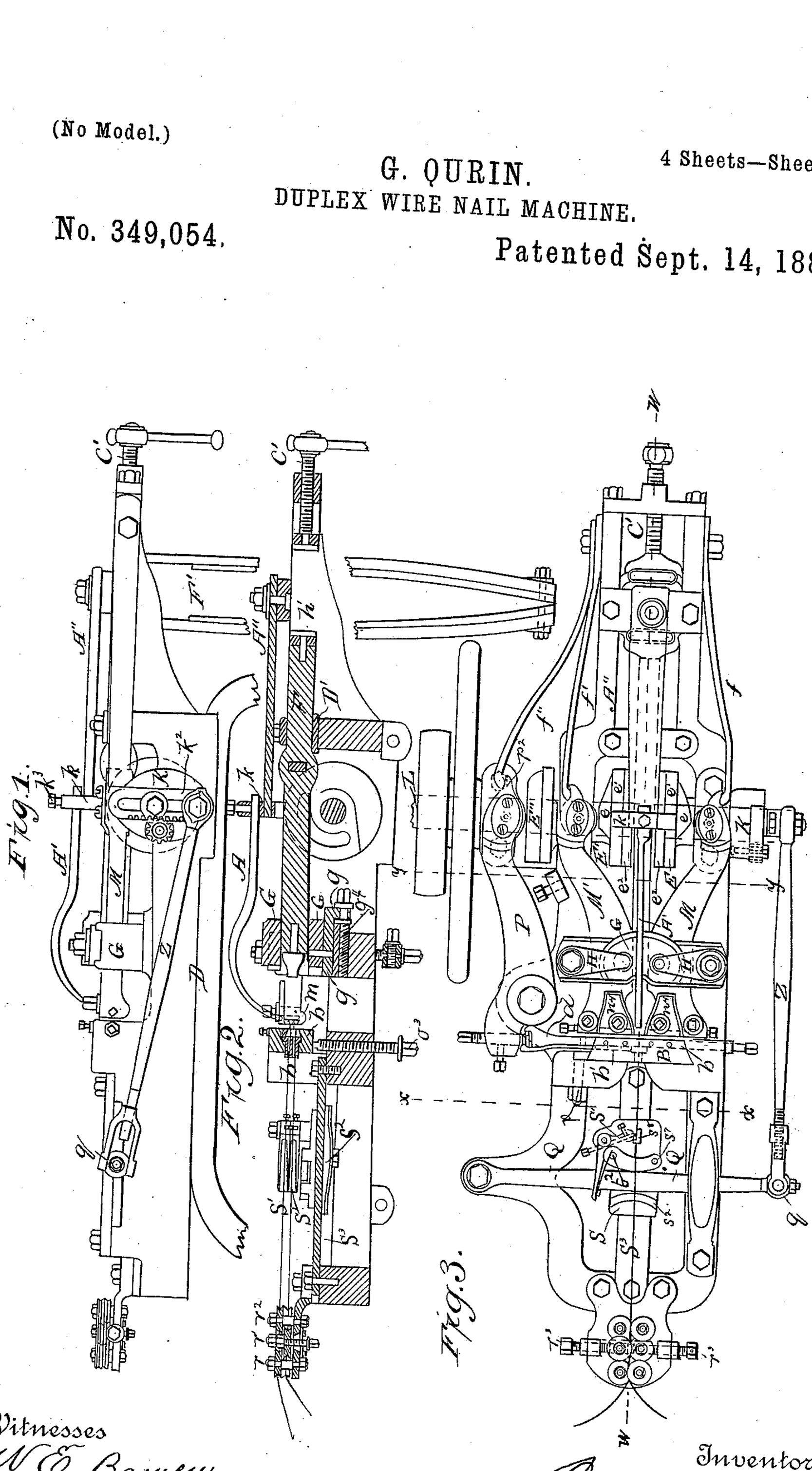
(No Model.)

4 Sheets—Sheet 1.

G. QURIN.

DUPLEX WIRE NAIL MACHINE.

No. 349,054. Patented Sept. 14, 1886.



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(No Model.) 4 Sheets—Sheet 2.

G. QURIN.

DUPLEX WIRE NAIL MACHINE.

No. 349,054. Patented Sept. 14, 1886.

Fig. 4.

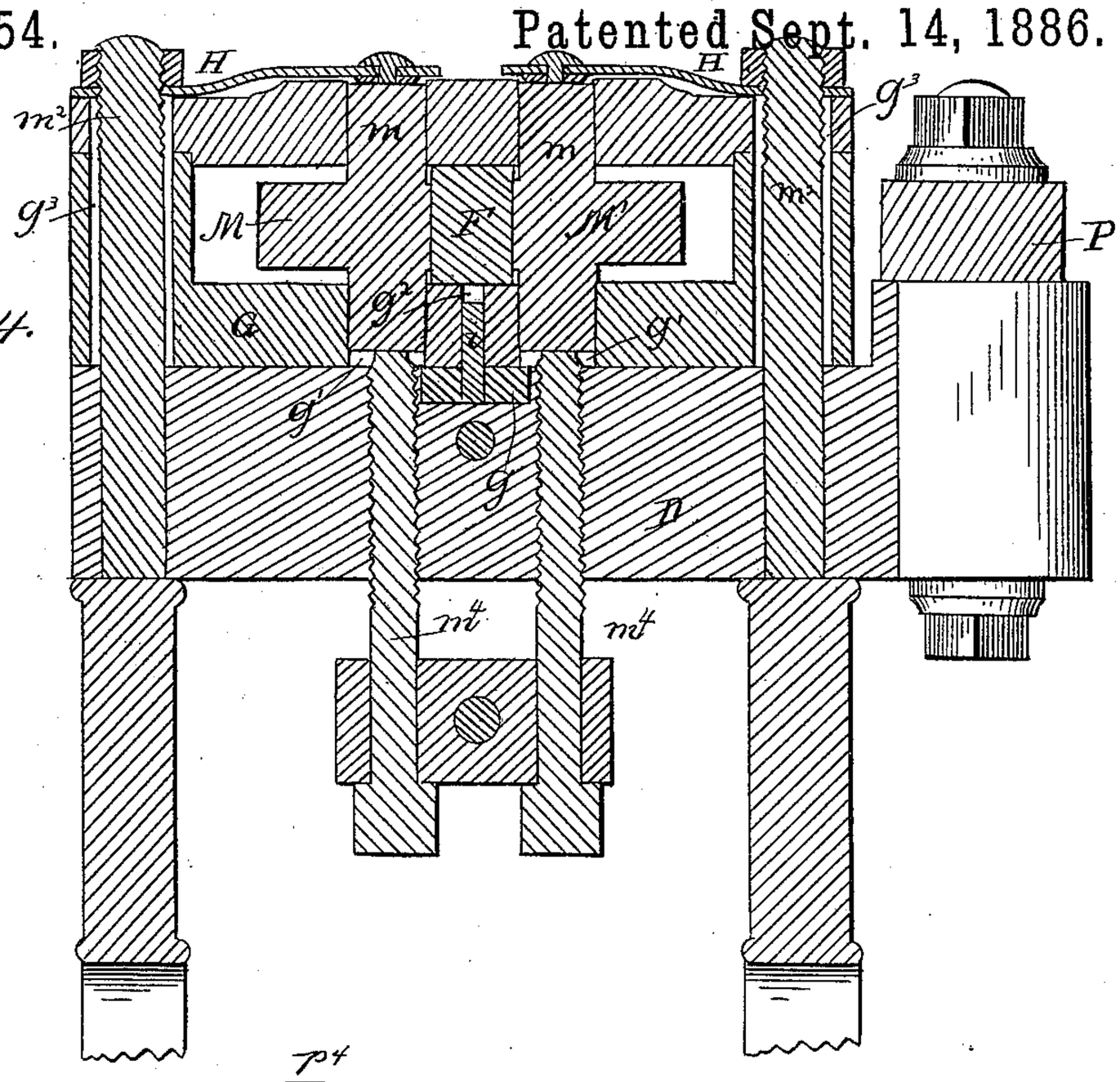
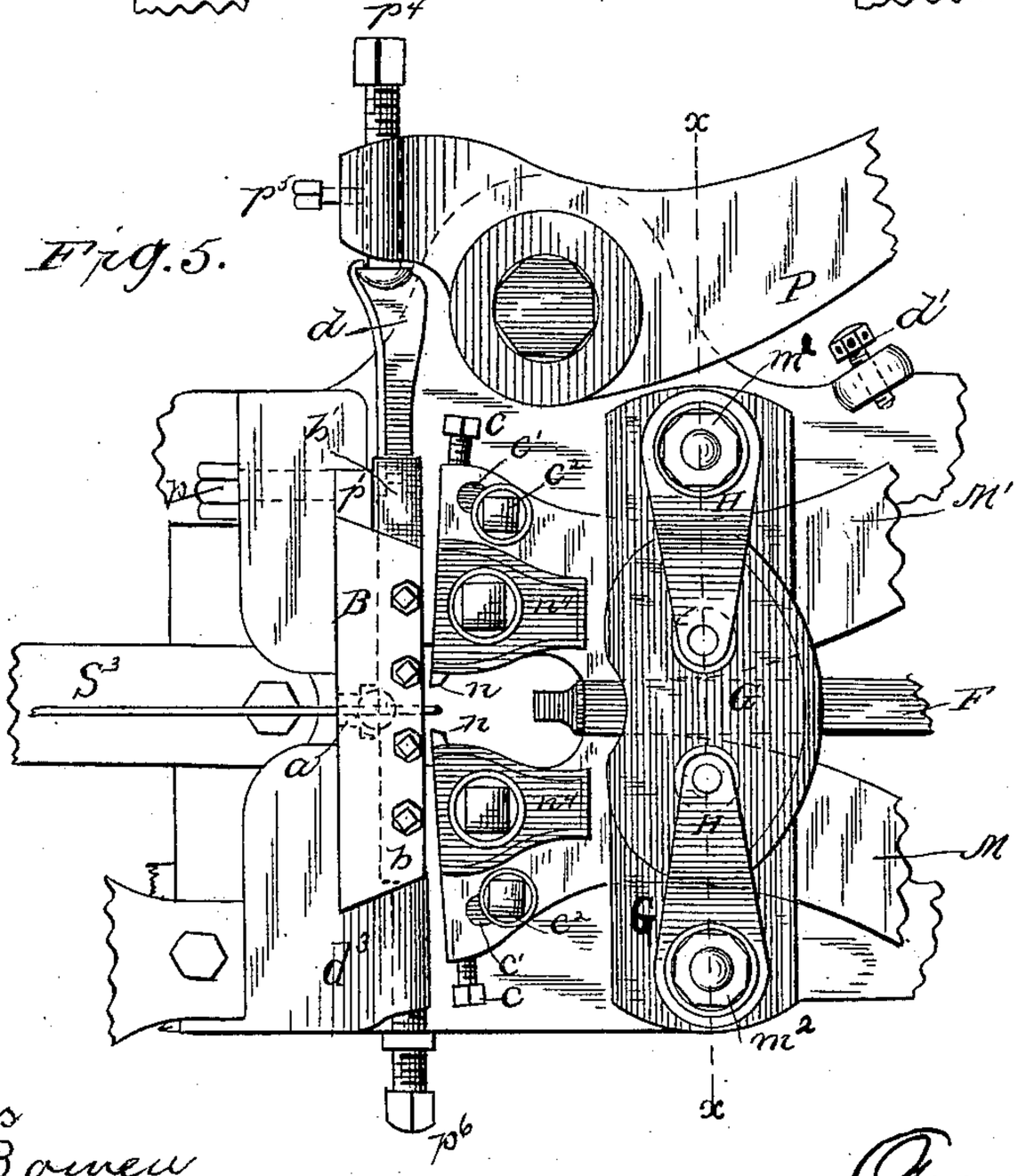


Fig. 5.



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(No Model.) 4 Sheets—Sheet 3.

G. QURIN.

DUPLEX WIRE NAIL MACHINE.

No. 349,054. Patented Sept. 14, 1886.

Fig. 6.

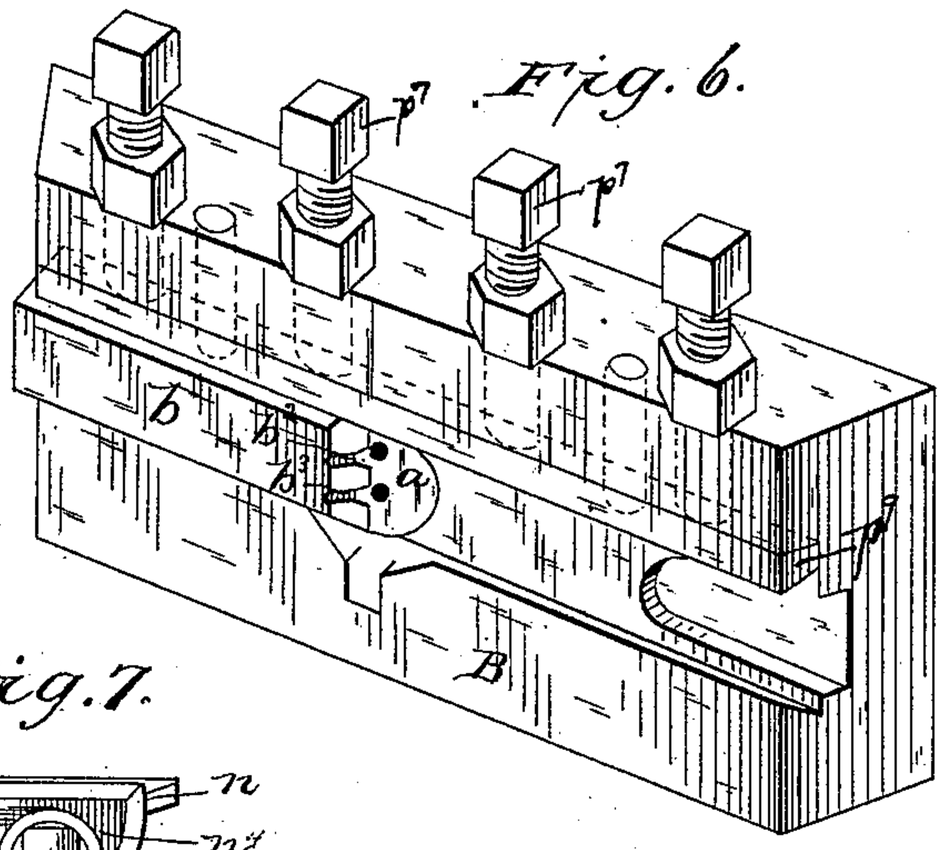


Fig. 7.

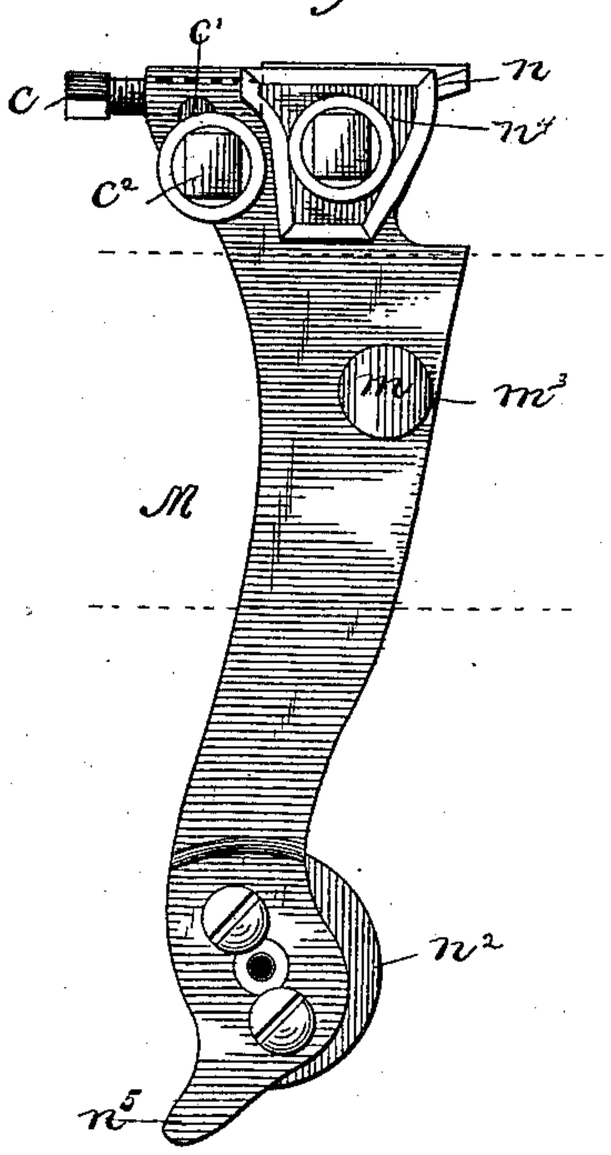


Fig. 7a.

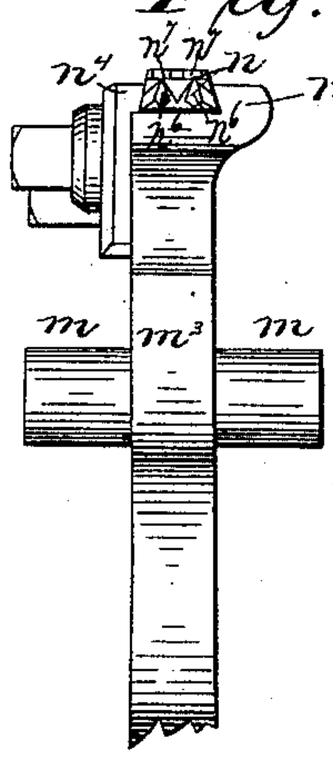
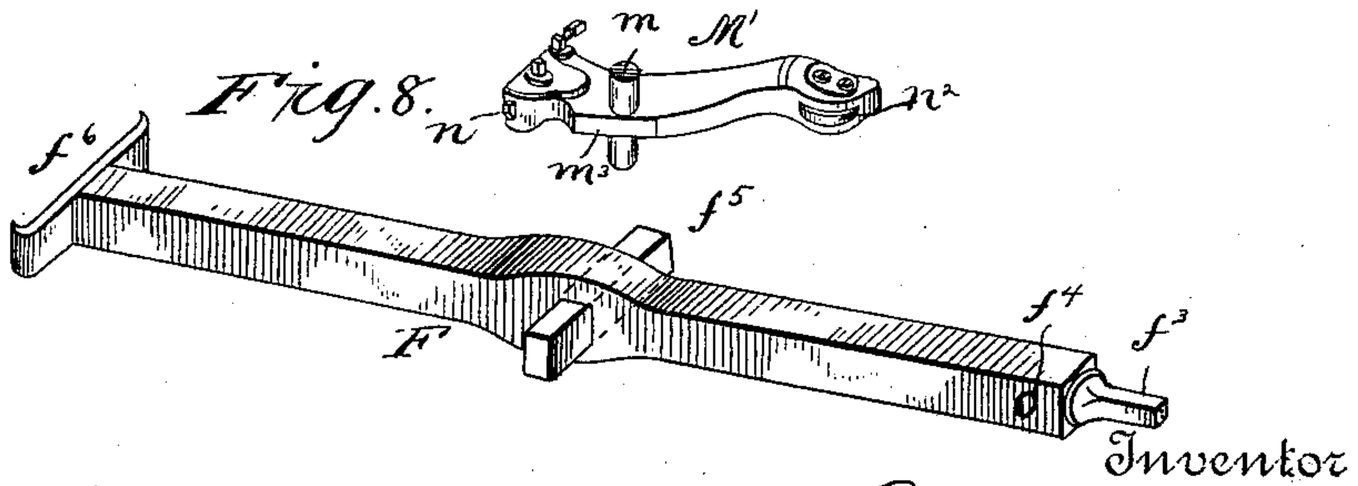


Fig 7b

Fig. 8.



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(No Model.) 4 Sheets—Sheet 4.

G. QURIN.

DUPLEX WIRE NAIL MACHINE.

No. 349,054. Patented Sept. 14, 1886.

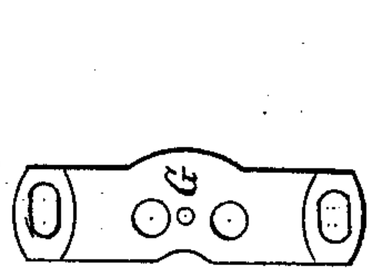

Fig. 4.

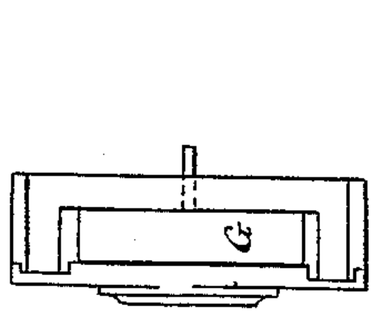

Fig. 4.a

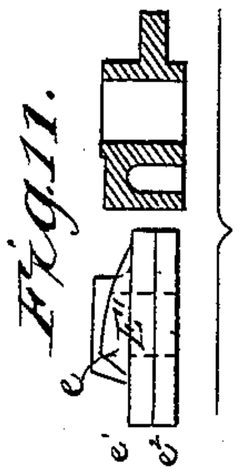

Fig. 11.

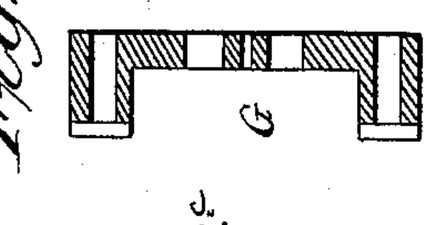

Fig. 4.b

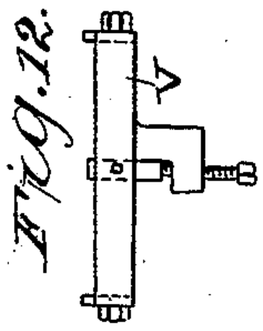

Fig. 12.

Fig. 13.

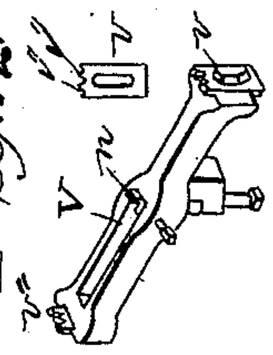

Fig. 12.a

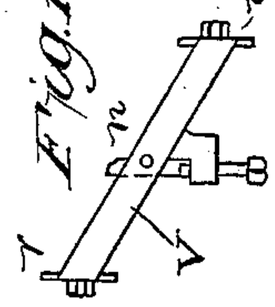

Fig. 12.c

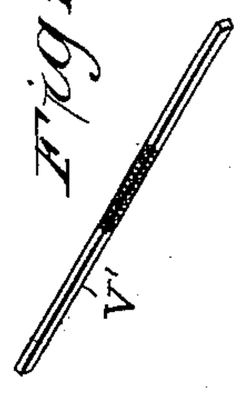

Fig. 12.b

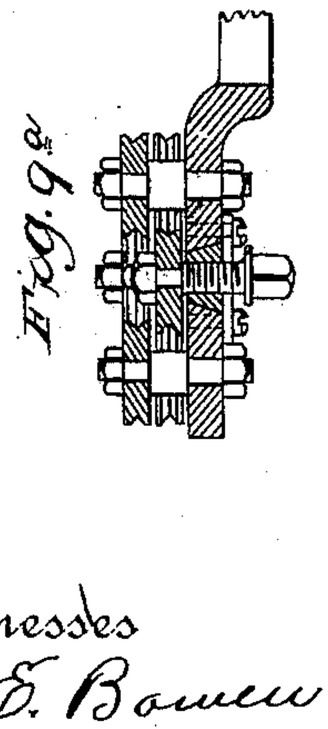

Fig. 9.a

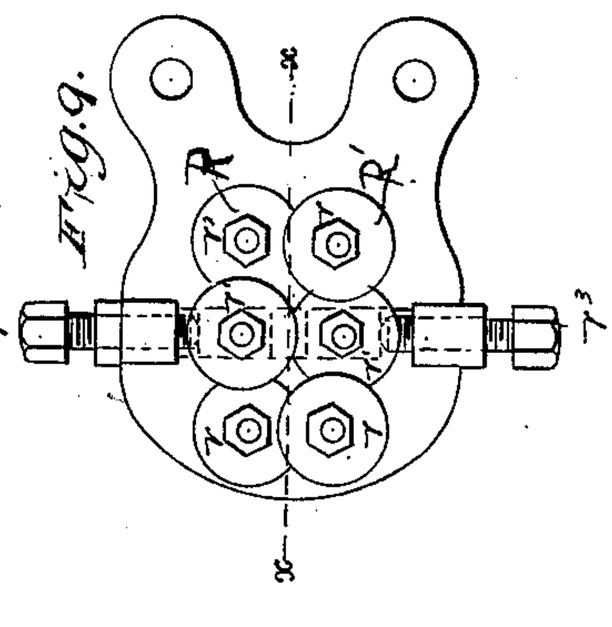

Fig. 9.

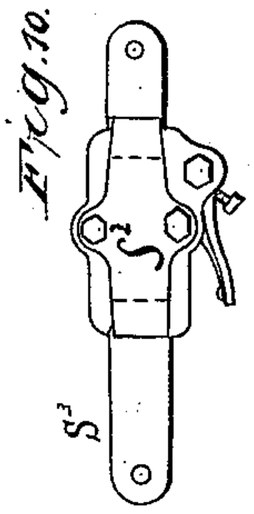

Fig. 10.

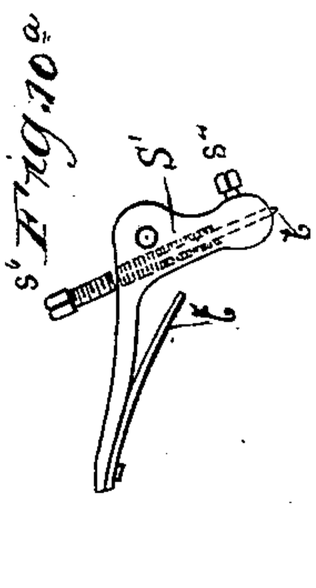

Fig. 10.a

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UNITED STATES PATENT OFFICE.

GEORGES QURIN, OF COLUMBUS, OHIO, ASSIGNOR OF ONE-THIRD TO SAMUEL R. KLOTTS, OF SAME PLACE.

DUPLEX WIRE-NAIL MACHINE.

SPECIFICATION forming part of Letters Patent No. 349,054, dated September 14, 1886.

Application filed June 9, 1886. Serial No. 204,618. (No model.)

To all whom it may concern:

Be it known that I, GEORGES QURIN, having duly made oath of intention to become a citizen of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented certain new and useful Improvements in Duplex Wire Tack, Nail, and Spike Machines; 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 and figures of reference marked thereon, which form a part of this specification.

The object of this invention is to provide an improved wire tack, nail, and spike machine for the manufacture of pointed and headed tacks and nails of any desired size and shape from a continuous piece of wire; and the invention consists of the improved machine hereinafter described.

In the accompanying drawings, forming part of this specification, Figure 1 represents a side elevation of a machine embodying my invention; Fig. 2, a section on line *w w*, Fig. 3. Fig. 3 represents a plan view thereof, showing the two wires or blanks as entering the rolling apparatus; Figs. 4, 4^a, 4^b, and 4^c, respectively, a section on line *x x*, Fig. 5, and top and side views of the fulcrum-stock; Fig. 5, an enlarged detail between the lines *x x* and *y y*, Fig. 3, with the detacher removed. Fig. 6 represents the adjustable die-stock; Figs. 7, 7^a, and 7^b, details of the knife-levers; Fig. 8, a perspective of the hammer; Figs. 9 and 9^a, a plan and section of the rolling apparatus. Fig. 10 is a bottom view of the slide or feeding device; Fig. 10^a, one of the crank-levers; Fig. 11, one of the cams; Figs. 12, 12^a, 12^b, and 12^c, the die-sharpening apparatus, and Fig. 13 the bridge.

A machine for the manufacture of wire nails should be simple of construction, embodying means whereby the working parts are readily adjustable, and the means of adjustment should be readily accessible. The parts should be light and well proportioned, but sufficiently strong to withstand the work and pressure required. These principles I have endeavored to embody in my invention.

The operating parts of my machine are supported upon a suitable standard, D, which is provided with a cam-shaft, L, to which are keyed the several actuating-cams hereinafter described. The motive power is applied to the shaft by any suitable means.

In this duplex machine two wires or blanks are fed through a double series of guide-rolls, (marked R R′, respectively,) one series being superposed above the other. The two middle rolls, *r′ r′*, are laterally adjustable by means of the screws *r*^{3}. From these rolls the superposed wires pass to the slide S, which takes up and intermittently feeds the wires through the parallel wireways of the guide-block *a*. The slide S, which is held upon the bar S^3 by means of the spring S^2, Figs. 2 and 10, is provided with the radial shoulders *s*^{2} *s*^{7}, between which the feed-bar Q is held, and also with the stud *s*^{8}, which in turn is provided with an anvil, (not shown,) over which the two wires pass, one above the other. Two bell-crank levers, S′ S′, as shown in Fig. 2, are pivotally connected to the slide S. These bell-crank levers, one of which is shown in detail in Fig. 10^a, are provided at their lower ends with the chisels *t t*, that are adjustable by means of the screws *s*^{6} and set by means of the screw *s*^{4}. These levers are also provided with the springs *t′ t′*, by means of which the wires are forced against the anvil, and, when the slide S is carried forward, feed the two wires through the guide-block *a* to the duplex pressure-dies *b b′*. The springs *t′ t′* of the superposed levers press against the lug *t*^{2}, and thereby force the ends containing the chisels *t t* against the wires which are engaged by said chisels, and when the latter are carried forward the two superposed wires are simultaneously fed to the duplex pressure-dies *b b′*, as clearly shown in Figs. 2 and 3. In their backward movement the levers readily disengage themselves and slide over the wires.

The duplex pressure-dies and their arrangement form a very important part of my invention. These duplex dies (marked *b* and *b′*) are horizontally adjustable in a vertically-adjustable die-stock, B, the latter being held and guided on either side by shoulders of the frame D and clamped by means of the clamp-

screw *p*. This screw is provided with the angular lip *p'*, as shown in Fig. 5, which, when the screw *p* is tightened, forces the die-stock B against the shoulder d^3 of the frame, and thus securely clamps the same. The die-stock is vertically adjustable by means of the screw o^3, as shown in Fig. 2. The two horizontal pressure-dies *b b'* are guided within a dove-tailed guideway of the die-stock B, and are provided with the serrated wireways b^2 b^3, which are a continuation of the wireways of the guide-block *a*, as clearly shown in Fig. 6. These duplex dies—of which the one marked *b* is stationary, being adjustable by means of the screw p^6, while the one marked *b'* is actuated by the pressure-lever P—clamp the two wires in the ways b^2 b^3, when the hammer F forms the two heads. The screws marked p^7, pressing upon the key p^9, serve to clamp the die *b* and ease the movement of die *b'* within the guideway. The movement of the pressure-die *b'* toward the die *b* is regulated by means of the screw p^4 of the lever P, the die *b'* being movably connected thereto by means of a link, *d*. The outward movement of the die is checked by means of the screw *d'*. The wires, after leaving the pressure-dies *b b'*, passing through the same in juxtaposition, are fed to a duplex point-cutting mechanism, comprising a set of duplex cutting-dies mounted within suitable knife-levers, the levers working pivotally within sockets of an adjustable fulcrum-stock, G, which is situated immediately in front of the pressure-dies *b b'*. The fulcrum-stock G, provided with a feather-fitting top, rests on either side on the frame D, working in the center upon the pin *i* of the slide *g*, as shown in Figs. 2 and 4. The stock is provided with the elongated slots g^3 g^3, pivot-sockets *g' g'*, and the central socket, g^2, adapted to contain the pin *i* of the slide *g*. The two pivoted knife-levers M and M', provided with the studs *m m*, work within the sockets *g' g'* of the fulcrum-stock, being vertically adjustable therein, and rest upon the adjustable set-screws m^4 m^4, which project into the sockets. Springs H H, attached to the top of the stock, and provided with small metallic buttons, exert a pressure upon the studs *m m*, and tend thereby to continually force them upon the adjusting-screws m^3 m^3. By means of the slide *g* the fulcrum-stock may be carried forward or rearward, being pivotally connected to said slide, and by means of the pivot-pin *i* and socket g^2 the stock may be readily adjusted. The slide *g* is operated by means of a screw, g^4, as will be readily understood by referring to Figs. 2 and 4 of the annexed drawings. The fulcrum-stock is set by means of the bolts m^2 m^2, which are connected to the frame D and pass through the elongated slots g^3 g^3 of the stock, being fastened on top by means of nuts. It will thus be seen that the knife-levers M and M' are universally adjustable longitudinally by means of the slide *g*, the fulcrum-stock G being pivotally connected thereto vertically by means of the adjusting-screws m^4 m^4 and radially by means of the fulcrum-stock G.

The knife-levers M and M', by the joint cutting action of which two points are simultaneously cut and two nails severed from the blanks, are peculiarly but gracefully shaped. The front or jaw stocks are provided with the adjustable duplex cutting-dies *n n*, while the rear or lever portion is provided with the ears n^5 n^5 and the rolls n^2 n^2, which work upon journals that are held in position by suitable screws, as shown in Figs. 7, 7^a, and 7^b. The levers M and M' are provided with the diverging hardened and tempered breasts m^3 m^3, that serve as a guide for the upsetting die or hammer F.

The construction of the knife-levers form a very important part of my invention. It often happens that one or the other of the knife-levers tightly wedges into the blanks when cutting the points, so that the springs *f* or *f'*, which are designed to force the levers into an open position, fail to perform their function. The hammer F, which plunges immediately after the joint cutting action of the knife-lever M M', would crush into the cutting-dies *n n* if it were not for the breasts m^3 m^3, which the hammer strikes, forcing the lever or levers into the proper position. It also occasionally happens that the springs *f f'* break, leaving the dies *n n* in the path of the hammer F. This would also result seriously if it were not for the breasts m^3 m^3, which the hammer engages, and thus forces the dies out of its path. By this arrangement of the knife-levers the springs *f f'* may be dispensed with.

The duplex cutting-dies *n n*, as shown in Fig. 7^a, are held in the jaws of the levers by means of the angular lips n^3 n^3 and the screw-plates n^4 n^4.

The cutting-dies *n n* are adjustable by means of the screws *c c*, which are clamped by the pins *c' c'* and the set-screws c^2 c^2. These dies are provided with two adjoining pyramidal-shaped angular depressions, n^6 n^6, the apices of which terminate at the cutting-edges n^7 n^7 of the dies, as clearly shown in Fig. 7^a. These dies *n n* are very carefully constructed, as it is very necessary that the cutting-edges of the two dies should exactly coincide; otherwise imperfectly-pointed nails will be formed. It is also very necessary that the cutting-edges of the dies should accurately coincide with the wireways of the guide-block *a* and of the pressure-dies *b b'*. This is readily accomplished by means of the adjusting devices described above.

In order to have one die precisely like the other, I employ the apparatus shown in Figs. 12, 12^a, 12^b, and 12^c, by which in clamping the dies *n n* in the angle-iron V and guiding a file, V', in the adjustable ways *v'' v''* of the iron I am enabled to cut one die precisely like the other.

Adjoining the knife-lever M', working upon a suitable stud, is the pivoted pressure-lever

P. This lever is similar in construction to the knife-levers, being provided with an anti-friction roller and the ear p^2. At the forward end the lever is provided with an adjusting-screw, p^4, and set-screw p^5. The adjusting-screw p^4 is provided with a button, which is engaged by a connecting-link, d, that is pivotally connected to the movable duplex pressure-die b', as shown in Fig. 5. The movement of the lever P in one direction is checked by means of the screw d'. The return motion of the knife-levers M M′ and the pressure-lever P is accomplished by means of the springs f, f', and f^2, which bear against ears at the rear of the several levers. The cam-shaft L is provided with the cams E E′ E″ and the crank-eccentric K. The outermost cam, E″, is keyed to the shaft and operates the pressure-lever P. This lever is laterally oscillated by means of the cam E″, which engages the roll of the lever, and thus forces the duplex pressure-die b', which is connected thereto, into open and closed position when the wires are feeding and when the heads are being formed. The duplex cams E and E′ engage the knife-levers M M′, the hammer F, and the bridge K′ of the detacher A′. These cams are both rigidly keyed to the shaft L. The parts marked e e engage the rolls of the knife-levers, simultaneously opening and closing the same. The parts marked e' e' drop and raise the bridge k, imparting thereby the plunging motion to the detacher, while the parts marked e^2 e^2 engage the lug f^5 of the hammer F, forcing the latter against the spring F″, but releasing the same at the proper moment when propelled by the spring F′. The crank-eccentric K, to facilitate adjustment, is provided with a pinion and pinion-rod k^2. To the rod k^2 is attached the adjustable pitman Z, that is connected by means of a universal joint, q, to the pivoted feed-bar Q. It will be seen that the parts marked K, Z, Q, and S constitute the adjustable feeding mechanism, by means of which the length of the nails is regulated. The bridge k connects the arm A′, which is adjustable therein and set by means of a set-screw, k^3, to the wooden or metallic spring A″. This spring is fastened to the frame D by any suitable means. The bridge k, riding upon the cams e' e', imparts a plunging motion to the arm A′, which at each revolution of the cams plunges downward and detaches the finished nail from the blank.

The detacher, although not required until the nail is finished, forms, nevertheless, a very important part of the machine. It often happens, especially when the dies become somewhat dull, that the nails are not entirely severed from the blank. As these hanging nails would interfere with the operation of the hammer F, it is very necessary that they should be removed, which is accomplished by means of this detacher A′.

The hammer shown in Fig. 8 is provided with a suitable socket adapted to contain the shank of the removable duplex upsetting-die f^3, which is held in the socket by means of a pin, f^4. When square, round, or conical heads are to be made, the die f^3 is provided with two suitable cavities adapted to simultaneously work the heads upon the two projecting blanks. Centrally of its length the hammer is provided with the lug f^5. This lug is engaged by the cams E E′ and forces the hammer against the spring F′. At the proper moment the cams release the hammer, and it plunges forward, being guided in the rear by the way D′ of the frame D and forwardly by the fulcrum-stock G and the knife-levers M M′. At the rear the hammer is provided with the movable saddle f^6, that engages one member of the spring F′. The force of the spring F′ is regulated by means of the screw C′. The hammer is shown in its extreme rearward position in Fig. 2 and in perspective in Fig. 8. The nail-head cavity may be in the upsetting-die f^3 or in the pressure-dies b b'.

The operation of my machine is as follows: The pressure-lever P, which may be of any suitable metal, clamps the two superposed wires between the pressure-dies b b'. The cams E E′ liberate the hammer F, which, propelled by the force of the spring F′, plunges forward, upsetting the blanks, and thereby forming the heads upon two tacks or nails. At this moment the pressure-lever P recedes, and the wires are advanced the length of a nail by the slide S. The hammer now recedes to its normal position. At this moment the pivoted knife-levers M M′ are simultaneously engaged by the cams E E′, forcing the dies n n upon the blanks, by the joint cutting action of which the two pyramidal points are formed. The levers then open, whereupon the detacher A′ descends, forcing the finished nails into a suitable receptacle. In the mean time the pressure-dies b b' have again clamped the wires, the hammer again descends, forming the heads of the nails, and thus the operation is continued.

With a slight modification of the construction three or more wires may be simultaneously fed into the machine. By changing the dies b b' or the upsetting-die f^3, heads of square, round, flat, or conical shape may be formed.

My machines are preferably made in several sizes. The smallest machines, manufacturing nails from one-fourth to one-half inch in length, making two hundred and fifty revolutions per minute, are capable of turning out five hundred nails per minute. The machines manufacturing the larger size nails and spikes, from one and one-half to eight inches in length, are capable of turning out eighty spikes per minute.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a wire-nail machine, the duplex point-cutting mechanism, comprising the following

instrumentalities, to wit: a fulcrum-stock, G, longitudinally adjustable by means of a slide, *g*, and pin *i*, cam-actuated knife-levers M M′, working within pivot-sockets *g′ g′* of said fulcrum-stock, said knife-levers being provided with adjustable duplex cutting-dies *n n*, adapted to simultaneously cut two blanks, in combination with a duplex feeding device adapted to simultaneously feed two superposed wires to said cutting mechanism, substantially as described.

2. In a duplex wire-nail machine, a fulcrum-stock radially and longitudinally adjustable by means of a slide and pin, in combination with vertically-adjustable knife-levers provided with suitable studs working within sockets of said fulcrum-stock, springs mounted above said fulcrum-stock, adapted to press the studs of said knife-levers upon suitable screws vertically adjustable, substantially as described.

3. In a wire nail machine, the rolling apparatus comprising the double series of superposed rolls *r r′ r²*, the central rolls, *r′ r′*, being laterally adjustable, in combination with a duplex feeding mechanism comprising the slide S, provided with the superposed bell-crank levers *s′ s′*, adapted to intermittently engage and simultaneously feed two wires to a duplex head forming and cutting mechanism, substantially as described.

4. The fulcrum-stock G, horizontally and radially adjustable, respectively, by means of the slide *g* and the pivot *i*, and the horizontally-reciprocating knife-levers M M′, in combination with the hammer F, provided with die f^3, stud f^5, and saddle f^6, adapted to be engaged by the spring F′, substantially as described.

5. The vertically-adjustable knife-levers M M′, adjustable, in combination, with the fulcrum-stock G, as shown and described, said knife-levers being provided with the duplex cutting-dies *n n*, adapted to simultaneously cut two blanks, and with the plates n^4 n^4, screws c^2 c^2, and pins *c′ c′*, said pins being adapted to be forced upon screws *c c* by means of the set-screws c^2 c^2, substantially as described.

6. The knife-levers M M′, provided with the studs *m m*, adapted to rest upon set-screws m^4 m^4, the diverging tempered breast-surfaces m^3 m^3, adapted to be engaged by a plunger-hammer, F, adjustable duplex cutting-dies *n n*, adapted to simultaneously cut two blanks, in combination with the springs H H, adapted to force the studs *m m* of the knife-levers upon the adjusting-screws m^4 m^4, substantially as described.

7. The combination of the fulcrum-stock G, horizontally and radially adjustable by means of the slide *g* and pin *i*, the vertically-adjustable and horizontally-reciprocating knife-levers M M′, provided with the tempered diverging breasts m^3 m^3, adapted to be engaged by a hammer, F, by means of which said levers M M′ are thrown into an outward position, substantially as and for the purpose set forth.

8. In a wire-nail machine, the fulcrum-stock G, longitudinally and radially adjustable by means of the slide *g* and pivot *i*, the horizontally-reciprocating and vertically-adjustable knife-levers M M′, and the hammer F, in combination with a detacher comprising the following instrumentalities, to wit: the spring A″, bridge *k*, and arm A′, said arm A′ being horizontally adjustable within said bridge, and set by means of a screw, k^a, substantially as and for the purpose set forth.

9. In a duplex wire-nail machine, the vertically-adjustable die-stock B, provided with the duplex pressure-dies *b b′*, the knife-levers M M′, carried on the adjustable fulcrum-stock G, the pressure-lever P, provided with the link *d*, and adjusting and set screws p^1 p^5, said link *d* being pivotally connected to and adapted to operate the duplex pressure-die *b′*, in combination with the springs *f f′* f^2 and the cams E E′ E″, respectively actuating said levers M M′ and P, substantially as described.

10. In a wire tack, nail, and spike machine, the combination of the adjustable fulcrum-stock G and the universally-adjustable knife-levers M M′, adjustable longitudinally, vertically, and radially, respectively, by means of the slide *g* and pin *i*, the screws m^4 m^4, and the pivot-pin *i*, substantially as described.

11. The fulcrum-stock G, longitudinally and radially adjustable by means of the slide *g* and pin *i*, and the vertically-adjustable and horizontally-reciprocating knife-levers M M′, in combination with the hammer F, provided with the removable die f^3, said die being provided with two cavities adapted to simultaneously work the heads upon two blanks, substantially as described.

12. In a duplex wire-nail machine, the following instrumentalities, to wit: the fulcrum-stock G, horizontally and radially adjustable, respectively, by means of the slide *g*, pin *i*, and screw g^4, vertically-adjustable knife-levers M M′, working within said fulcrum-stock, said knife-levers being provided with adjustable duplex cutting-dies *n n*, and tempered breast-surfaces m^3 m^3, adapted to guide the hammer F and to separate said levers at their forward ends, in combination with suitable supporting and operating mechanism, substantially as described.

13. The feeding mechanism herein described, comprising the oscillating feed-bar Q, horizontally-guided slide S, provided with the superposed clutching bell-crank levers *s′ s′*, the adjustable die-stock B, provided with the guide-block *a*, having duplex guide-holes, and the adjustable duplex pressure-dies *b b′*, having the gripping-faces b^2 b^3, adapted to simultaneously clutch two blanks, in combination with suitable supporting and operating mechanism, all being relatively arranged as described, and for the purpose set forth.

14. In a wire-nail machine, the following instrumentalities, to wit: a longitudinally and radially adjustable fulcrum-stock provided with suitable sockets, universally-adjustable knife-levers within said sockets, said knife-levers being provided with adjustable duplex cutting-dies, and diverging tempered breast-surfaces adapted to guide a plunger-hammer, in combination with a duplex feeding device adapted to simultaneously feed two superposed wires to said duplex cutting-dies, substantially as and for the purpose set forth.

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Witnesses:
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