(No Model.) 2 Sheets—Sheet 1.

E. S. MORTON.

WIRE NAIL MACHINE.

No. 588,462. Patented Aug. 17, 1897.

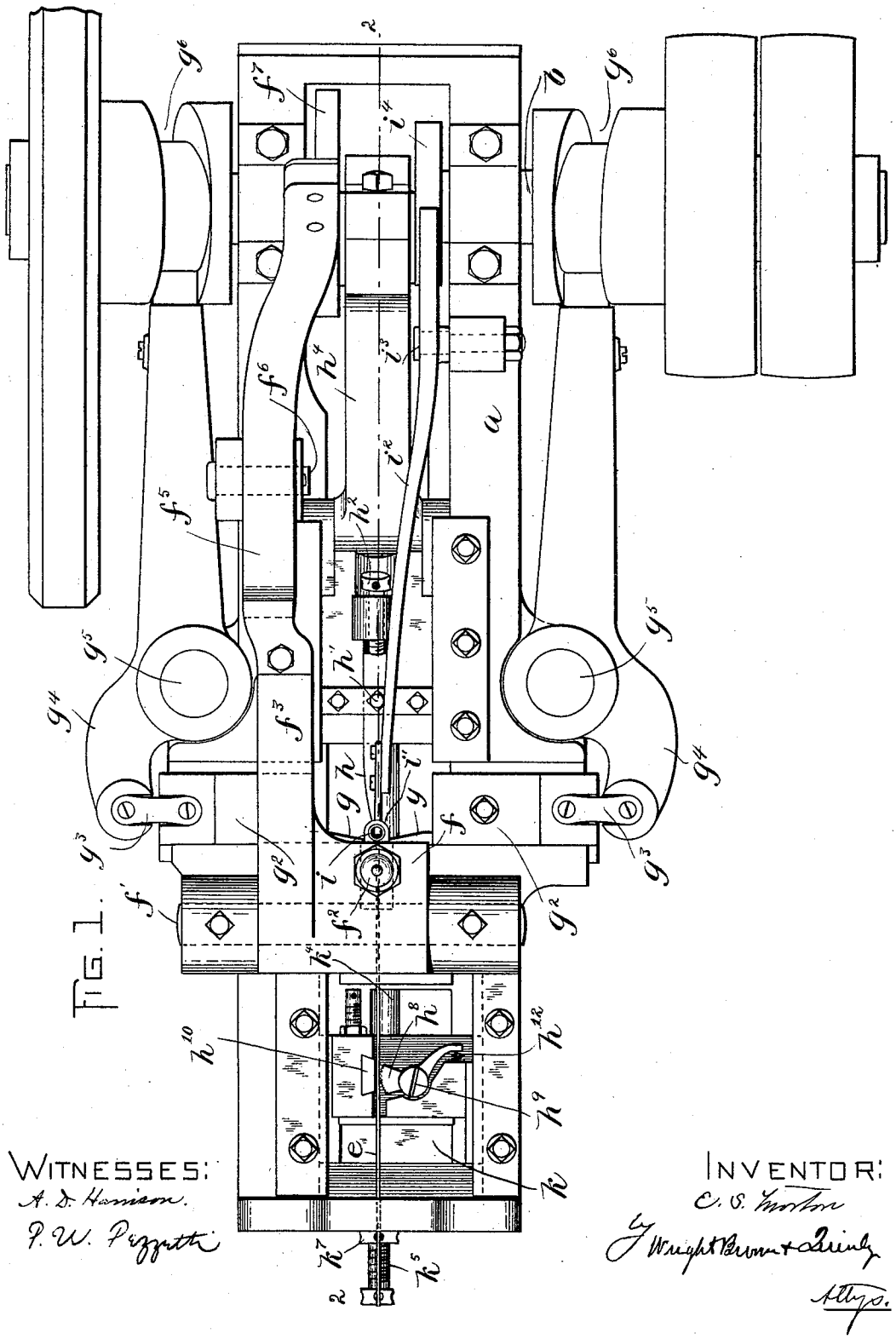


FIG. 1.

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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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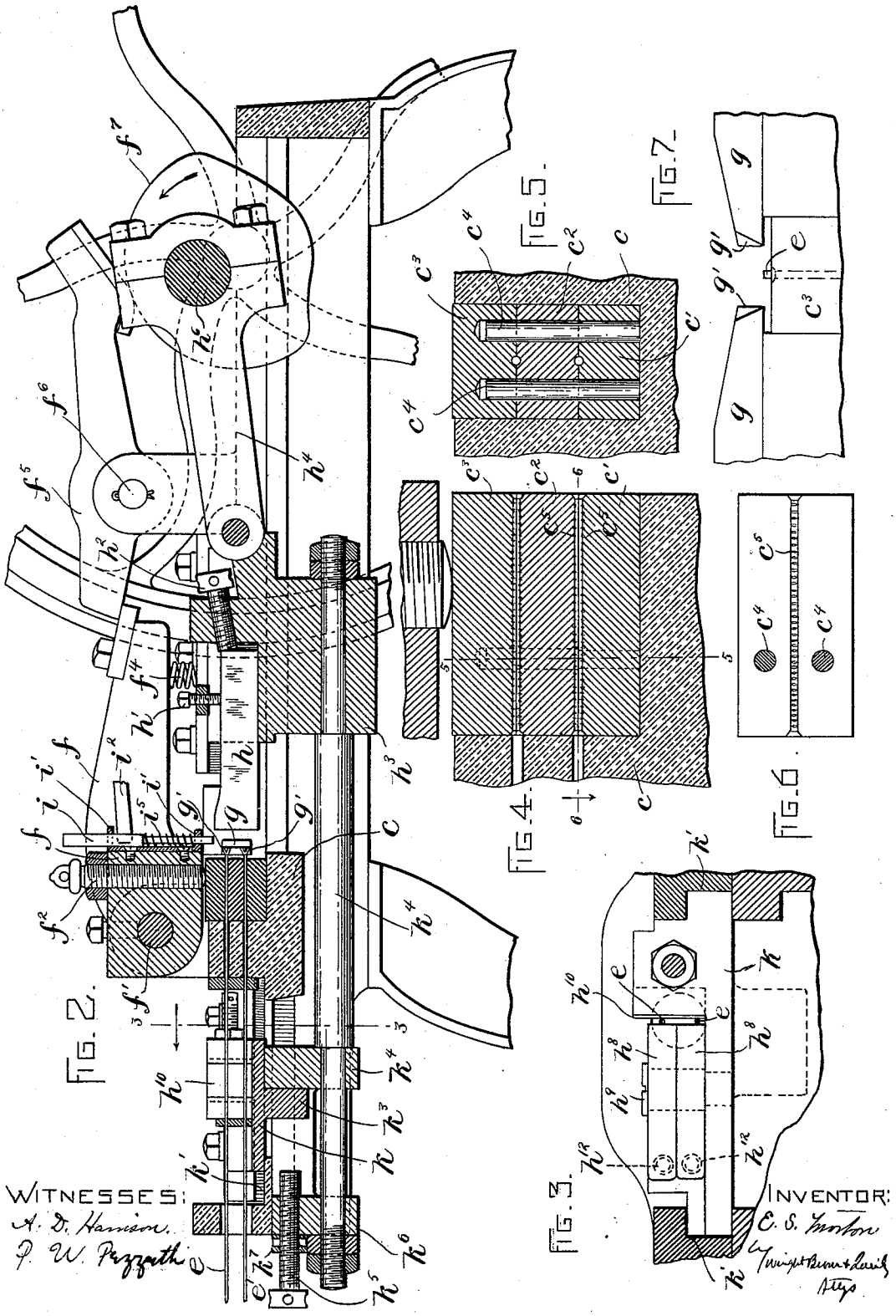


FIG. 2.

FIG. 4.

FIG. 6.

FIG. 7.

FIG. 3.

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UNITED STATES PATENT OFFICE.

EPHRAIM S. MORTON, OF BROCKTON, MASSACHUSETTS.

WIRE-NAIL MACHINE.

SPECIFICATION forming part of Letters Patent No. 588,462, dated August 17, 1897.

Application filed August 27, 1896. Serial No. 604,067. (No model.)

To all whom it may concern:

Be it known that I, EPHRAIM S. MORTON, of Brockton, in the county of Plymouth and State of Massachusetts, have invented certain new and useful Improvements in Wire-Nail Machines, of which the following is a specification.

This invention relates to that class of wire-nail machines in which a length of wire is fed forward, headed at its forward end, and severed at a distance from the head by cutters which form a point, the entire wire being thus cut up into sections, each forming a nail.

The invention has for its object to provide a simple and efficient machine of this class adapted to treat a plurality of wires simultaneously, a plurality of nails being made at each operation.

The invention consists in the improvements which I will now proceed to describe and claim.

Of the accompanying drawings, forming a part of this specification, Figure 1 represents a top plan view of a wire-nail machine provided with my improvements. Fig. 2 represents a section on line 2 2 of Fig. 1. Fig. 3 represents a section on line 3 3 of Fig. 2. Fig. 4 represents an enlargement of a portion of Fig. 2. Fig. 5 represents a section on line 5 5 of Fig. 4. Fig. 6 represents a section on line 6 6 of Fig. 4. Fig. 7 represents a top view showing portions of the cutters, a portion of one of the wire-grasping dies, and portions of the die-holder.

The same letters of reference indicate the same parts in all the figures.

In the drawings, *a* represents the supporting-frame of the machine, having bearings in which is journaled the driving-shaft *b*.

c represents a die-holder which is rigidly affixed to the frame *a* and has a cavity in which are inserted a vertical series of gripping-dies c' c^2 c^3, said dies c^2 c^3 being loosely inserted in the cavity of the holder *c*, so that they are permitted a slight vertical play on guide rods or pins c^4, which prevent horizontal movement of said dies. The meeting faces of said dies are provided with die-cavities c^5, arranged in pairs, each pair of cavities being formed to surround a length of wire *e*, the dies being provided with teeth or corrugations, which cause them to slightly indent and firmly grasp the wire.

f represents a lever mounted to oscillate upon a stud f', affixed to the die-holder *c* or any other suitable fixed part of the machine, said lever being adapted to oscillate in a vertical plane and having a bearing-screw f^2, which projects below the lever *f* and bears upon the upper die c^3. The lever *f* is provided with an extension f^3, which is pressed upwardly by a spring f^4 against one arm of a lever f^5, which is pivoted at f^6 to an ear on the supporting-frame, its other arm bearing upon the perimeter of a cam f^7, affixed to the driving-shaft *b*. The spring f^4, acting through the extension f^3, holds the lever f^5 against the cam f^6 and coöperates with said cam in oscillating the lever *f* and thus causing the bearing-screw f^2 to alternately press downwardly upon and release the dies c^3 c^2. It will be seen, therefore, that the wires *e e* inserted in the cavities of said dies will be grasped and firmly held by the dies when the lever *f* is depressed and will be released so that they can be fed forward endwise through the dies when the lever *f* is raised, the loose arrangement of the dies c^3 and c^2 causing them to be depressed by the lever *f* when the latter descends and to rest upon the wires only by their own weight when the lever *f* rises, so that the wires can be readily fed forward.

g g represent cutters which are movable toward and from each other across the outer ends of the gripping-dies, each cutter having two cutting-dies g' g' upon its inner end, said dies being arranged to act upon and simultaneously cut the two wires *e e* at points close to the outer ends of the gripping-dies, so that when the cutters close upon each other they simultaneously sever the two wires at points close to the outer ends of the gripping-dies, the cutting-dies being formed to point the lengths of wire which they cut off. The cutters *g g* are affixed to slides g^2 g^2, which are movable in guides on the supporting-frame and are connected by links or struts g^3 g^3 with the shorter arms of levers g^4, which are pivoted at g^5 to the supporting-frame, the longer arms of said levers being engaged with cam-grooves g^6 g^6 in cam-disks affixed to the driving-shaft, the arrangement being such that the levers

g^4 are oscillated horizontally in such manner as to simultaneously move the slides g^2 g^2 and cutters g g toward and from each other.

h represents a header which is movable toward and from the outer ends of the gripping-dies and is arranged to strike the opposite short ends of the wires left projecting from said gripping-dies by the cutters, the header being moved toward the gripping-dies after the cutters have severed the wire and separated from each other. The header h is affixed by screws h' h^2 to a slide or carriage h^3, which is movable in guides on the supporting-frame and is connected by a rod h^4 with a crank h^6 on the driving-shaft b.

i represents a knocker or clearer which is arranged to knock off the nails from the main portions of the wires after the cutters have acted on the same, the nails being liable to remain adhering to the main portions of the wires, particularly when the cutters are somewhat dull. The knocker i is movable in guides i' i' on the lever f and is operated by a lever i^2, pivoted at i^3 to the supporting-frame, a cam i^4 on the driving-shaft bearing on one end of said lever, the other end being engaged with the knocker i, and a spring i^5, Fig. 2, which presses the knocker upwardly and holds the lever i^2 against the cam i^4, the knocker being vertically reciprocated by the combined action of the cam and spring.

k represents a feed-slide which is mounted to move in guides k' k', Fig. 3, on the supporting-frame and is located at the side of the die-holder opposite the header and cutters, said slide being movable toward and from the die-holder. An arm or projection k^3 extends downwardly from the die-holder between two abutments k^4 k^5, which are movable with the carriage h^3 and are connected therewith by a longitudinal rod k^4, said rod k^4 constituting a part of the carriage h^3. The arrangement of the projection k^3 and abutments k^4 k^5 is such that the carriage has a considerable independent motion independently of the feed-slide, the carriage in moving backwardly causing the abutment k^4 to strike the projection k^3 and retract the feed-slide. When the carriage moves forward, the abutment k^5 is at first separated from the projection k^3 by a space, so that the feed-slide does not move until the abutment k^5 moves across said space and strikes the projection k^3, the feed-slide moving with the carriage during the remainder of the forward movement of the latter.

The abutment k^5 is preferably adjustable to vary the length of the feed movement, said abutment being here shown as a screw engaged with a tapped orifice in a block k^6, affixed to the rod k^4, and provided with a lock-nut k^7. The feed-slide is provided with dogs h^8 h^8, Figs. 1 and 3, which are pivoted at h^9 to the slide, their inner ends being oscillated and arranged to press the wires e e against an anvil block or bearing h^{10}, inserted in a shoulder on the feed-slide. The dogs h^8 are acted on by springs h^{12}, which normally press the dogs against the wires, the dogs being arranged so that when the feed-slide moves forward they automatically grasp the wires and press them against the block h^{10}, the wires being thus fed forward a distance equal to the length of movement of the feed-slide. When the feed-slide moves backwardly, the dogs release the wires and slip back thereon, the wires remaining stationary, being at this point held by the gripping-dies.

The operation is as follows: The cutters g g being separated and the wires e slightly projected from the gripping-dies, as shown in Fig. 7, and the lever f being depressed, as shown in Fig. 2, to cause the dies to clamp the wires, the carriage h^3 moves toward the gripping-dies, causing the header to upset the projecting ends of the wires and thus form nail-heads, the feed-slide being at the same time retracted. The lever f is then raised, causing the gripping-dies to release the wires, and the carriage is moved forward, advancing the feed-slide and feeding the wires through the gripping-dies, the header h at the same time receding. At the end of the feed movement of the wires the lever f is again depressed, causing the gripping-dies to clamp the wires, and the cutters are advanced, severing the wires and forming points on the severed lengths or nails. The cutters then separate and the knocker descends, completing the detachment of the nails from the wires. After the knocker rises the header advances and the operation above described is repeated.

The chief feature of novelty in my improved machine is the vertical series of loose gripping-dies and a pressure device, such as the lever f, arranged to act on the top die of the series, and thus cause them to simultaneously grasp and release a plurality of wires inserted between them. By the employment of a vertical series of loose gripping-dies I am enabled to make as many nails simultaneously as may be desired, my invention not being limited to two, the number here shown.

I am aware that it is not new to pass a plurality of wires through a wire-nail machine and cut them simultaneously, but I am the first, so far as I am aware, to arrange the wires in a vertical series and pass them between the members of a vertical series of loose gripping-dies.

I claim—

1. In a wire-nail machine, the combination of a stationarily-supported base-die, a plurality of loose dies independently movable and forming with the base-die a series of dies having gripping formations in their confronting faces, guides common to the loose dies, and means applied to the outermost die for pressing all the dies together, substantially as described.

2. In a wire-nail machine, the combination of wire-grasping devices and means for operating the same, a sliding carriage equipped

with a header at or near one end and having a pair of abutments near the opposite end, one of which abutments is longitudinally adjustable, a feed-slide movable on the frame and provided with wire-grasping devices, said feed-slide having an abutment projecting between the abutments on the carriage, and means for reciprocating the carriage.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 17th day of August, A. D. 1896.

EPHRAIM S. MORTON.

Witnesses:
HORACE BROWN,
P. W. PEZZETTI.