2, on forward end, that strikes against the end of the wire and forms the last bend. (Seen at ♀ in form VI.) This completes the pin, and then the said forming-die is released by its cam, which then flies back, and the pin, being freed, falls into a trough, T, and slides down and drops into a receptacle beneath.

Having described my invention, I claim—

1. In a machine for making wire clothes-pins by a continuous operation, a mechanism constructed and arranged to automatically straighten and feed forward the wire at stated intervals, a mechanism constructed and arranged to cut off the blanks at stated intervals, a mechanism constructed and arranged for conveying across the table and making the first bend in the said blank wire, a mechanism constructed and arranged for forming the bends and crooks in each end of said blanks, a mechanism for coiling the central part of said blanks, and a mechanism for bending over the end of blank wire in completing the pin, all combined and operating substantially in the manner and for the purpose specified.

2. The combination, with the revolving shaft A, provided with the cam-wheel 1, of the reciprocating lever D, having the segmental gear d, operating the geared turning post d^2, having the arm d^3, connected to and moving the sliding block e, provided with the grippers e^3, and the straightening-wheels e e e, as and for the purpose specified.

3. The combination, with the revolving shaft A, provided with the cam 3, of the bifurcated pitman h, operating the tilting lever H, having the connecting-rod h^3, operating the sliding block g in the ways G, which carries the pivotal arm g^2, having the latch i, whereby the blank is carried across the table and given the first bend, II, substantially as described.

4. The combination, with the revolving shaft A, provided with the cam 4, having leaf m, of the spindle k^2, set in the blocks k k, and having the spring k^4, and carrying the forming-die k^3, and also having the crank-arm l, with its link l^2, whereby the second bend and crook is made in the blank in conjunction with the fixed die j, substantially as described.

5. The combination, with the revolving shaft A, provided with the cam 4, having leaf m, of the spindle n, set in the depending blocks n^2, and provided with the pinion n^3, spring o^3, and sleeve o^4, and also having the pin o and hook o^2 on the end, whereby the bend III on end of the blank is made at the same time and in conjunction with the forming-die k^3 and fixed die j, substantially as described.

6. The combination, with the revolving shaft A, provided with the cam 5, having a leaf, m^2, of the spindle P, set in blocks, and having spring, crank-arm, and link, like spindle k^2, and carrying forming-die p^2, whereby the bend and crook IV on opposite end of blank is made in conjunction with fixed die j^2, substantially as described.

7. The combination, with the revolving shaft A, provided with the cam 2, of the angle tilting lever s^2 s^3, having the connecting-rod s, op-

erating the sliding block q^2 in the ways r, and carrying the spindle with head and hook q, also having the pinion t, working in the rack t^2, whereby the curling of the central part of the blank V is made, substantially as described.

8. The combination, with the revolving shaft A, provided with the cam 6, of the sliding plate u, having a depending arm, u^2, with a friction-roll, and actuated by said cam 6, the said plate u being connected with the end of said spindle q, whereby said spindle is made to approach and take up the blank in conjunction with the aforesaid coiling mechanism, and again to release it from the blank when coiled, substantially as described.

9. The combination, with the revolving shaft A, provided with cam 7, of the sliding plate v^2, arranged on under side of the table, and having a depending arm and friction-roll actuated by said cam 7, said plate v^2 carrying a hook, v, whereby the blank wire is held and moved toward the spindle-head after the release from the forming-die k^3, for the said spindle-head to catch it for coiling, substantially as described.

10. The combination, with the revolving shaft A, provided with the wheel 8, having side projection, of the sliding plate w, having projection w^2, for forming the last bend ♀ in the blank, thus completing the pin as seen in VI, substantially as described.

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