(No Model.) 6 Sheets—Sheet 1.

L. GODDU.

NAILING MACHINE.

No. 383,455. Patented May 29, 1888.

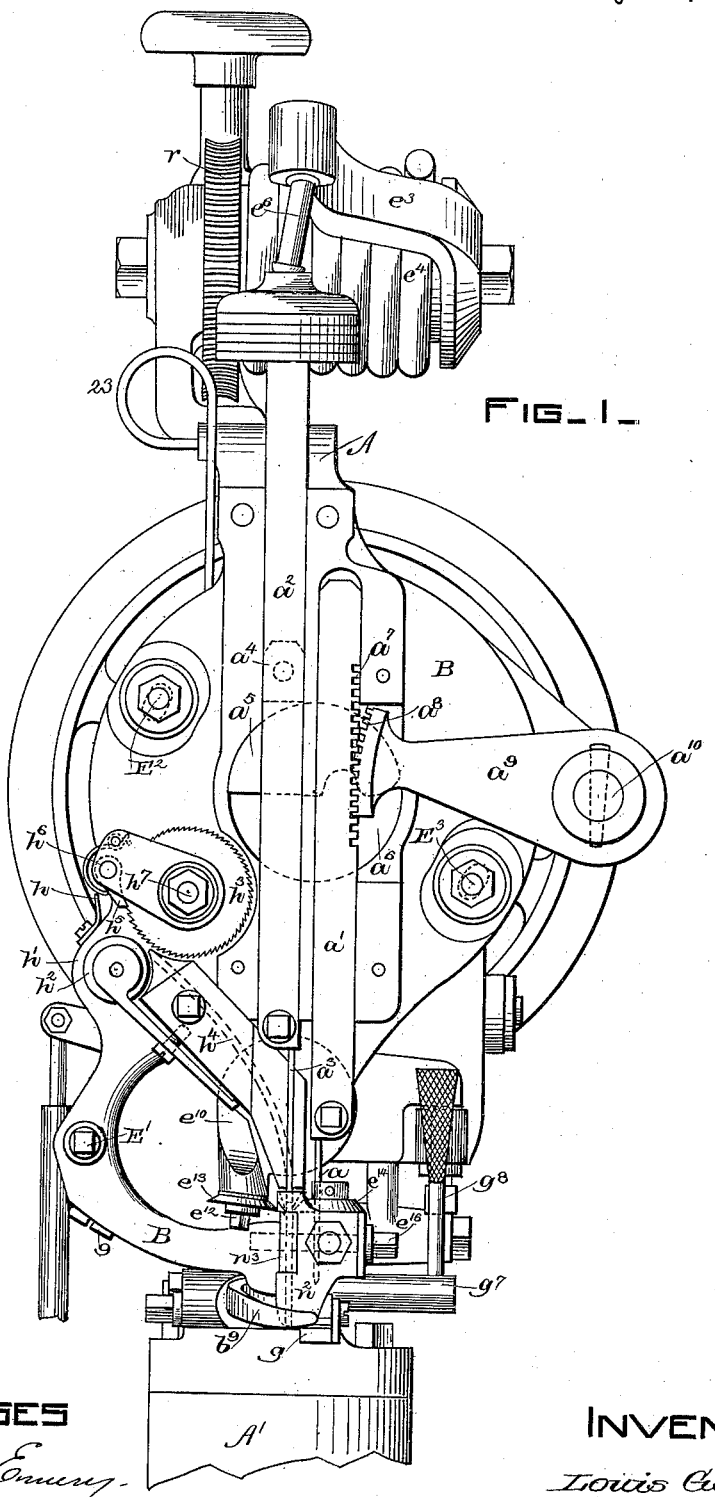


FIG. 1.

WITNESSES

Fred. L. Emery.

John. P. C. Prentiss

INVENTOR.

Louis Goddu.

By Dewey & Gregory Attys.

(No Model.) 6 Sheets—Sheet 2.

L. GODDU.

NAILING MACHINE.

No. 383,455. Patented May 29, 1888.

FIG. 2.

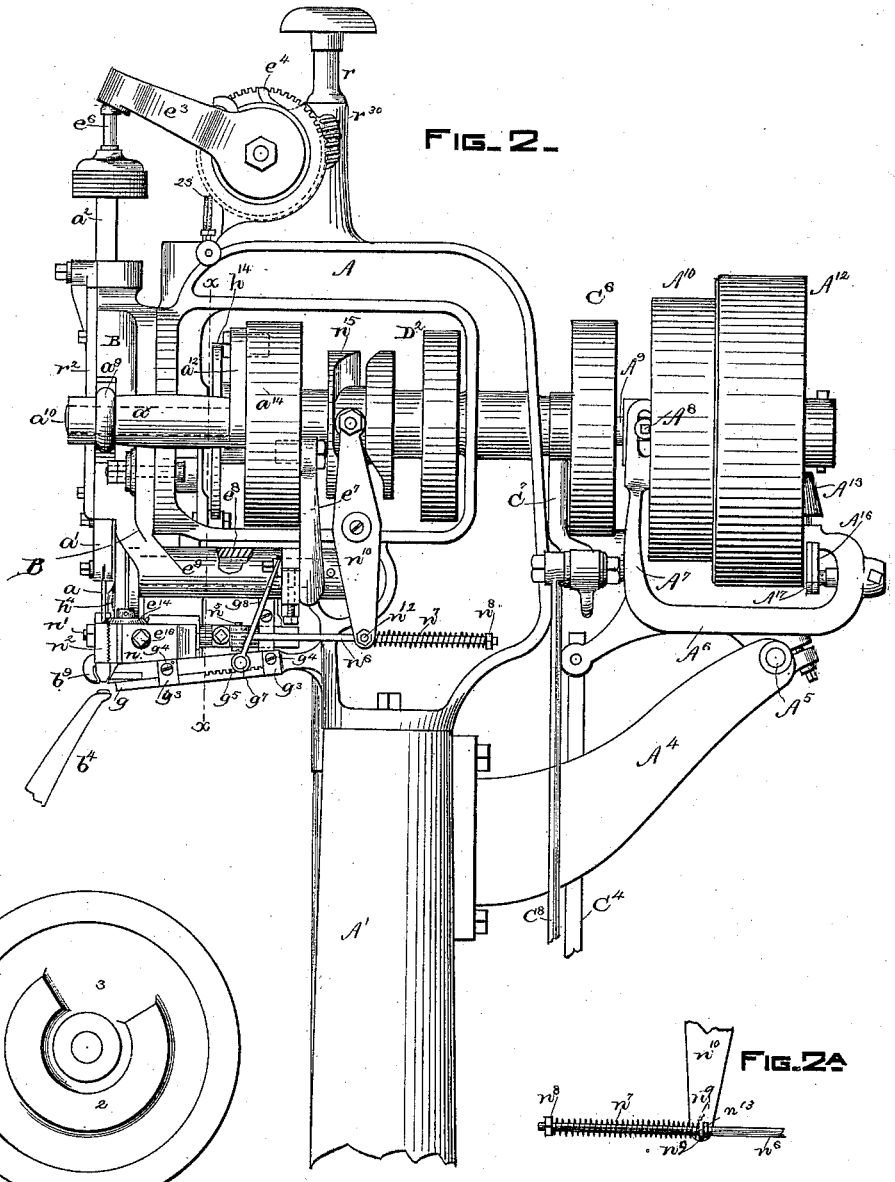


FIG. 3.

FIG. 2A.

WITNESSES,

Fred L. Emery.

John H. Prentiss.

INVENTOR,

Louis Goddu,

by Crosby & Gregory,

Attys.

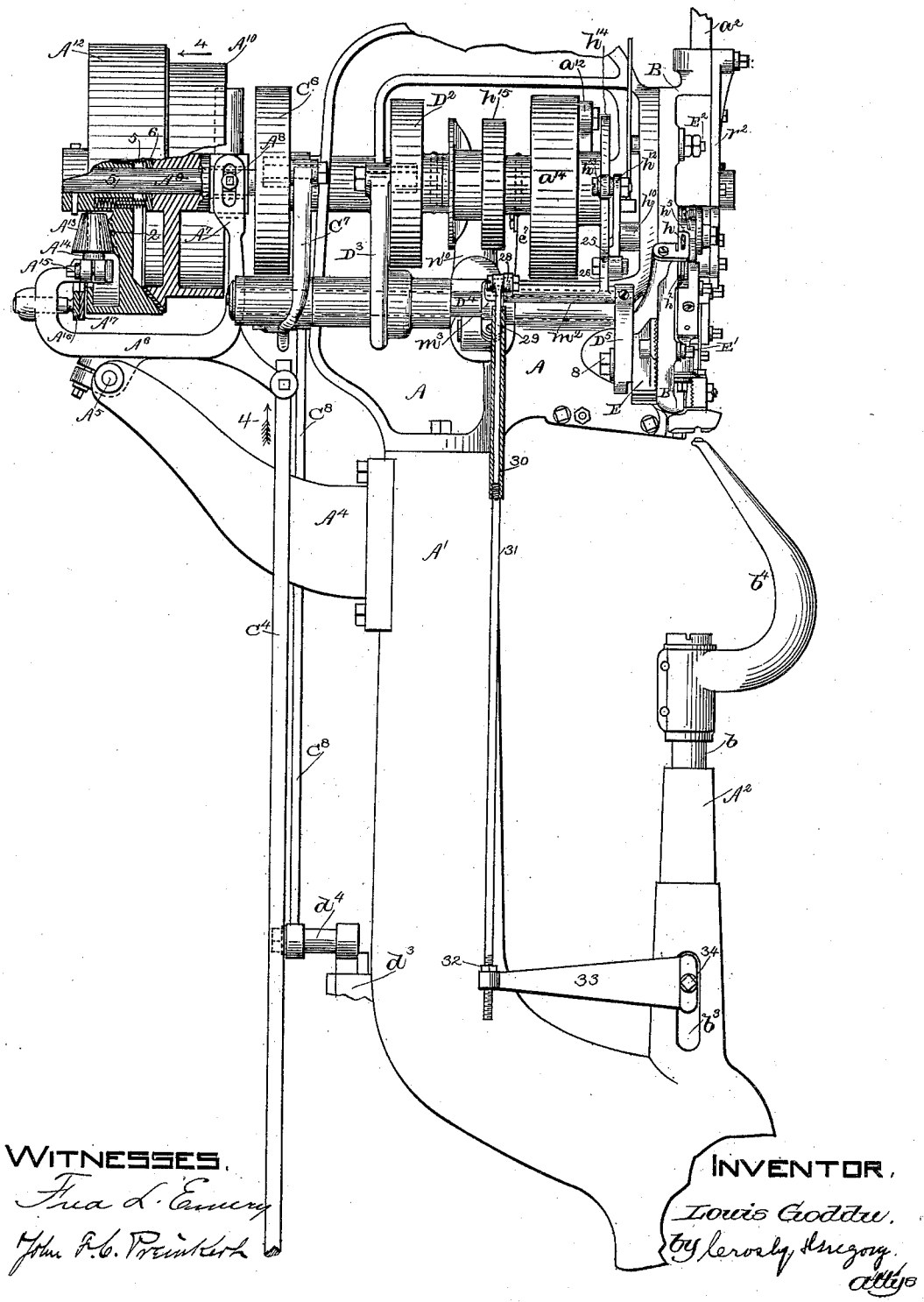
(No Model.) 6 Sheets—Sheet 3.

L. GODDU.

NAILING MACHINE.

No. 383,455. Patented May 29, 1888.

FIG. 4.



WITNESSES.

Fred L. Emery

John P. C. Prentiss

INVENTOR.

Louis Goddu.

by Leroy Gregory.

Atty

(No Model.) 6 Sheets—Sheet 4.

L. GODDU.

NAILING MACHINE.

No. 383,455. Patented May 29, 1888.

FIG. 5.

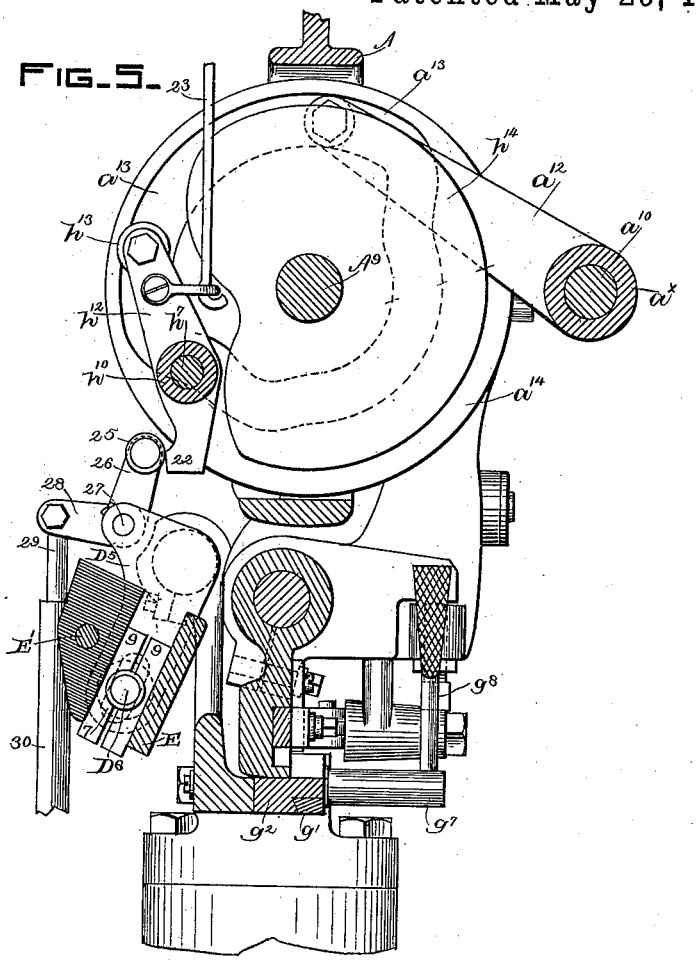


FIG. 6.

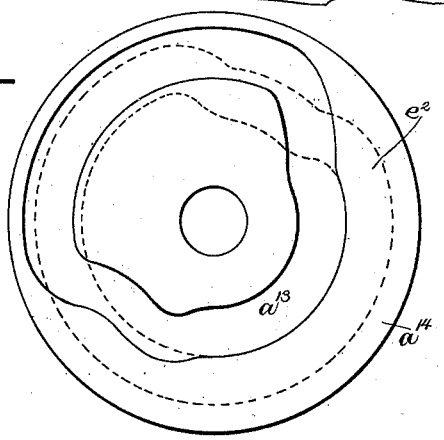
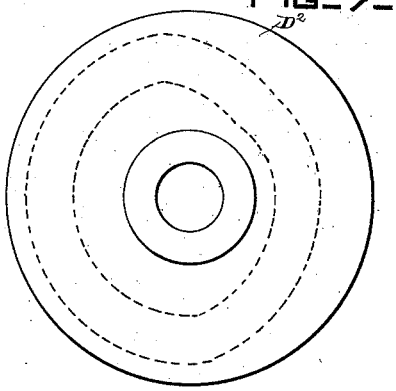


FIG. 7.



WITNESSES.

Fred. L. Emery.

John F. C. Brinkerhoff.

INVENTOR

Louis Goddu.

by Lersby & Gregory Attys.

(No Model.)

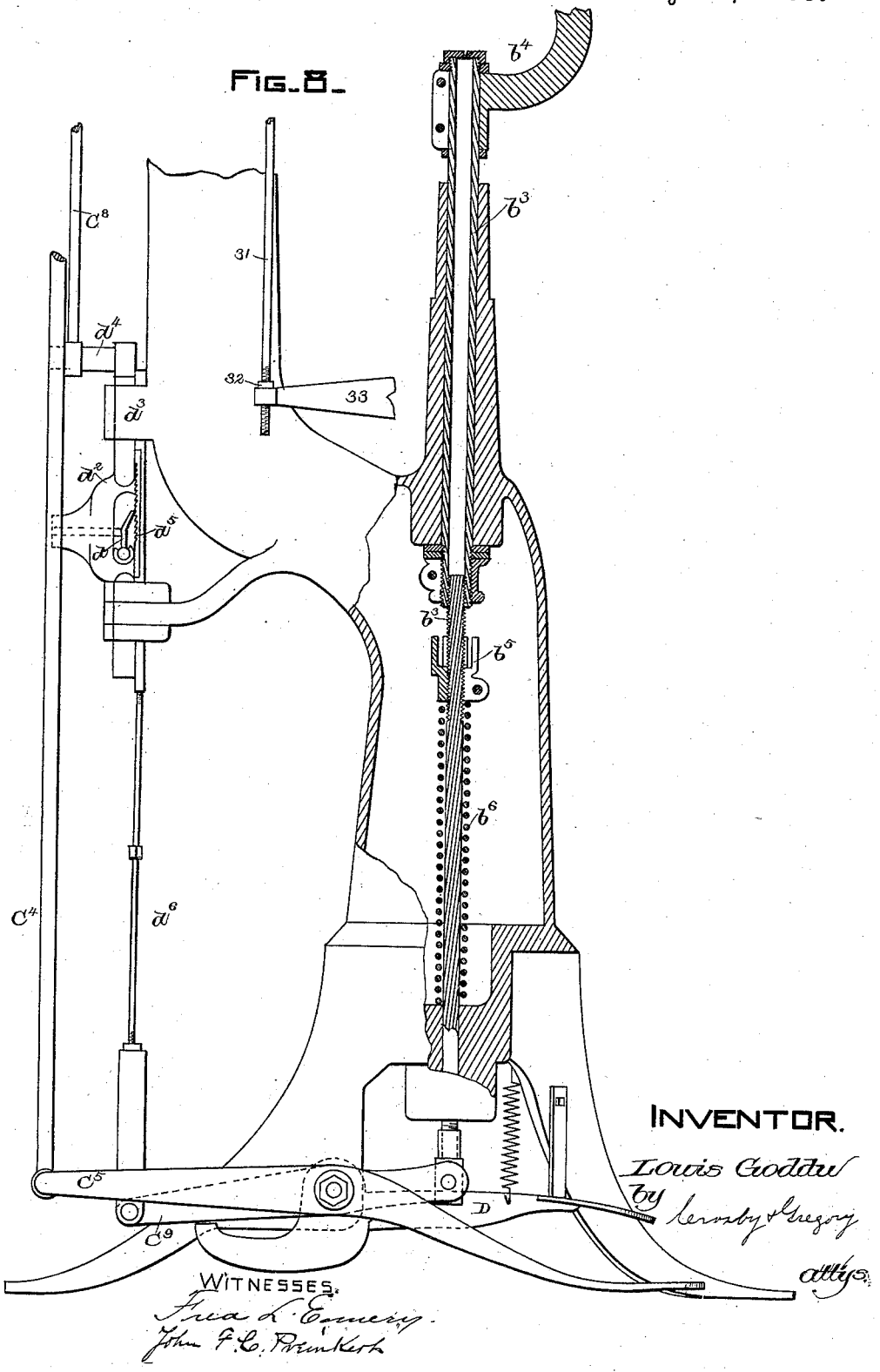
6 Sheets—Sheet 5.

L. GODDU.

NAILING MACHINE.

No. 383,455. Patented May 29, 1888.

FIG. 8.



INVENTOR.

Louis Goddu

by Lemby & Gregory

attys.

WITNESSES.

Fred L. Emery.

John F. C. Pfrenkert

(No Model.) 6 Sheets—Sheet 6.

L. GODDU.

NAILING MACHINE.

No. 383,455. Patented May 29, 1888.

FIG. 9.

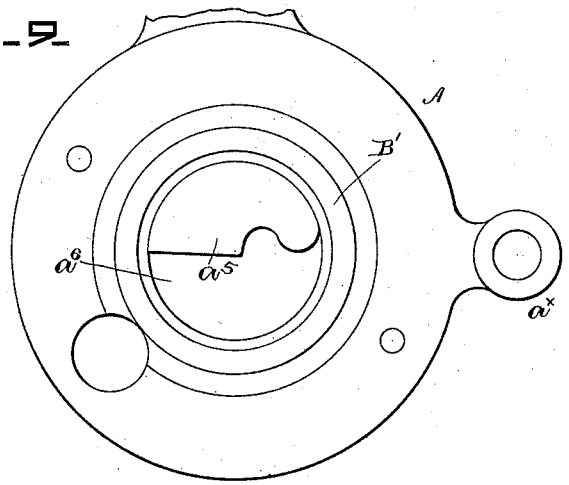


FIG. 13.

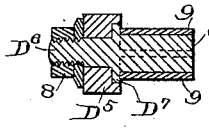
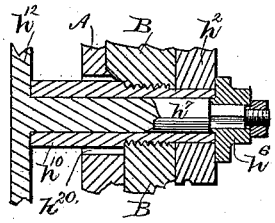


FIG. 12.



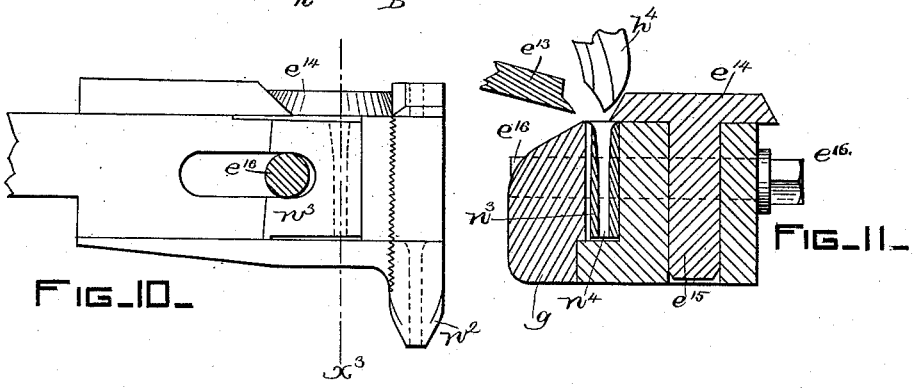


FIG. 10.

FIG. 11.

WITNESSES

Fred L. Emery.

John F. C. Preuss Lort

INVENTOR

Louis Goddu

by Lemley & Gregory Attys.

UNITED STATES PATENT OFFICE.

LOUIS GODDU, OF WINCHESTER, ASSIGNOR TO JAMES W. BROOKS, TRUSTEE, OF CAMBRIDGE, MASSACHUSETTS.

NAILING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 383,455, dated May 29, 1888.

Application filed June 13, 1887. Serial No. 241,116. (No model.)

To all whom it may concern:

Be it known that I, LOUIS GODDU, of Winchester, county of Middlesex, and 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 on the drawings representing like parts.

This invention has for its object to improve and simplify the construction of that class of machine for uniting soles to uppers, or for driving fastenings into leather, wherein the fastenings are cut from a wire and driven singly.

The machine herein described contains an awl and driver carried by reciprocating bars arranged in a vibrating or pivoted head of usual construction, the vibration of the head effecting the feeding movement of the stock, the vibration taking place while the awl is in the stock and so as to properly feed it over the horn, the latter at such time being lowered.

One feature of my invention consists in improved means for automatically determining the length of the fastening to be cut from the wire, as will be described, the difference in the length of fastening being gaged by or through the horn acted upon by the stock, as will be described, whereby the length of the fastening is automatically adapted to the thickness of the stock.

The wire, fed through a guide and having its end inserted into a recess in a carrier, is severed at the proper time by means of peculiar cutters, they consisting, essentially, of disks having beveled edges, one of the said disks being carried by a vibrating arm. The nail, severed from the length of wire and held in the carrier, this latter device not being of itself new, is, by a movement of the carrier, placed in line with the driver-passage in the nose attached to the lower end of the vibrating head, the shank of the said carrier being surrounded by a spring, and having combined with it a lever which is moved positively, the spring permitting the carrier to remain at rest should the nail fail to be driven correctly from the carrier, or should the driver-bar be stuck in the carrier or nose, the spring at such time yielding, while the lever actuating the carrier continues to move, the spring avoiding the breaking of parts.

The awl-carrying bar is provided at one edge with a series of rack-teeth, which are engaged by the teeth of a sector carried by a rock-shaft.

In this my machine the wire-feeding mechanism is mounted upon the vibrating head in which the awl-carrier is reciprocated, the extent of movement of the wire-feeding mechanism, and consequently the length of the fastening, depending upon the movement of a wire-measuring mechanism mounted upon a stationary part of the frame-work, as will be described, the said wire-measuring mechanism being actuated to insure a longer or shorter feed-stroke of the feeding mechanism, according to the position of the top of the horn supporting the stock to be nailed, the said horn being changed vertically by varying thicknesses of the stock, as will be described.

My invention in nailing-machines consists, essentially, in wire-feeding mechanism, combined with wire-cutting mechanism containing a cutting-disk having a beveled edge, any portion of which may be brought into operative position in case any other portion of the edge becomes dulled; also, a nose attached to the lower end of the head in which the driver reciprocates, wire feeding and cutting mechanism, and a carrier to receive a fastener cut from a wire, combined with a rod or shank, spring, and lever to move the carrier, whereby, in case the backward movement of the carrier is obstructed, the spring may yield and avoid breaking of parts; also, a loose pulley, a shaft, and a balance-wheel provided with a cam-surface, combined with a yoke, and a roller to co-operate with the said cam-surface; also, a vibrating head to carry an awl, and wire-feeding mechanism made movable with the said head, combined with measuring mechanism connected to the frame-work or detached from the vibrating head, and controlled by the height of the horn to determine the extent of movement of the wire-feeding mechanism and the length of the fastener to correspond with the requirements of the stock on the horn; also, a feeding-ratchet, a tappet-shaft, on which it is

mounted loosely, a tappet-lever, pawl to move the said ratchet, and means to move the tappet-lever, combined with a measuring-sleeve, measuring-leg, and a horn and connections between the said horn and leg; also, a feeding-ratchet, a pawl to move it, a tappet-shaft, and tappet-lever, having an arm provided with a curved and inclined edge or end, combined with a rock-shaft, a stud, and sleeve mounted therein having arms, one of which co-operates with the curved and inclined end of the tappet-lever, while the other arm co-operates with or is moved by the horn, all substantially as will be described.

Other features of my invention will be described, and pointed out in the claims at the end of the specification.

Figure 1 is a front elevation of the upper working parts of a machine embodying my invention, the cap of the head being removed. Fig. 2 is a right-hand side elevation, on a smaller scale, of the machine shown in Fig. 1, the figure showing somewhat more of the standard or column of the machine and a part of the horn; Fig. 2ª, a detail of the devices for moving the carrier; Fig. 3, an outer side view of the balance-wheel. Fig. 4 is a left-hand side view of the machine shown in Fig. 1, the said figure showing, however, more of the column and the horn, chiefly to illustrate the mechanism operated by or through the horn for regulating automatically the length of the fastening, part of the said mechanism being broken out to better enable the construction thereof to be understood. Fig. 5 is a sectional detail in the line *x*, Fig. 2, looking to the right. Figs. 6 and 7 are views, respectively, of the cams a^{14} and D^2, to be described. Fig. 8 is an enlarged view of the lower end of the horn-shaft and column of the machine, the latter being broken out to better show the construction of the parts. Fig. 9 is a detail showing a part of the stationary frame of the machine having the circular hub upon which rocks or turns the head carrying the awl and driver bar, the said figure also showing the disk at the front end of the main shaft, the disk having a driver-lifting cam of usual construction. Fig. 10 is an enlarged detail, chiefly to show the nose and the carrier adapted to slide therein. Fig. 11 is a section of Fig. 10 in the dotted line x^3, the said figure also having added to it a part of the guide through which the wire travels, and also the cutters, the movable cutter being but partially shown; and Figs. 12 and 13 are enlarged details to be described.

The frame-work A, of suitable shape to sustain the working parts, is firmly bolted or secured to the upper end of a column, A′, having a cylindrical hub or projection, A^2, in which slides vertically the shank b^3 of the horn b^4, the said horn, its shank, and collar b^5, the spring b^6, the lever C^9, to which it is attached, the connecting-rod d^6, the rack-toothed bar d^5, connected therewith, the pawl *d*, the pawl-carrier d^2, the bolt d^4, the rod C^8, the lever C^7, to which it is connected, the rod C^4, the lever C^5, to which it is attached, and the foot-lever D, are and may be substantially as in United States Patent No. 265,227, granted to me September 26, 1882, wherein the operation of the said devices is substantially the same, and so need not be herein further referred to. I have herein, however, shown the horn-shaft as made in two parts, the upper part being made hollow, as shown in section in Fig. 8, thus lightening the same and avoiding shocks due to momentum.

The column A′ has bolted to it a bracket, as A^4, which has pivoted upon it at A^5 a yoke, A^6, which is connected to the rod C^4. This yoke has an upwardly-extended arm, A^7, which is slotted to embrace a pin or stud, A^8, forming part of a collar placed loosely upon a sleeve-like hub surrounding the main shaft A^9, the said hub forming part of a pulley, A^{10}, loose on the main shaft A^9, in practice driven regularly by a belt from a proper counter-shaft, the inner face of the said pulley being made conical to co-operate with a conical recess of a balance-wheel, A^{12}, fast upon the main shaft A^9, the said balance-wheel, as shown in Fig. 4 and in Fig. 3, having a cam projection, 2, which bears against a conical friction-roll, A^{13}, mounted upon a stud, A^{14}, the shank of which is adjustably held or clamped by a screw, A^{15}, between slotted ears of the yoke A^6, the said yoke also carrying a friction device, consisting, essentially, of a sector, A^{16}, faced with leather or other material, as A^{17}, the said friction device bearing against a smooth part of the outer face of the balance-wheel A^{12} whenever the friction-roller A^{13} leaves the cam projection 2 of the balance-wheel A^{12} and enters the recess 3, this happening immediately after the driver has driven a fastener.

When it is desired to start the machine, the operator depresses the outer end of the treadle C^5, lifts the rod C^4, tips the yoke A^6, and causes its arm A^7 to effect the movement of the loose pulley in the direction of the arrow 4 (see Fig. 4) near it, thus forcing its conical part firmly into engagement with the conical part of the balance-wheel A^{12}, causing the latter to start. This movement of the yoke A^6 also releases the friction device and carries the roll A^{13} out from the space 3 in the cam 2, so that the roll comes readily upon the said cam, the cam thereafter acting to maintain the friction between the pulley and balance-wheel, even though the foot were removed from the treadle.

The balance-wheel A^{12} (see Fig. 4) is chambered to receive springs 5, which act upon a washer or collar, 6, resting against the hub of the driving-pulley, to thus insure the removal of the driving-pulley from contact with the balance-wheel whenever the roller A^{13} comes into the space 3 referred to. The main shaft A^9 has fast upon it a cam-disk, C^6, having at one side of it a groove, which receives a roller or other stud of the lever C^7, hereinbefore referred to, the said cam and lever being common to my said patent. The shaft A^9 has also secured to it a cam-disk, D^2, grooved at its

side, and shown separately in Fig. 7, the groove of the disk receiving in it a roller or other stud of an arm, D^3, (see Fig. 4,) the hub of which is connected to the rock-shaft D^4, provided at its front end with an arm, D^5, (see Figs. 1, 5, and 13,) grooved at its front side and slotted to receive the shank of a stud, D^6, having a collar, D^7, and a tubular projection, 6. The shank of this stud is extended through a slot, 7, (shown partially by dotted lines, Fig. 5,) in the arm D^5, and receives upon it a nut, 8, which binds the stud in place.

The sleeve 6 of the stud receives upon it two loose blocks, 9, (shown best in Fig. 5,) which enter and slide in a groove formed at the rear side of a block, E, bolted by bolt E′ to the lower part of the head B, mounted, substantially as in my said patent, upon a circular hub, B′, (see Fig. 9,) extended horizontally from the front end of the frame A, the head B being retained upon the said hub by means of suitable screws and nuts, as at E^2 E^3, the slots through the head being, as usual, of enough greater length than the diameter of the screws to let the head oscillate for a distance sufficient to enable the awl a, attached to the awl-carrying bar a', to effect the feeding of the material over the top of the horn b^4 in usual manner.

The head B, besides the awl carrying bar a', also has in it the driver-bar a^2, carrying the driver a^3, the said driver-bar having at its rear side, in usual manner, a block, a^4, which is acted upon by the usual cam-shaped projection, a^5, (shown by dotted lines in Fig. 1 and by full lines in Fig. 9,) the said cam projection constituting part of a disk, a^6, secured to or forming part of the front end of the main shaft A^9.

The spring e^4, the lever e^3, mounted upon it, and the loose link e^6, as well as the worm toothed wheel r, and the worm r^{30}, to engage the toothed wheel r, are common to the patent referred to, and herein they operate as described in the said patent.

The driver and awl carrying bars are retained in suitable grooves of the head by means of a cap-plate, r^2. (Shown in Figs. 2 and 4.)

The awl-carrying-bar at one side, as shown in Fig. 1, has a series of teeth, as a^7, which are engaged by the teeth of a sector, a^8, at one end of an arm, a^9, attached to a rock-shaft, a^{10}, extended through a sleeve-bearing, $a^\times$, attached to the frame A, the said shaft having at its opposite end an arm, a^{12}, provided with a roller or other stud, which enters a cam-groove, a^{13}, in the front side of a cam-disk, a^{14}, fast upon the main shaft A^9, the said cam operating the said rock-shaft to effect the proper movements of the awl, to enable it to enter and prick a hole in the material for the reception of the fastening next to be inserted, and to thereafter remain in the said material long enough to feed it over the surface of the horn for a distance sufficient to correctly space the fastenings at different distances each from the other, the awl being moved laterally to feed the stock over the horn while the horn is fully released or drawn down, and as the awl is retracted from the stock the horn rises to thus prevent the displacement of the material horizontally or otherwise from underneath the presser-foot b^9, also common to my said patent, the awl-holes being thereby maintained in correct registering position with the driver.

The cam-disk a^{14} has at its rear side a cam-groove, e^2, (shown by dotted lines in Fig. 6,) the said groove receiving in it a roller or other stud of an arm, e^7, attached to a rock-shaft, e^8, mounted in a bearing, e^9, the said rock-shaft at its outer end having a disk-like arm, e^{10}, upon a projecting portion of which is secured by a clamping-screw, e^{12}, a disk-shaped cutter, e^{13}, the said cutter being beveled at its periphery to form a cutting-edge, and being so mounted upon the said disk-shaped arm that it may be turned about the clamping-screw e^{12} whenever it is desired to bring a new or undulled part of the cutter into position to correctly cooperate with the other cutter, e^{14}, of the cutting mechanism, the said cutter e^{14} being a disk having a beveled edge, the said disk having a shank, as e^{15}, which is properly clamped in a part of the nose by a clamping-screw, as e^{16}, the said disk being revoluble at the proper time, so as to bring a sharp or undulled part of its periphery in position to act as a cutter.

Ordinary straight-edge cutters have frequently to be removed and sharpened, which, besides requiring the time of the operator, also results in the loss of time of the machine, and so, also, when ordinary straight cutters are taken off to be ground, much difficulty is experienced in again setting them correctly with relation to each other. By the employment of the disk-like cutters, they having fixed centers about which they may be turned, a sharp portion of the cutting-edge of each disk may be readily brought into operative position, and the two edges will always work correctly together without any special adjustment. The edge gage, g, has, as shown in Fig. 5, a shank, as g', dovetailed at one side, the shank of the edge gage being retained in a dovetailed groove of a bracket, g^2, by means of spring caps or plates g^3, held in place by screws g^4, the said caps acting by friction to hold the shank of the gage in place when left by the operator. The shank of the edge gage has rack-teeth, as at g^5, which are engaged by the teeth of a rod, g^7, having a handle, g^8. The wire from which the fastenings are to be made may be of any usual or suitable form, and it may be taken from a suitable reel, (not shown,) supported above or near the machine in usual manner, the end of the said wire being led through an eye in a plate, as h, (see Figs. 1 and 4,) attached to a rib, h', forming part of the vibrating head B. Then the end of the wire is led between the pressure-roll h^2 and a feeding-roll, h^3, each properly grooved to embrace the wire, and the end of the wire is then led into a groove in a guideway, h^4.

The feed-roll h^3 is provided at its periphery

from side to side with ratchet-teeth, which are engaged by a pawl, as h^5, mounted upon a pawl-carrier, h^6, fixed to a tappet-shaft, h^7.

The pressure-roll h^2 is loose on the sleeve h^{10}, screwed into the vibrating head B, (see Fig. 12,) and extended through a slot, h^{20}, in the frame-work A, the said sleeve constituting the bearing for the tappet shaft h^7, having at its inner end a tappet-arm, h^{12}, provided at its upper end with a roller or other stud, h^{13}, and at its lower end with a toe, 22, the said tappet-arm being acted upon by a suitable spring, 23, which normally acts to push the roll toward the cam-plate h^{14}, attached to the shaft A^9. When the roll h^{13} of the tappet arm is permitted to approach the shaft A^9 as far as the periphery of the cam-plate will admit, then the lower end of the tappet arm rests against the roll 25, mounted on an arm, 26, of a measuring-sleeve, m^2, mounted on a stud, 27, held in the arm D^5, and in a hub or collar, m^3, both secured to or forming part of the rock-shaft D^4, before described.

The measuring-sleeve m^2 has a second arm, 28, to which is pivoted a measuring-leg, 29, that enters loosely a socket, 30, forming part of the measuring-rod 31, the threaded end of the said rod entering and being adjustable vertically in a threaded hole of an arm, 33, bolted to the shank b^3 of the horn, the rod being held in place by a check-nut, 32.

The presser-foot common to United States Patent No. 265,227, and below and between which and the top of the horn the material is passed or fed, is stationary; but the horn is free to rise and fall and adapt itself to the thickness of the stock, as in the said patent.

The fastener to be driven must or should vary in length as the material or stock varies in thickness and as the position of the horn is varied automatically by the thickness of the stock.

I have attached to the horn-shank the arm 33, so that as the horn rises or falls the arm rises or falls with it, causing the rod 31 to act on the leg 29 and turn the measuring-sleeve to place the roll 25 in contact with the toe 22 of the tappet-lever h^{12}, thereby controlling the distance of the roll h^{13} with relation to the shaft A^9, so that more or less of the throw of the cam-plate h^{14} may be utilized, these devices operating in such manner that the thinner the stock the less the movement of the tappet-lever h^{12}, and vice versa; and so, also, the less the throw of the feed-actuating rock-shaft D^4 the less the movement of the pawl h^5, carried by this rock-shaft, the less the movement of the feeding-roll h^3, and the shorter the fastener. The feed-roller is thus, it will be seen, given a greater or less rotation, according to the position of the top of the horn, its position being determined by the thickness of the stock, against the under side of which the horn rises just before or as the cam h^{14} commences to move the tappet-lever h^{12}. The distance between adjacent nails driven into the stock, or the extent of feed movement of the stock over the horn, due to the awl, is determined by the adjustment of the stud D^6. The bevels of the two cutters are unlike, the bevel of the cutter e^{13} being longer, because of the fact that it comes against the wire at that side of it which presents a concave curve, owing to the curve in the wire.

Referring to Fig. 5, it will be noticed that the edge of the tappet-lever h^{12} is both curved and inclined, I having found it essential in practice to shape the tappet-lever as shown, in order that the vibration of the head shall in no way interfere with the feeding of the wire, or, in other words, so that the mere vibration of the head in the act of feeding the stock shall not feed the wire longitudinally.

The lower portion of the head B has connected to it by the clamping-screw e^{16} a block, n, to which by bolt n' is secured the nose n^2, in which the driver reciprocates. The block and nose are both grooved at one side to receive the fastener-carrier n^3, into which the end of the wire to be cut into fasteners is fed by the feeding mechanism.

The carrier n^3 (shown enlarged in Fig. 11) has a vertical passage, n^4, (see Fig. 11,) for the reciprocation of the end of the wire, the said passage being in line with the wire-passage in the curved guideway h^4 when the carrier is retracted or in its position farthest back from the front of the machine.

The carrier has jointed to it at n^5 a rod or shank, n^6, surrounded by a spiral spring, n^7.

One end of the spring rests against a nut, n^8, and its other end against a hub or collar, n^9, connected loosely to the lower end of the carrier-moving lever n^{10} by a nut, n^{12}, the said rod n^6 having fast on it a collar, n^{13}, (see Fig. 2^a,) against which the lower end of the collar n^9 acts as the carrier is to be moved forward with a fastener cut from the wire standing in the passage n^4. The carrier in its forward movement places the fastener in line with the driver and the driver-passage through the nose. The lever n^{10} is actuated by the cam-hub n^{15}. As the lever is moved to retract the carrier, the collar n^9 acts against the spring n^7, which obviates breaking the parts provided the fastener or driver happens to stick in the nose.

The tappet-lever h^{12}, the measuring-sleeve, leg 29, and rod or tube 30, positioned by the horn, constitute a measuring mechanism for determining the extent of movement of the feeding mechanism, and consequently the length of the fastening required at any particular spot in the stock.

Herein the stock is fed over the horn by the awl, and to enable this to be done in the best manner the head is actuated in the arc of a circle, and to preserve the same relative position of the guide for the wire and the feeding and cutting mechanism all the said parts are made to travel with the head in its vibrations; but the measuring mechanism for moving the feeding mechanism for a greater or less distance is mounted upon a stationary part of the frame-work, so as to be moved uniformly

by the rise and fall of the horn and always measure the length of the fastening accurately.

I claim--

1. In a nailing-machine, a vibrating head, a driver-bar, and awl-carrier therein, the latter provided at one side with teeth, and a toothed sector to move it, combined with a horn to support the work, substantially as described.

2. In a nailing-machine, a vibrating head, a driver-bar, and awl-carrier therein, the latter provided at one side with teeth, and a toothed sector to move it, combined with a horn to support the work, and with wire feeding and cutting mechanism to sever the wire into fasteners, substantially as described.

3. In a nailing-machine, wire-feeding mechanism, combined with wire-cutting mechanism containing a cutting-disk having a beveled edge, any portion of which may be brought into operative position in case any other portion of the edge becomes dulled, substantially as described.

4. The nose attached to the lower end of the head in which the driver reciprocates, and an attached disk cutter, combined with a lever, e^{10}, and with a disk-shaped cutter fastened to it, to operate substantially as described.

5. The nose attached to the lower end of the head in which the driver reciprocates, wire-feeding mechanism, cutting mechanism having disk-like cutters, and a carrier to receive a fastener cut from the wire, combined with means to reciprocate the said carrier to transfer a fastener from the cutting mechanism into position to be driven by the driver, substantially as described.

6. The nose attached to the lower end of the head in which the driver reciprocates, wire feeding and cutting mechanism, and a carrier to receive a fastener cut from a wire, combined with the rod or shank, spring, and lever to move the carrier, whereby in case the backward movement of the carrier is obstructed the spring may yield and avoid breaking of parts, substantially as described.

7. The loose pulley, the shaft A^9, and the balance-wheel, provided with the cam-surface 2, combined with the yoke, and the roller A^{13}, to co-operate with the said cam-surface, substantially as described.

8. The loose pulley, the shaft A^9, and the balance-wheel fast on it, combined with the pivoted yoke, and friction device carried by it to act on the balance-wheel, substantially as described.

9. The loose pulley, the shaft A^9, and the balance-wheel provided with the cam-surface 2, combined with the yoke, the roller A^{13}, to co-operate with the said cam-surface, and a friction device, substantially as described, to act on the balance-wheel, as set forth.

10. The gage g, having a dovetailed shank, and the block on which the shank of the gage is free to slide, combined with the friction-plates g^3, to retain the shank of the gage in place, substantially as described.

11. In a nailing-machine, a vibrating head to carry the awl, and wire-feeding mechanism made movable with the said head, combined with measuring mechanism, substantially as described, connected to the frame-work or detached from the vibrating head, and controlled by the height of the horn to determine the extent of movement of the wire-feeding mechanism and the length of the fastener to correspond with the requirements of the stock on the horn, substantially as described.

12. The feeding-ratchet, the tappet-shaft, on which it is mounted loosely, the tappet-lever, pawl to move the said ratchet, and means to move the tappet-lever, combined with the measuring-sleeve, measuring-leg, the horn, and connections between the said horn and leg, to operate substantially as described.

13. The feeding-ratchet, a pawl to move it, the tappet-shaft, and tappet-lever, having an arm, 22, provided with a curved and inclined edge or end, combined with the rock-shaft D^4, the stud 27, and sleeve mounted thereon having arms, one of which co-operates with the curved and inclined end of the tappet-lever, while the other arm co-operates with or is moved by the horn, substantially as described.

14. The rock-shaft D^4, the vibrating head, the awl-carrying bar located in the said head, connections between the said rock-shaft and head to operate the latter, and feeding-ratchet, combined with the horn, the measuring-sleeve m^2, having means to support the said sleeve and to actuate it from the said horn, and with a tappet-lever, its shaft, and means to move it a greater or less distance, and a pawl actuated by the said tappet-shaft to move the feeding-ratchet, substantially as described.

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

LOUIS GODDU.

Witnesses:
G. W. GREGORY,
C. M. CONE.