(No Model.) 4 Sheets—Sheet 1.

L. GODDU.

NAILING MACHINE.

No. 490,625. Patented Jan. 24, 1893.

Fig. 1.

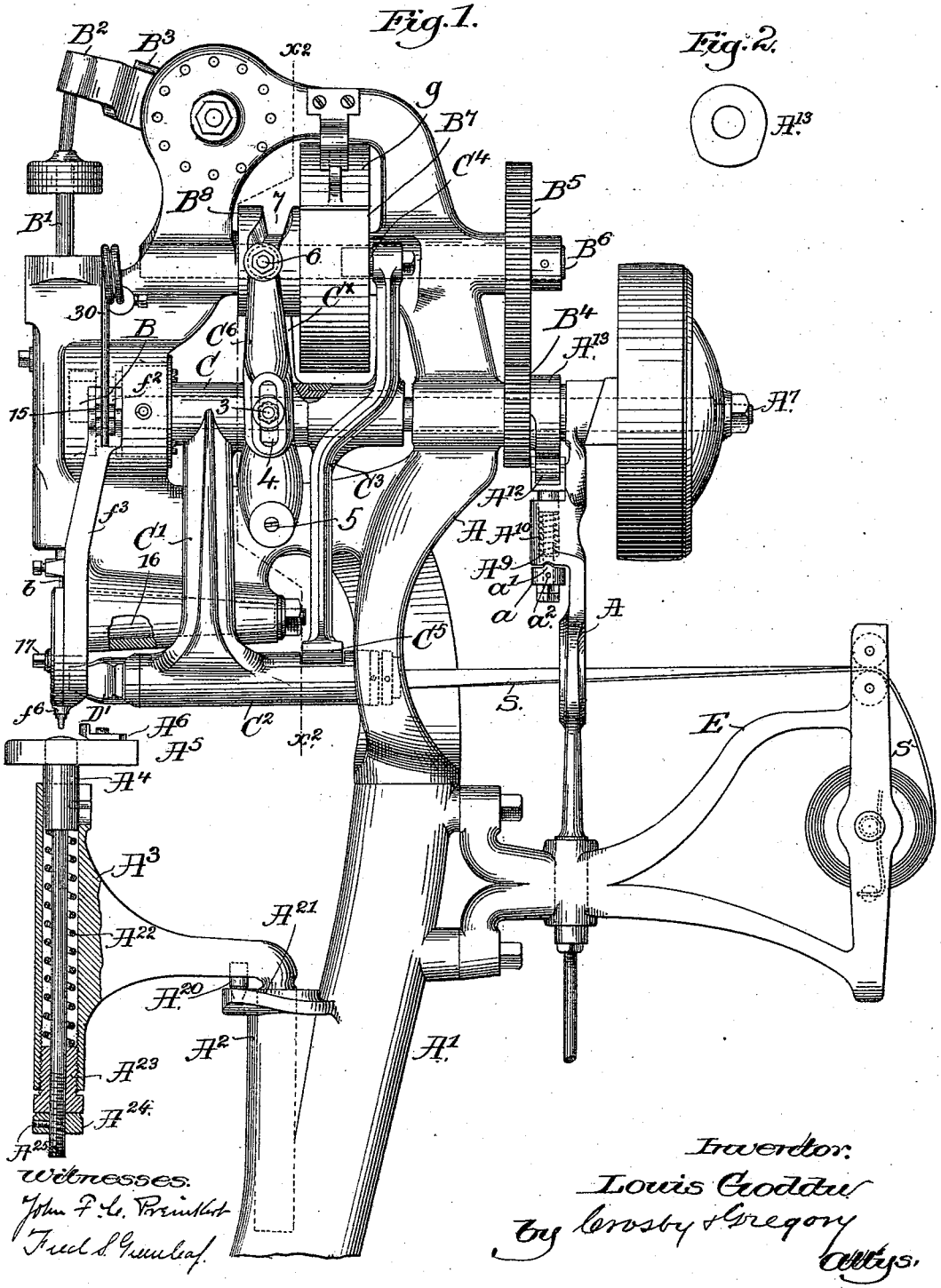

Fig. 2.

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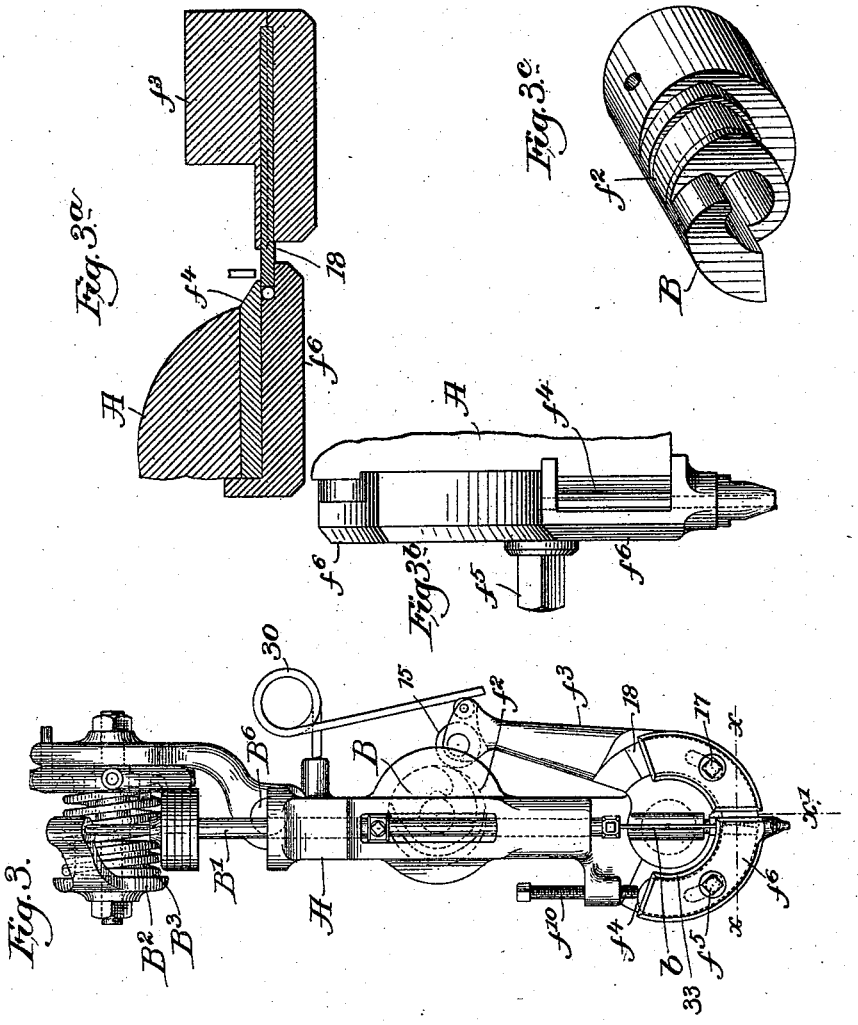

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(No Model.) 4 Sheets—Sheet 3.

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NAILING MACHINE.

No. 490,625. Patented Jan. 24, 1893.

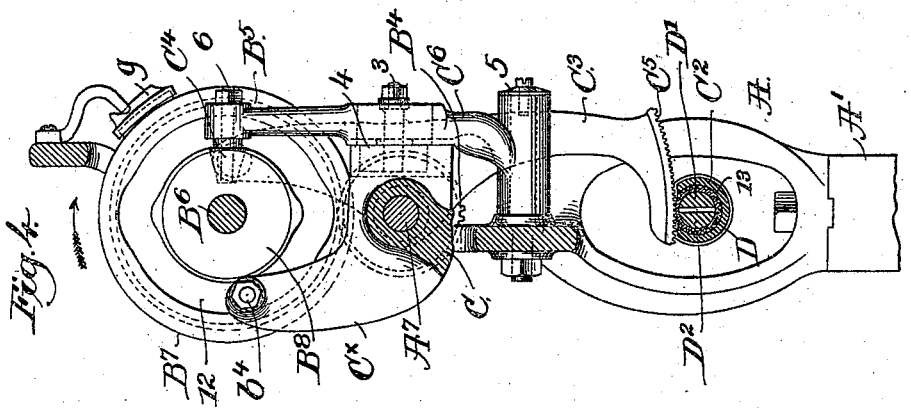

Fig. 4.

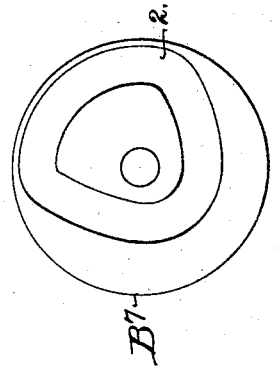

Fig. 5.

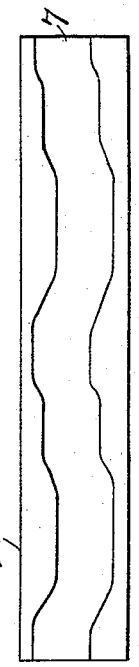

Fig. 6.

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(No Model.) 4 Sheets—Sheet 4.

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NAILING MACHINE.

No. 490,625. Patented Jan. 24, 1893.

Fig. 7.

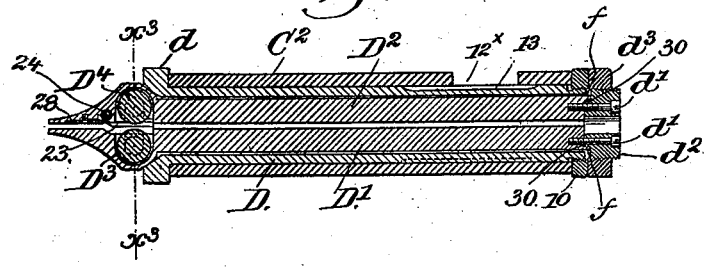


Fig. 8.

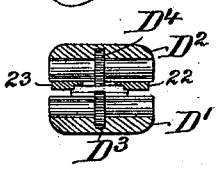


Fig. 9.

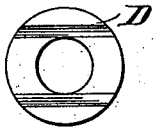
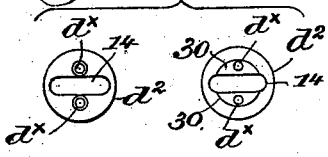


Fig. 10.



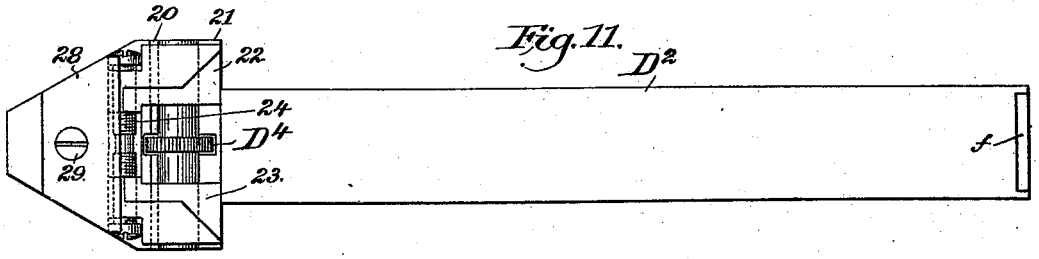


Fig. 11.

Fig. 12.

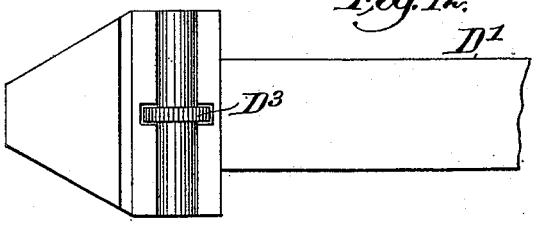


Fig. 13.

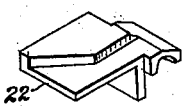
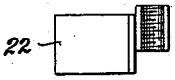


Fig. 14.



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Fred S. Greenleaf

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UNITED STATES PATENT OFFICE.

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NAILING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 490,625, dated January 24, 1893.

Application filed April 7, 1892. Serial No. 428,155. (No model.)

To all whom it may concern:

Be it known that I, LOUIS GODDU, of Winchester, county of Middlesex, State of Massachusetts, have invented an Improvement in Nailing-Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters and figures on the drawings representing like parts.

This invention has for its object to improve that class of nailing machines represented in United States Patent No. 360,585, granted to me April 5, 1887, said machine employing a metal ribbon or strip, from the end of which is cut transversely each nail as it is to be driven.

I will describe the principle of my invention first and the best mode in which I have contemplated applying that principle, and then will particularly point out and distinctly claim the part, improvement or combination, which I claim as my invention.

Figure 1, in elevation, represents a partial right-hand side view of a nailing machine embodying my invention. Fig. 2 shows the cam A^{13}. Fig. 3, a partial front end view of the machine shown in Fig. 1, Fig. 3^a, an enlarged sectional detail in the line x Fig. 3. Fig. 3^b, an enlarged detail looking at the movable cutter to the left of the line x' Fig. 3. Fig. 3^c, a detail showing the cams B and f^2. Fig. 4, a section in the line x^2 Fig. 1. Figs. 5 and 6, show the cams B^7 and B^8, the latter being developed. Fig. 7, a longitudinal section of the strip carrier and part of the carriage containing it. Fig. 8, a section in the line x^3, Fig. 7. Fig. 9, a left-hand end view of the pipe forming part of the strip carrier. Fig. 10, opposite face views of the nut d^2. Fig. 11, shows enlarged one-half of the central clamping device or bar of the strip carrier. Fig. 12 shows a similar view of the other half thereof. Figs. 13 and 14 show the adjustable strip guides detached.

A represents the head of the machine supported on a column A′ having in practice a suitable foot to rest on the floor.

A^2 is a hub on the column; A^3, a swing frame, which receives the shank A^4 of a work support A^5, on which is secured in suitable manner a gage A^6, the hub having an opening to receive a locking device A^{20} by which to keep the frame A^3 in proper working alignment. The hub is shown as provided with a cam surface A^{21}, whereby when the locking device is disengaged, it will slide down the incline of the cam and thus automatically put the work support in its inoperative position, or swing it against the column.

The shank A^4, as best shown in Fig. 1, is reduced in diameter for part of its length and has a shoulder to rest on a spring A^{22}, the lower end of which in turn rests on the inner end of a hollow screw A^{23} which is screwed into the frame A^3, the said hollow screw serving also, as shown, as a bearing for the shank A^4. On this shank is an adjustable collar A^{24} held in place by a set screw A^{25}, so that the normal height of the work support may be varied to adapt it to work of different thicknesses, and by increasing the tension of the spring the degree of resistance offered to the point of the nail or fastener while being clinched may be varied at will.

The main shaft A^7 of the machine is provided with usual fast and loose friction pulleys under the control of a slide bar A^8 which may be moved by a treadle or otherwise when it is desired to start the rotation of the shaft A^7, as in the said patented machine.

The slide bar A^8 in this invention has bearings for a rod A^9 supported by a spring A^{10}, the rod at its upper end being shaped to receive a roller A^{12} which is acted upon by a cam A^{13} fast on the shaft A^7. The rod A^9 has at its lower end a collar a, having a projection a' to enter a notch in the lower end of the bearing for the rod A^9, the partial rotation of the rod in any suitable manner, as by engaging a stud a^2, effecting the pulling of the rod into the bearing so as to enable the shaft A^7 to be rotated if desired, while the loose pulley driven by the belt pulley, not shown, is as rest.

In operation, when the collar a is in the position Fig. 1, the depression of the rod A^8 will effect the engagement of the clutch pulley and the shaft A^7 will be started, causing the cam A^{13} to act on the roll A^{12} and keep the rod A^8 depressed even though the operator should remove his foot from the treadle after pulling the rod A^8 down, but as soon as the shaft A^7 has made a full rotation, the cam A^{13} permits the roll A^{12} to enter a space in the cam,

and the rod A^8 to rise sufficiently to enable the clutch pulleys to be released one from the other.

The shaft A^7 has at its front end a cam B, shown separately in Fig. 3^c, which acts on a roller or other stud of a collar attached to the driver bar B' having the driver *b*, and lifts the same against the action of the driver bar actuating lever B^2 and spring B^3, all as usual.

The main shaft A^7 has a pinion B^4 which engages a toothed gear B^5 on and rotates the cam shaft B^6 having the two cams B^7, B^8.

The shaft A^7 receives on it loosely the hub C having an arm $C^\times$, and a depending arm C' provided with a hub C^2, the said hub, arms and sleeve constituting a carriage for the strip carrier, to be described. A roller or other stud b^4, carried by the arm $C^\times$, enters a groove 12 in the front side of the cam B^7, to thus work the carriage.

The hub C is reduced at one end to receive on it loosely the hub of a lever C^3 provided at its upper end with a roller or other stud C^4 which enters the cam groove 2, see Fig. 5, at the rear side of the cam B^7, the lower end of the lever C^3 being provided with a series of segmental teeth to constitute a rack bar C^5.

The hub C has a stud 3 on which is a loose block 4 which enters a slot in a lever C^6 pivoted at 5 on the frame-work and having at its upper end a roller or other stud 6 to enter the cam groove 7 in the cam B^8.

The hub or sleeve C^2 receives within it, see Fig. 7, a tube D having at one end a flange *d*, the tube at its other end being threaded to receive a threaded collar 10, the latter serving to keep the tube in the hub or sleeve. The hub or sleeve is slotted at $12^\times$, and opposite this slot, the tube D is peripherally and longitudinally fluted to constitute teeth 13 which are engaged by the rack C^5. The tube D receives two like bars D', D^2 having holding rolls D^3, D^4. The rear ends of the bars D', D^2, have threaded holes to receive two like screws *d'* which are first extended through holes $d^\times$ in a guide block d^2 threaded externally to receive an adjusting nut d^3. The flanged end *d* of the pipe or tube is cut away and beveled as shown in Figs. 7 and 9, and the bars D', D^2, are correspondingly beveled to contact therewith, so that as the nut d^3 is screwed upon the block d^2, the said beveled surfaces are made to co-operate with the beveled surfaces of the tube resulting in causing the rolls D^3, D^4, to clamp the metallic nail strip with increased force. The outer ends of the bars D', D^2 are enlarged to constitute heads which are grooved transversely to receive the journals of the said rolls D^3, D^4, said heads having suitable slots for the reception of each of the said rolls as best shown in Figs. 11 and 12. To adapt the bars to guide nail strips of different widths, I have provided the head of the bar D^2 with supports or bearings 20, 21, for two guides 22, 23, made adjustable by a right and left hand screw 24 shown as having a head at each end, the left hand thread engaging a threaded part of one guide and the right hand thread a threaded part of the other guide, so that the said guides by the rotation of the screw are adjusted simultaneously in opposite directions so as to adapt the acting edges of said guides to nail strips of different widths and present the strip of whatever width with its center line in the center of oscillation of the strip carrier.

I have so shaped the heads referred to, as to contain a friction device 28, herein shown as a spring plate under the control of a screw 29, the friction device overlapping frictionally and acting upon the sides of the guides 22 and 23.

The block d^2 at its inner side is provided with two projections 30, shown in the enlarged Fig. 10, which projections receive against them the lips *f* of the bars D', D^2, the screws *d'* connecting the bars and the block d^2, the projections 30 preventing the possibility of the bars being closed or brought together near the block d^2.

The nail strip, in coil form, is taken from a suitable support or frame E, which is entirely disconnected from the strip carrier referred to, so that as the latter is oscillated by the lever C^3, the strip bends or twists for about one hundred and eighty degrees and hence as the strip carrier does not have to carry the entire weight of the strip it may be oscillated very rapidly without injurious or varying strains due to momentum, as described.

The slide bar or clutch controller A^8 is shown as provided with an opening through it for the strip S.

The shaft A^7 has near its front end a cam f^2, see Fig. 3^c, which acts on a roller 15 at the upper end of the arm f^3 forming part of the cutter carrying lever, the said lever having a projection 16, (shown partially in Fig. 1, by breaking away part of the head,) the said projection serving as the fulcrum for the said lever. This latter lever has attached to it by set screw 17, a movable cutter or blade 18, see Fig. 3^a, which co-operates with a stationary yet adjustable blade f^4, which is clamped in adjusted position by a set screw f^5. A spring 30 acts to keep the roll 15 against the said cam f^2.

The sleeve C^2 is set obliquely to the center of rotation of the shaft A^7 sufficiently to establish the taper of the nail which the machine is to make.

The carriage referred to is reciprocated positively by or through the lever C^6 and the cam B^8, and by adjusting the block 4 in the slot of the lever C^6 the length of the reciprocating stroke of the carriage may be adjusted to the width desired for the nail, the carriage being driven back or to the right, Fig. 1, just after the cutters engage the strip to cut it off, the movement of the carriage in the direction indicated while the strip is held by the cutters, resulting in the rolls traveling backward over the strip, thus leaving out of the tube enough strip for the next nail to be

cut off. The carriage has more or less backward movement away from the cutter as described after the strip has been cut off, so as to remove the free end of the strip projecting beyond the heads referred to, sufficiently from the cutters to let the strip carrier make substantially a half rotation without the end of the strip or the strip carrier interfering with other parts, and during this last movement of the carriage the rolls do not rotate but simply hold firmly between them the strip.

Should the carriage containing the strip carriers be moved only by a spring when the carriage is moved to cause the free end of the strip to be projected into the space between the two cutters preparatory to cutting off a nail, it would sometimes happen that the spring would fail to move the carriage with sufficient force to take with it the strip and cause it to be unwound from the coil, but by moving the carriage positively, as described, in both directions, this trouble cannot happen.

By supporting the strip S independently of the strip carrier, it is possible to run the machine at a very high speed and yet not be troubled at all by strain due to momentum, and this fact alone has enabled me to run my present machine very much more rapidly than my patented machine, and at the same time with less wear, noise, and power. The end of the strip having been projected beyond the cutting edges of the cutters for the desired distance, the cam f^2 operates on the arm f^3 and causes the cutters to catch between their edges and cut off the strip, leaving a nail between the outer face of the stationary cutter and the cap plate f^6, see Fig. 3ª.

The rolls referred to hold the strip firmly between them so as to roll over the strip while the latter is engaged by the cutters, the carriage being then retracted and this constitutes a valuable improvement over friction-springs or dogs such as used in my patent referred to, the present construction being much more durable and easier in its operation. The cutter f^4 carried as described, is fitted to slide between a curved lip on the face plate f^6 and a curved lip 33 on the arm f^3, and a screw f^{10} is used to adjust the cutter and keep it up to its work.

To prevent the backward movement of the cam shaft B^6 from any cause, I have provided a brake plate g, see Fig. 4, coacting with the periphery of one of the cams, as cam B^7, the said plate at its outer side having a cam rib which enters a suitable notch in a part of the frame-work or a projection therefrom.

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

1. In a machine for inserting metallic fastenings, the following instrumentalities, viz:—the carriage; the cam to rock the carriage; a lever; a cam to move the said lever positively back and forth upon its pivot; means to adjustably connect the said lever with the said carriage; a strip carrier; devices to oscillate the strip carrier; and cutting mechanism to sever the strip, substantially as described.

2. In a machine for inserting metallic fastenings, the following instrumentalities, viz:—a support for the material; a driver bar; strip cutting mechanism; a carriage; means to oscillate said carriage, a lever as C^6, a variable fulcrum for said lever, and devices to reciprocate the said lever positively in both directions; and a lever to oscillate the said strip carrier, substantially as described.

3. The combination with a carriage and cutting mechanism, of a strip carrier mounted on said carriage and devices to move the carriage longitudinally and to reciprocally oscillate the strip carrier, and clamping rolls to act upon, ride and roll over a strip while held by the cutting mechanism, substantially as described.

4. The carriage, and the oscillating strip carrier therein consisting of bars having rolls to act upon the opposite sides of and hold the strip, and guides, and means for adjusting the same to adapt the guides to strips of varying width, substantially as described.

5. The combination with the carriage, the tube therein, and the bars forming part of the strip carrier, of a threaded block connected with the bars, and a nut as d^3 the rotation of which effects the longitudinal movement of the bars in the carriage causing the rolls to clamp the strip more or less as desired, substantially as described.

6. The carriage; the tube therein; and the bars provided with rolls, combined with a block d^2 having projections which receive against them the ends of the bars, and means to unite the bars and block, substantially as described.

7. The carriage; the tube therein provided at one end with bevels, combined with the bars D', D^2 having beveled surfaces, and with devices to adjust the said bars longitudinally, to operate, substantially as described.

8. A carriage and oscillating strip carrier therein having a detachable slotted block at its receiving end for the passage through the strip carrier of the strip to be cut into nails, the said strip carrier at or near its delivery end having rolls to act upon and hold the strip, substantially as described.

9. A carriage; a strip carrier therein; gages co-operating with the strip carrier; means to adjust the gages to adapt them to strips of different widths; and a friction device to act upon the gages, as and for the purposes set forth.

10. In a machine for inserting metallic fastenings, cutting mechanism to cut a strip transversely; a carriage; means to reciprocate the said carriage toward and from the cutters; a reciprocally oscillating strip carrier mounted in said carriage and provided with clamping rolls frictionally engaging and holding the strip to thereby insure its forward movement with the carriage and strip car-

rier, said rolls rolling over the strip in the strip carrier as the latter and the carriage are drawn away from the cutters, the latter then holding the end of the strip, substantially as described.

11. The combination with the driver bar, its driver, a nail tube, and an arm pivoted at one side the line of movement of the driver and having a work supporting surface, of a locking device to retain the said arm in working position, and a fixed cam surface to automatically move the said arm into its inoperative position when the locking device is disengaged, substantially as described.

12. A driver-bar having a driver, combined with a supporting column, work-support and a swing-frame for such support pivoted to said column out of line with the driver and adapted to be swung from the column to bring the work-support in line with the driver and a locking device to retain it in such position, and also adapted to be swung toward and be arrested by the column to move the work-support out of line with the driver, substantially as described.

13. A driver bar having a driver; an arm as A^3 pivoted at one side of the line of movement of the driver—a locking device to retain it in operative position, combined with a spring-sustained shank, a work-support secured thereto, and an adjusting device to control the effective strength of the said spring, and means to determine the position to which the work-supporting surface may rise, substantially as described.

14. A driver-bar having a driver, an arm, as A^3, pivoted out of the line of reciprocation of the driver, a spring sustained work-support having a screw-threaded shank, and set-nuts for controlling the effective strength of the spring, combined with a locking device for the said arm, substantially as described.

15. In a machine for inserting metallic fastenings the combination with a strip carrier having strip-engaging rolls, means to move said carrier to feed the strip, and means to oscillate said carrier to turn the strip, of a support for the coil of metal strip separated from the carrier, substantially as described.

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

LOUIS GODDU.

Witnesses:
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EMMA J. BENNETT.