(No Model.) 5 Sheets—Sheet 1.

L. GODDU.

NAILING MACHINE.

No. 490,623. Patented Jan. 24, 1893.

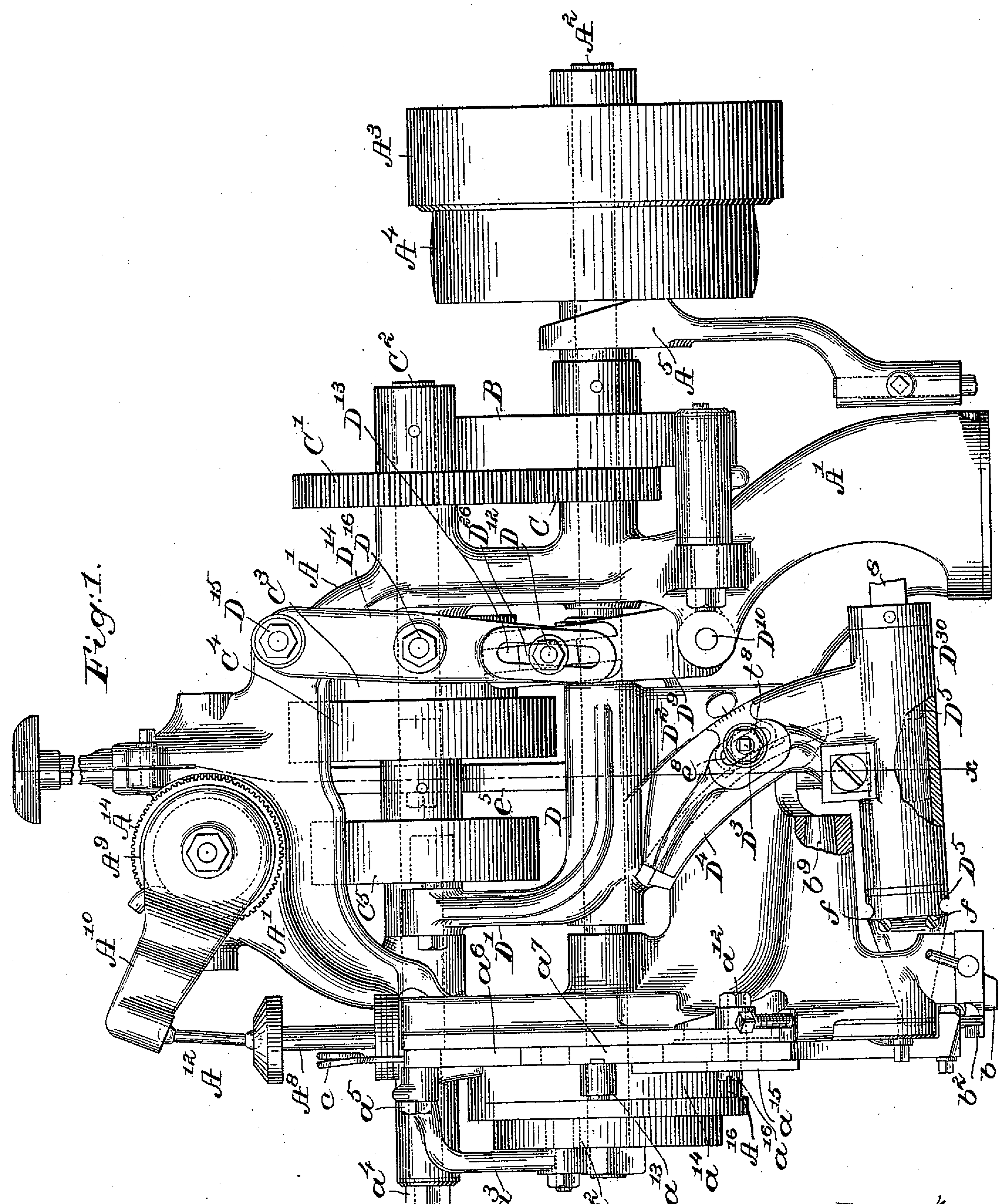

Fig. 1.

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

(No Model.)

5 Sheets—Sheet 2.

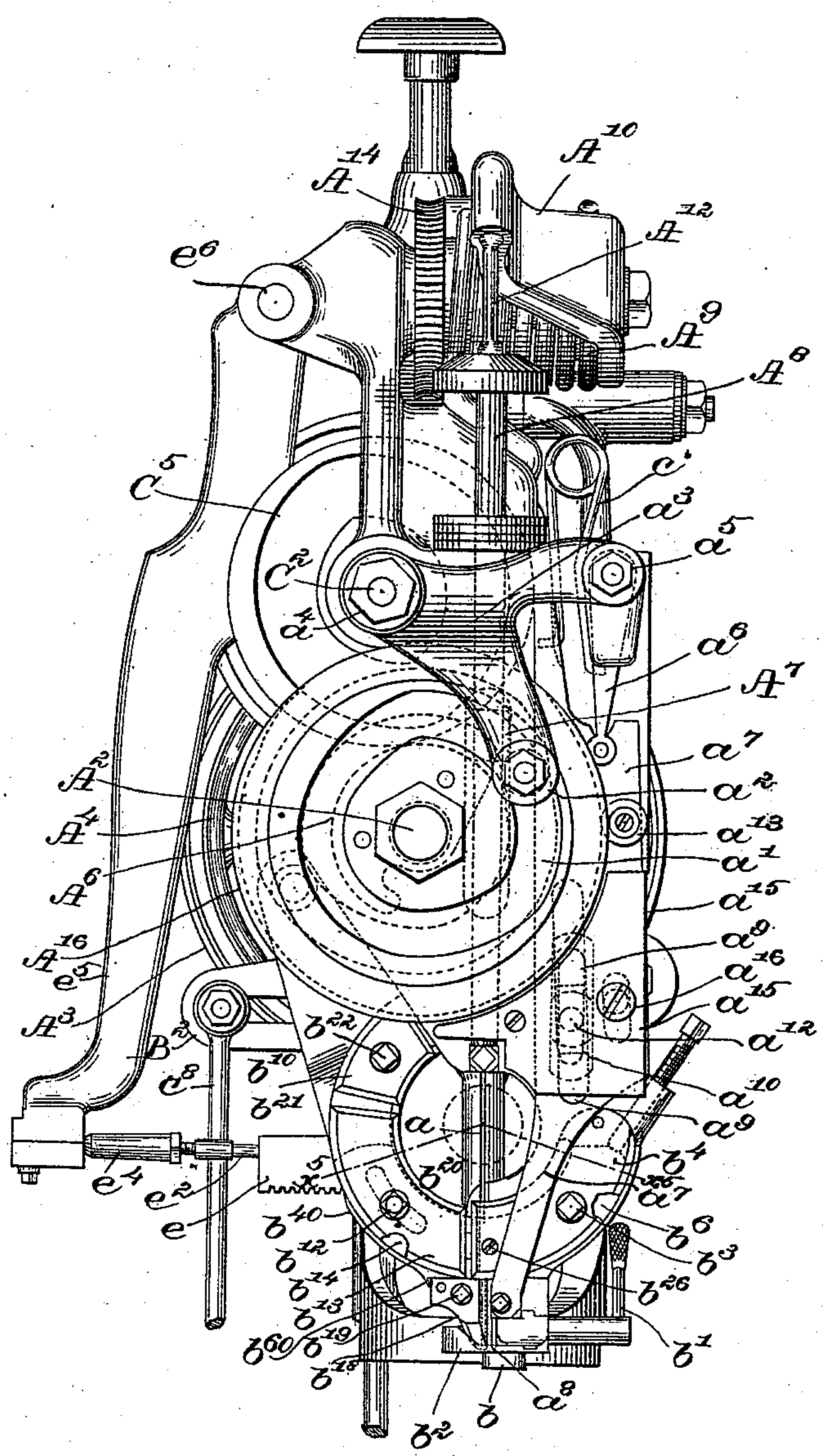
L. GODDU.

NAILING MACHINE.

No. 490,623.

Patented Jan. 24, 1893.

Fig: 2.



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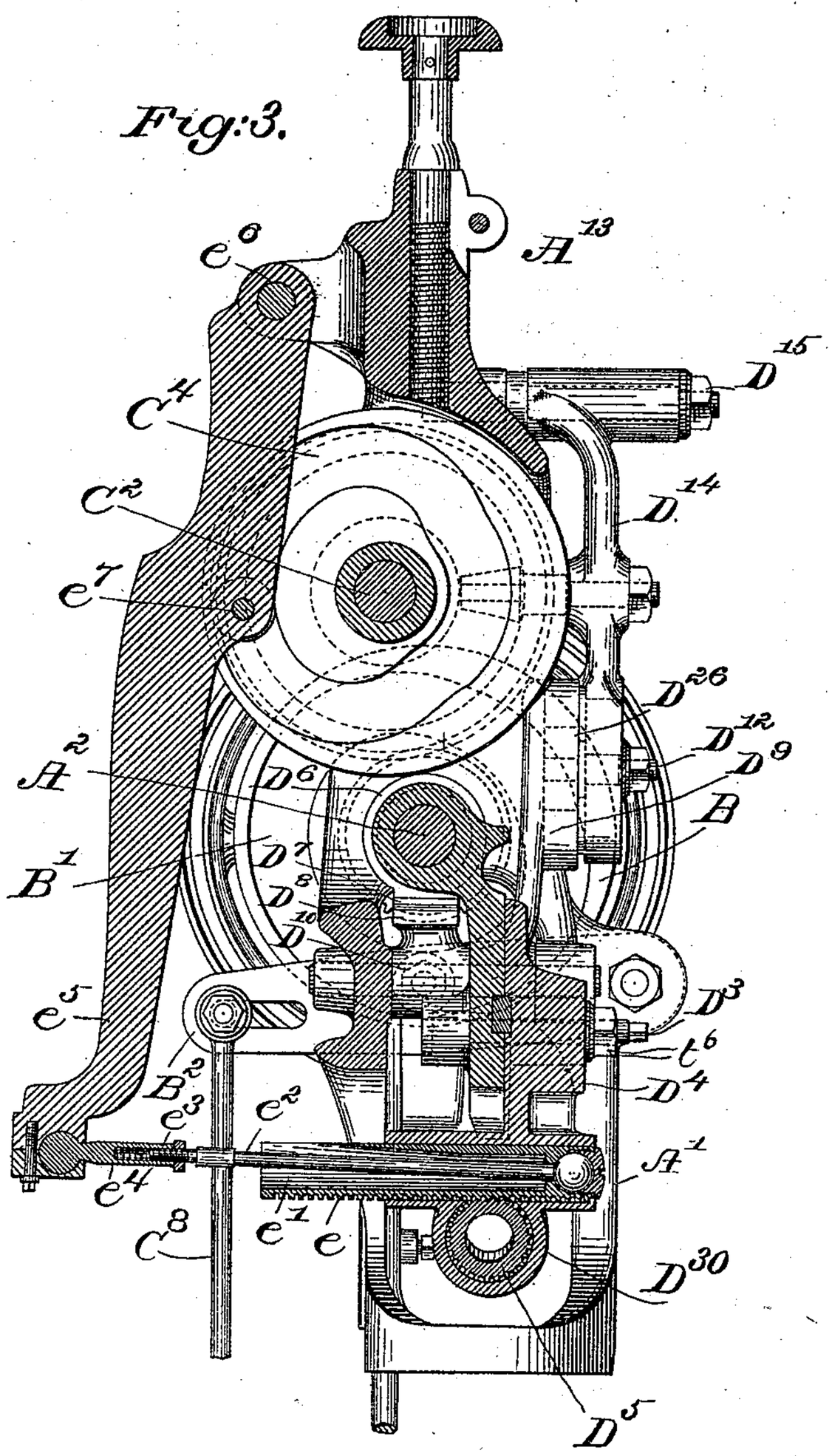
(No Model.) 5 Sheets—Sheet 3.

L. GODDU.

NAILING MACHINE.

No. 490,623. Patented Jan. 24, 1893.

Fig: 3.



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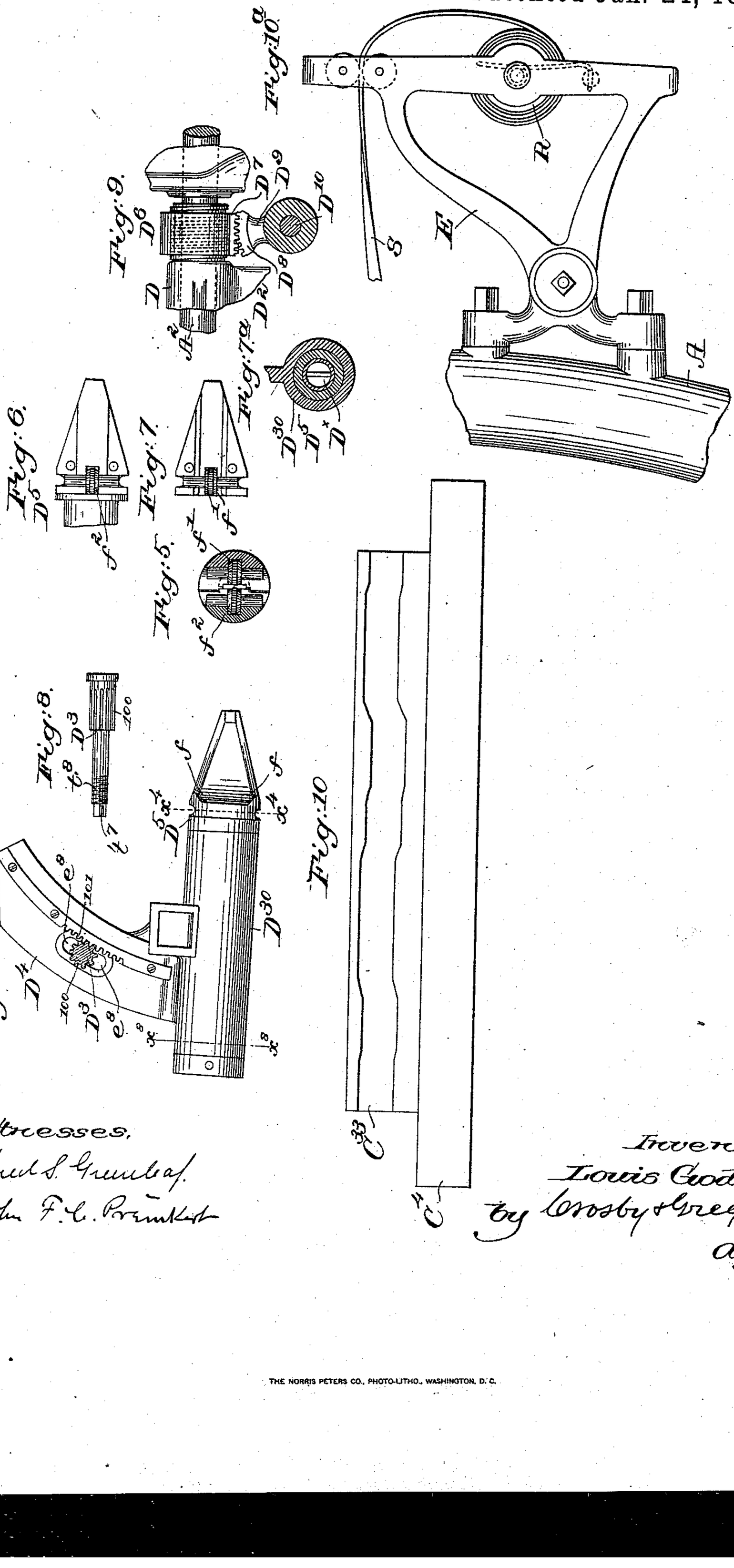
(No Model.)

5 Sheets—Sheet 4.

L. GODDU.

NAILING MACHINE.

No. 490,623. Patented Jan. 24, 1893.



Witnesses,
Fred S. Grundy
John F. C. Brinkerhoff

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(No Model.) 5 Sheets—Sheet 5.

L. GODDU.

NAILING MACHINE.

No. 490,623. Patented Jan. 24, 1893.

Fig. 11.

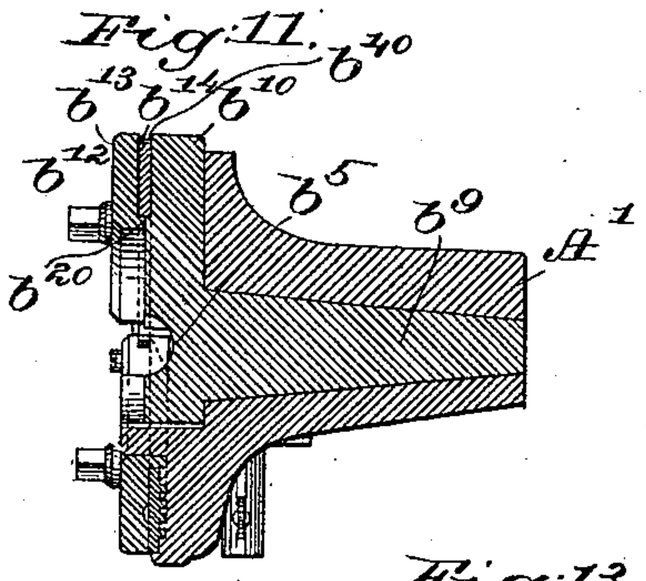

Fig. 12.

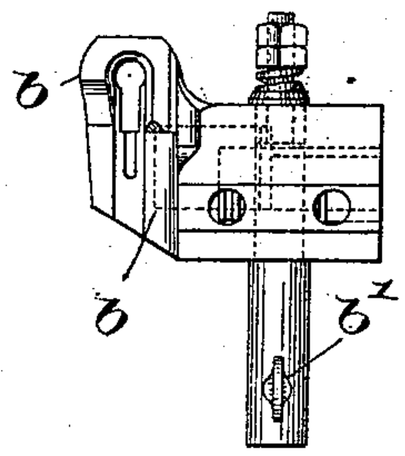

Fig. 13.

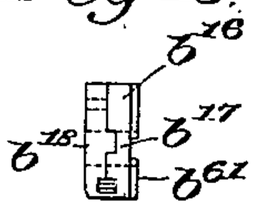

Fig. 14.

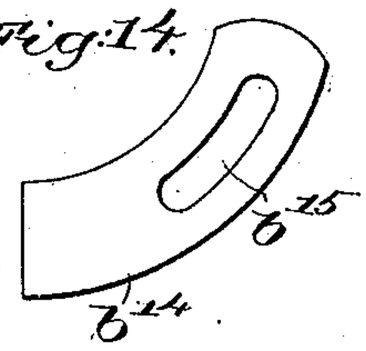

Fig. 17.

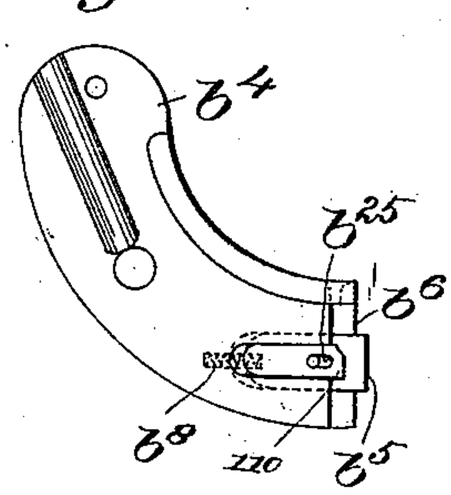

Fig. 16.

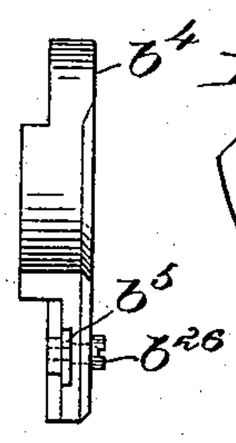

Fig. 15.

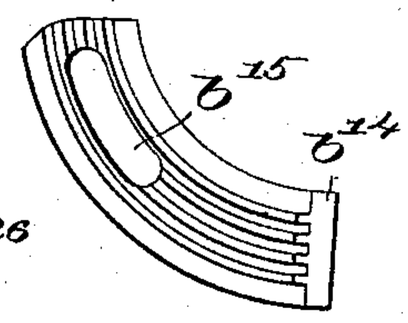

Fig. 18.

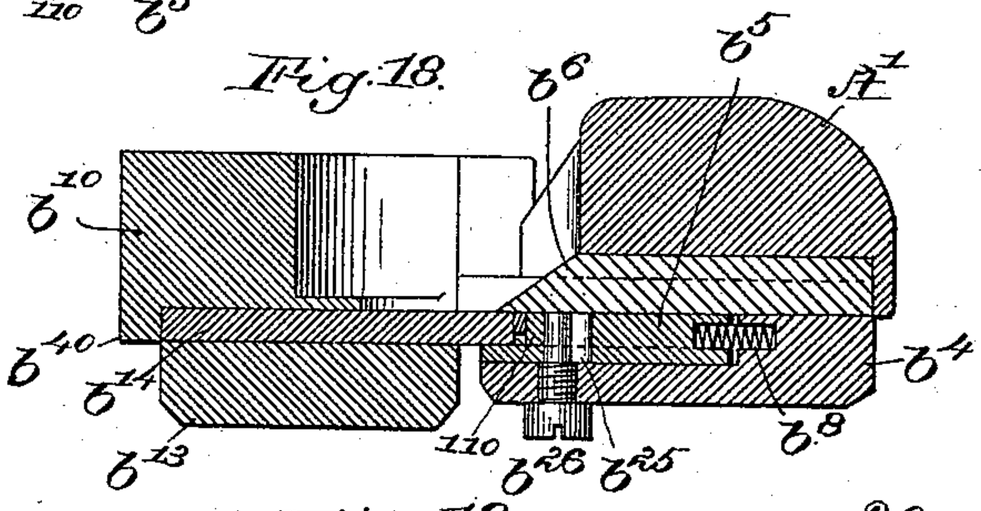

Fig. 19

Fig. 20.

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UNITED STATES PATENT OFFICE.

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NAILING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 490,623, dated January 24, 1893.

Application filed April 7, 1892. Serial No. 428,153. (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.

The machine to be herein described and made the subject of this invention has provision for producing its own nails as needed from a nail strip having a width to correspond with the length of the nail, this present invention being an improvement on the machine shown in United States Patent No. 360,585, heretofore granted to me. The nail strip is contained in an oscillating and longitudinally movable strip carrier, the end of the strip being moved or put into position between the cutters, which then sever the strip to form a nail, the driver then descending to drive it. In the patent referred to the strip, in coil-form, was so mounted and supported with relation to the strip carrier that it partook bodily of all the movements of the strip carrier both in its reciprocations and its oscillations, which was objectionable because of the great strains resulting from momentum due to the weight of the strip and the high speed of the machine, such strain being variable according to the weight of material and speed. In this present invention, to do away with these objections, I have connected to a rigid part of the frame a suitable support for the coiled metallic strip, and the said coil has only a motion of rotation upon its own axis when being unreeled, the strip being twisted about half-way round between the strip carrier and the reel as one nail after another is cut from the strip, the strip-carrier in this present invention besides having a motion of oscillation and of reciprocation being also adapted to be tipped vertically to change the bevel or shape of the nail to be severed from the strip. I have also provided novel mechanism, by which to oscillate the strip carrier. Herein also the nail tube is connected to the lever carrying the movable cutter member, so that the nail tube is put into position to receive each nail as it is cut off from the strip. I have also combined with the cutters a yielding or spring actuated nail holder adapted to prevent axial rotation of the nail between the cutting and driving operations. I have also combined with the strip carrier, cutting mechanism, and driver and awl, for feeding the material.

Figure 1, of the drawings is a right-hand side elevation of the working parts or head of the improved machine herein to be described, the column and work-support or horn being omitted, as well as the strip support, the latter being shown in Fig. 10^a. Fig. 2, is a front elevation of the parts shown in Fig. 1, together with a part of the usual horn. Fig. 3, is a section in the dotted line x, Fig. 1. Fig. 4, shows the strip-carrier detached and reversed from its position Fig. 1. Fig. 5, is a section of the strip-carrier in the dotted line x^4. Figs. 6 and 7 represent the mouth or delivery end of the strip-carrier separated, to show the holding rolls which act on the strip. Fig. 7^a is a section in the line x^8 Fig. 4, it, however, showing a tube inserted as it may be to change the diameter of the opening in the strip-carrier for a narrower strip. Fig. 8, a detached view of the adjusting gear stud shown in Fig. 4, to adjust the inclination of the strip-carrier, according to the taper which it is desired to give to the nail. Fig. 9, a detail showing the toothed segment for reciprocating the sliding frame having the attached sleeve-like bearing in which the strip-carrier is mounted, together with the threaded collar having the rack. Fig. 10, shows developed the cam for actuating the strip-carrier. Fig. 10^a, a detail showing part of the column and the strip-carrier. Fig. 11, is a partial horizontal section at the head of the machine in about the dotted line x^5, Fig. 2, the section showing the pivot stud of the lever on which is mounted the movable blade or member of the cutter. Fig. 12, is a detail top view of the foot or throat plate and gage detached. Fig. 13, an upper end view of the nose detached. Figs. 14 and 15 are respectively outer and inner side views of the stationary cutter blade or member. Figs. 16 and 17 are respectively end and inner side views of the cover plate outside the stationary cutter blade, said figures showing the attached nail-holder and its actuating spring. Fig. 18, is an enlarged partial horizontal section in about the line x^6, Fig. 2. Fig. 19, represents

the strip in side elevation, the portion at the left of the full line representing the nail as cut off, the dotted line representing the line of the next cut to be made when the strip is rotated one hundred and eighty degrees. Fig. 20, shows a section of the strip.

The column A of the machine, the upper end of which is shown in Fig. 10ª, is and may be of any usual or suitable construction common to nailing machines, preferably as in United States Patent No. 360,585, the said column however having and supporting a suitable horn, substantially as in United States Patent No. 265,227 upon which may rest the work into which the nails made from the nail strips, of uniform thickness, are to be driven, the shape of the nail strip being best shown in Fig. 20, a portion of the strip being represented in Fig. 1, the strip in practice in coil form coming from some suitable reel R, supported in suitable manner, but independently of the strip carrier, as shown in Fig. 10ª.

Erected upon the column A is a head or frame A′, which contains bearings for the working parts to be described. This frame receives within it the main or power shaft A^2, having a fast pulley A^3 and a co-operating loose pulley A^4, the said members constituting a clutch pulley, one of the said members being forced into or pulled out of contact with the other, as it is desired to run or stop the power-shaft, by means of a wedge-shaped slide-bar A^5, controlled by a suitable treadle, not shown, all as common in United States Patent No. 360,585. The power-shaft A^2 has fast upon it a cam B, and a pinion C, and the forward end of the said shaft is provided with a driver-bar lifting-cam A^6, shown in Fig. 2 by dotted lines, it acting upon a projection A^7, see dotted lines Fig. 2, fast upon the driver-bar A^8, provided at its lower end with a driver *a*, the said cam A^6 serving to lift the driver-bar, as practiced in said patent No. 360,585, the spring A^9 acting on the arm A^{10}, and through the link A^{12} serving to depress or throw down the driver-bar quickly. The force of the spring A^9 may be regulated in usual manner by the screw A^{13} in engagement with the worm gear A^{14}. The inner face of the cam B has a cam groove B′, see Fig. 3, which receives a roller or other stud on the arm B^2, having a depending rod C^8 which corresponds with the rod designated by like letters in United States Patent No. 383,455, and co-operates with the horn to aid in depressing the same.

The parts so far described are such as are used at the present time. The pinion C on the main-shaft A^2 engages a toothed gear C′ on the cam-shaft C^2, said cam-shaft having a series of cams C^3, C^4, the two latter being preferably made in one piece, and a cam C^5. The main shaft A^2 also has fast on it at its front end a cam plate A^{16}, provided at its outer face with a cam groove *a*′, into which is entered a roller or other stud a^2 of a lever a^3, mounted loosely upon the outer end of the cam-shaft C^2, the hub of the said arm being retained upon the said cam-shaft by a suitable nut a^4. The arm a^3 has a projection, to which is jointed at a^5 a link a^6, herein represented as rounded at its lower end, see Fig. 2, and fitted into a circular socket in the upper end of the feed-bar a^7, provided as represented with an awl-like point a^8. The said feed-bar is slotted, as at a^9, in the direction of its length, and receives loosely in its slot a fulcrum block a^{10}, mounted on an adjustable fulcrum stud a^{12}, secured in the front of the head of the machine, the adjustment of the said fulcrum stud vertically regulating the effective length of the feed stroke of the feed-bar. The feed-bar has a roller or other stud a^{13}, which is acted upon by an irregular peripheral portion a^{14} of the cam plate A^{16} to vibrate the said feed-bar when in engagement with the material, the movement of the arm a^3 reciprocating the feed-bar, so that it descends to engage the stock, and retires therefrom, the backward movement of the feed-bar over the stock being effected by a spring *c*. The feed-bar works in a guide-box, the front plate of which is marked a^{15}, it being held in place chiefly by a screw a^{16}, the said screw passing through an enlarged opening in the feed-bar, so that the vertical movement of the latter, as well as its lateral movement, is not affected by the said screw. The edge gage *b*, made adjustable by the handle *b*′, and the foot-plate b^2 to rest upon the stock, are substantially as common.

To the front side of the head is attached by a screw b^3, a cover plate b^4, grooved at its inner side, see Fig. 17, and provided with a yielding nail holder b^5 acted upon by a spring b^8, the said nail holder being slotted at b^{25} for the passage through it of the inner end of a screw b^{26}, which screw acts both as a guide and to limit the sliding or horizontal movements of the said nail holder.

At the rear of the nail holder is located the stationary member b^6 of the strip-cutting mechanism.

The head of the machine is provided with a suitable orifice, see Fig. 11, to receive the pivot b^9 of the movable cutter lever b^{10}, to which is attached by screw b^{12} a cover plate b^{13}, the said plate holding in place between it and the said lever the movable blade b^{14} of the cutting mechanism, the latter being slotted at b^{15}, see Fig. 15, to enable it to be adjusted, when desired, to compensate for the grinding of the cutter. The lower end of the lever b^{10} carrying this movable cutter, has a suitable lip b^{60}, see Fig. 2, to which is attached by a screw b^{19} a nose, composed, see Fig. 13, of a block b^{16} provided at its front side with a vertical guide-way b^{17} to receive a key or rib projecting from the rear side of a plate b^{18}, said block b^{16} and plate b^{18} being provided with a vertical passage, through which the driver *a*, drives the nail when severed from the strip; Fig. 13 showing a nail in said pas-

sage. The lever b^{10} has a curved guide lip b^{40}, and the cap-plate b^{13} has a curved guide lip b^{20}, to inclose the movable cutter member.

The head of the machine has attached to it by a screw b^{22} a plate b^{21}, the inner edge of which overlaps a portion of the outer face of the movable lever b^{10} to keep its portion b^{9} properly seated in its bearing, the lever b^{10} being suitably slotted in line with the screw b^{22} so as to let the said lever move and not be obstructed by the screw.

The main shaft has loosely mounted upon it a sliding frame D having an upright arm D′, provided with a roller or other stud to enter a cam groove in the front face of the cam C^{5}. This sliding frame has a downwardly-projecting arm D^{2}, to which is connected by an adjusting device, shown as a stud D^{3} having gear teeth 100, and called a gear stud, see Figs. 1 and 8, a segmental arm D^{4}, having a hollow sleeve-like bearing D^{30}, in which oscillates the strip-carrier D^{5}, to be described. This strip-carrier has a thin tapered nose, made preferably in two pieces and held together by the screws *f*, see Fig. 1, and each half of said nose is provided with a gripping roll as *f′*, f^{2}, said rolls serving to grip the strip centrally between them sufficiently to take the same with the strip-carrier when the latter is being moved in the forward direction, the rolls rolling back along the strip when the latter is held by the cutters.

To provide for different widths of strip, the strip-carrier may have inserted in it tubes, as $D^{\times}$, see Fig. 7^{a}, to fill its space, the particular tube used having a central opening of the width of the strip. The frame D and its attached parts including the bearing D^{30}, is oscillated slightly so that as the strip-carrier, to be described, is oscillated, it may at the same time be moved somewhat laterally, so that neither the nose of the strip-carrier nor the edge of the strip will contact with the stationary cutter. The frame D at its rear end is shown as threaded, and as receiving loosely upon it a threaded collar D^{6}, provided at one side with a series of teeth D^{7} to constitute a rack, see Fig. 9, which teeth are engaged by a toothed segment D^{8} carried by a radius-bar D^{9} mounted upon a stud D^{10}, the said radius-bar having adjustably attached to it a stud D^{12}, provided with a loose block D^{26}, which enters a slot D^{13} in a lever D^{14} having its fulcrum at D^{15}, and provided with a roller or other stud D^{16} which enters the cam groove in the cam C^{3}, see Fig. 10, the latter groove moving the said lever and radius-bar, and causing the segment to reciprocate the slide frame D longitudinally upon the said shaft, said movement of the frame carrying with it the bearing D^{30} and the oscillating strip-carrier, it giving to the said strip-carrier more or less longitudinal movement, as may be desired, to enable it to place the free end of the strips, carried by it, more or less beyond the edge of the stationary cutter blade b^{6}, the movable cutter b^{14} being then retracted. The collar D^{6} being loose on the frame D enables the latter to be oscillated at the proper times without interfering with the motion of the rack and segment. While the knives are in engagement with the strip and cutting the same transversely, the strip-carrier is moved backwardly along over the strip for a distance equal to the width of the next nail to be made.

The strip-carrier, mounted to oscillate in the hollow hub D^{30}, is provided externally, see Fig. 3, with a series of teeth, which are engaged by teeth *e* of a rack-bar *e′*, herein represented as a hollow nearly square rack deriving its movement from a link e^{2}, which is ball-jointed at one end to the said rack-bar, and is adjustably connected by its threaded end e^{3} to a hollow nut e^{4}, in turn ball-jointed to the lower end of a lever e^{5}, pivoted at e^{6} and provided with roller or other stud e^{7}, which enters the groove in the cam C^{4}, see Fig. 3.

The segmental arm D^{4} of the hollow hub D^{30} in which oscillates the strip-carrier, is provided with a curved slot, e^{8}, struck from the center of the strip at the cutting point, and the gear stud D^{3}, confining the said arm to the said sliding frame, passes through said slot, the adjustment of the arm in the arc of a circle by the teeth 100 of the gear stud D^{3} engaging the rack 101 of the arm, enabling the nail cut from the strip to be of any given taper. It will be observed, see Figs. 1 and 8, that the gear stud D^{3} has near one end a thread t^{8}, and as represented, the end of the stud is squared or flattened as at t^{7}, so that it may be rotated when it is desired to adjust the segmental arm on the sliding frame, a check nut t^{6} being applied to the said threaded part t^{8} of the stud for clamping the same in adjusted position. Instead of squaring the end of the gear stud, as stated, I may shape it in any other suitable or usual way to be engaged by a wrench or screw-driver. The strip-carrier is rotated about one hundred and eighty degrees, first in one and then in the other direction, presenting uppermost first one edge of the strip and then the other, and the nails are cut alternately with their heads from opposite edges of the strip. The block b^{16}, see Fig. 13, has at its rear side a rib b^{61} which is adapted to enter a suitable horizontal slot, not shown, in the lip b^{60} before referred to.

In operation, as stated, the end of the strip is placed between the stationary and the movable cutters when they are separated, and then the movable cutter b^{14} is actuated and made to co-operate with the stationary cutter and grasp the strip, and this done the carriage and strip carrier are moved backwardly away from the cutters the rolls rolling over the strip. The cutters in their final closing movement cut from the strip the nail next to be driven, and as the movable cutter passes the stationary cutter, the former continues to act against the nail supported at its opposite side by the yielding guide b^{5}, and the said

severed nail is moved slightly to one side until it is put vertically in position with the driver and with the nail passage in the nose shown in Fig. 13. By making the guide movable laterally in the direction of the thickness of the nail strip the nail may be moved bodily laterally and the nail be prevented from turning around its own center between the cutting and driving operations.

In the machine shown in the Patent No. 360,585, the operator moved the work by hand, but in this present invention wherein regularity of feed is required, automatic mechanism has been devised and combined with the driver, the nail strip carrier, and cutting mechanism, so that the material into which the nails are driven is fed automatically.

I have herein shown a carriage having an oscillating strip-carrier provided with rolls to act upon the strip and aid in holding it in position, but the said strip-carrier and rolls are not herein broadly claimed as they constitute the subject matter of claim in another application filed by me concurrent herewith Serial No. 428,155, and herein I do not claim broadly moving the carriage containing the strip-carrier positively in its backward and forward movements irrespective of the device employed, as that feature is also made the subject of claim in the said application. As herein shown, each nail as it is formed is forced laterally against the yielding nail holder 110, which latter prevents the nail cut from the strip from rotating axially between the cutting and driving operations, and hence the said yielding nail holder constitutes a part of the driver passage.

I am aware that a spring has been located in a driver passage to center a nail point.

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

1. In a machine for inserting metallic fastenings, the combination of the following instrumentalities, namely:—a movable frame, the attached arm provided with a hollow sleeve-like bearing, an adjusting device to alter the angle of the said sleeve-like bearing upon or with relation to the movable frame and the line of its reciprocation, an oscillating strip-carrier mounted in said bearing, and cutting mechanism to sever the said strip, substantially as described.

2. In a machine for inserting metallic fastenings, a movable frame; an attached arm having a sleeve-like bearing; a strip-carrier mounted in said sleeve-like bearing; and two levers D^9, D^{14} adjustably connected together; the lever D^9 carrying and moving said frame, the lever D^{14} serving to actuate the lever D^9 for a variable distance; and mechanism to move the said lever D^{14}, substantially as described.

3. The movable frame; its attached sleeve-like bearing for the reception of a strip-carrier; and a collar loose on and to actuate the said frame and provided with rack teeth; combined with a lever having rack teeth, and with means for moving said lever, substantially as described.

4. The movable frame; its attached sleeve-like bearing for the reception of a strip-carrier; and an adjustable collar loose on and to actuate the said frame and provided with rack teeth, combined with a lever having rack teeth, and with means for moving said lever, substantially as described.

5. The movable frame; its attached sleeve-like bearing; the oscillating strip-carrier mounted therein and having gear teeth; combined with a sliding rack bar having its bearings at right angles to the said sleeve-like bearing; and means to reciprocate the said rack bar, substantially as described.

6. The movable frame; its attached hollow sleeve-like bearing; the oscillating strip-carrier therein provided with gear teeth; and the rack bar in engagement therewith; combined with the connecting rod, universally jointed to the said rack bar, to operate, substantially as described.

7. The movable frame; its attached hollow sleeve-like bearing; the oscillating strip-carrier therein provided with gear teeth; and the rack bar in engagement therewith; combined with the connecting rod universally jointed to the said rack bar, the lever e^5; and universal joint connections between it and the said connecting rod, to operate, substantially as described.

8. The movable frame; the adjustably attached arm provided with a hollow sleeve-like bearing; the strip carrier therein; and a rack to oscillate the strip-carrier; combined with an adjusting device to alter the angle of the said sleeve-like bearing upon or with relation to the said movable frame and the line of its feeding movement, substantially as described.

9. In a machine for inserting metallic fastenings, the following instrumentalities, viz:— a movable frame having an adjustably attached sleeve-like bearing; an adjusting device to alter the angle of said bearing with relation to the frame, a strip-carrier mounted in the said bearing; a rack to oscillate the said strip-carrier; cutting mechanism to sever the strip; a nose or nail guide in which the nail is deposited; a driver; and an awl feeding device, to operate, substantially as described.

10. The shaft A^2; its attached cam A^{16} the cam surface a^{14}; and the longitudinally slotted feed bar adapted to slide and rock upon its fulcrum; and the vertically adjustable fulcrum extended through the slot, combined with a lever actuated by the said cam A^{16}, and with a jointed connection between the said lever and feed bar, whereby the feed bar may be moved vertically; and a roll or stud carried by the feed bar and actuated by the cam surface a^{14}, to vibrate the said feed bar, substantially as described.

11. In a machine for inserting metallic fastenings, the following instrumentalities, viz:—

an oscillating and reciprocating strip-carrier, nail-cutting mechanism consisting of a stationary and a movable cutting blade, and actuating devices for one of said blades; and a notched spring-supported nail-holder located at the inner side of the stationary blade and in the path of movement of the movable blade when passing the edge of the stationary blade, the said nail-holder receiving against it the side of the nail being cut from the strip and yielding under the action of the nail and the movable cutter during the cutting operation, substantially as described.

12. In a machine for inserting metallic fastenings, the movable cutter carrying member b^{10}, its attached cutter; and an opposed cutting member; combined with a cap to keep the portion b^9 of the said movable member seated in its bearing in the frame-work, substantially as described.

13. In a machine for inserting metallic fastenings, the combination with two cutters to act on opposite sides of and sever nail material, of a yielding nail holder having a rectangular notch into which one of the cutters places the nail, substantially as described.

14. The movable frame; the attached arm provided with a hollow sleeve-like bearing; and the strip-carrier therein; combined with an adjusting device to alter the angle of the said sleeve-like bearing upon or with relation to the movable frame and the line of its reciprocation, substantially as described.

15. In a nailing machine, the combination with a driver bar and strip cutting mechanism and a movable frame, of an arm made adjustable on said frame in the arc of a circle struck from substantially the center of the strip at the cutting point, the strip carrier supported by said arm and means for both oscillating the strip-carrier and for moving the said strip-carrier backwardly over the strip while held by the cutting mechanism, substantially as described.

16. In a machine for inserting metallic fastenings, cutters to sever a strip; a movable frame; an arm having a sleeve-like bearing; means to adjust the said arm in the arc of a circle on or with relation to the said frame; a strip-carrier mounted in said sleeve-like bearing; a rack to oscillate the said strip-carrier; a lever as e^5; and a connecting rod universally jointed to the said rack and to the said lever, to operate substantially as described.

17. In a nailing machine, the combination with a driver bar and strip cutting mechanism, of an arm made adjustable in the arc of a circle struck from substantially the center of the strip at the cutting point, and provided with rolls, as f', f^2, to act upon the strip, and means for moving the said strip-carrier backwardly over the strip while held by the cutting mechanism, substantially as described.

18. In a machine for inserting metallic fastenings the combination with two cutters to form nails, of a spring-supported nail-holder held against one side of the stationary cutter, said nail holder yielding in the direction of the movement of and by the action of the movable cutter and preventing axial rotation of the nail between the cutting and driving operations, a nail-driver and means to actuate it, the driver driving the nails from between the end of the movable cutter and the said nail-holder, substantially as described.

19. In a machine for inserting metallic fastenings, a movable frame; its attached sleeve-like bearing for the reception of a strip-carrier; and a collar on the said frame provided with rack teeth; combined with a lever having rack teeth; a pivot for said lever, said pivot being substantially at right angles to the longitudinal center of said strip carrier; and means for moving said lever and with it the strip carrier in the direction of the length of the latter, substantially as described.

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

LOUIS GODDU.

Witnesses:
GEO. W. GREGORY,
FRANCES M. NOBLE.