

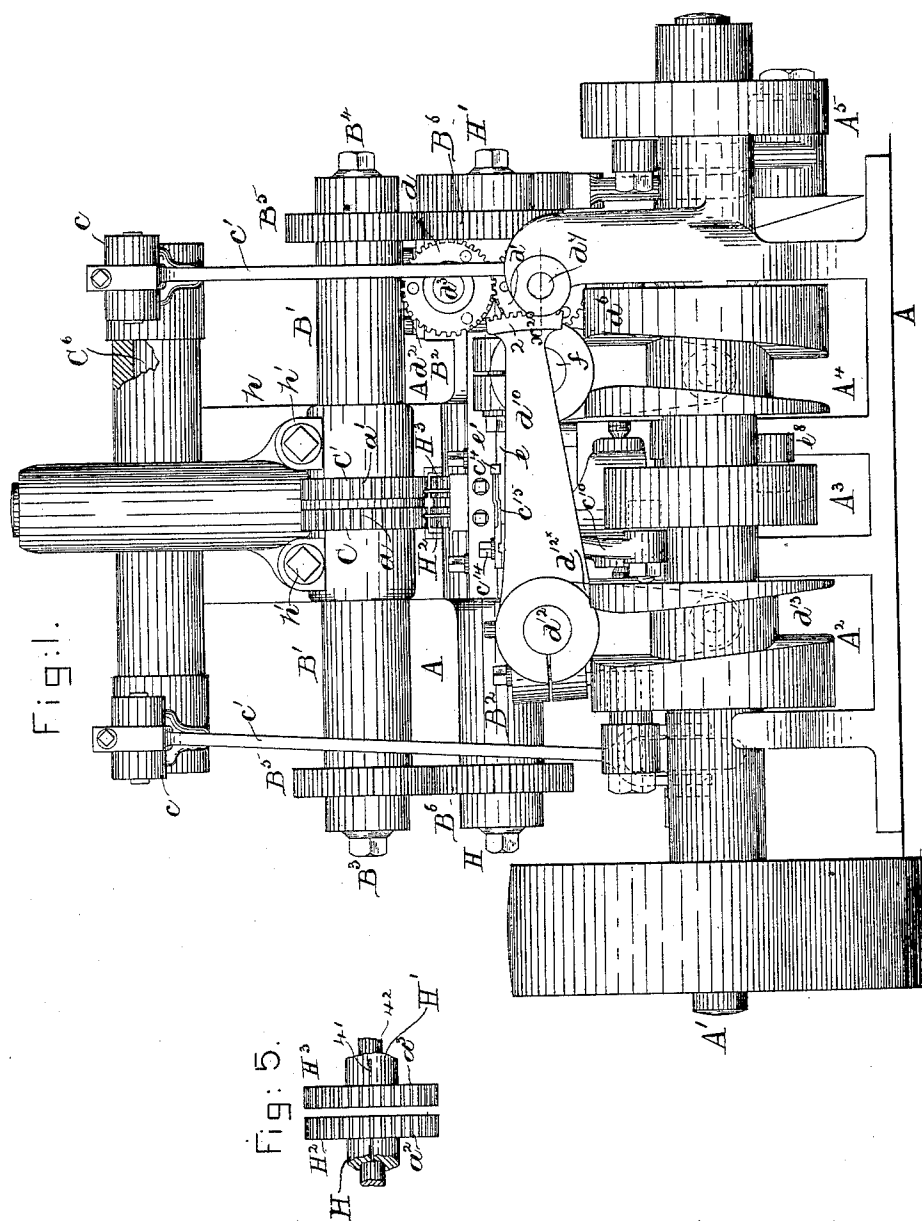
(No Model.)

5 Sheets—Sheet 1.

L. GODDU.
NAIL MAKING MACHINE.

No. 398,891.

Patented Mar. 5, 1889.



Witnesses.

Edgar A. Godkin
Frederick L. Emery.

Inventor.
Louis Gooden
by Lerahy & Gregory
attys.

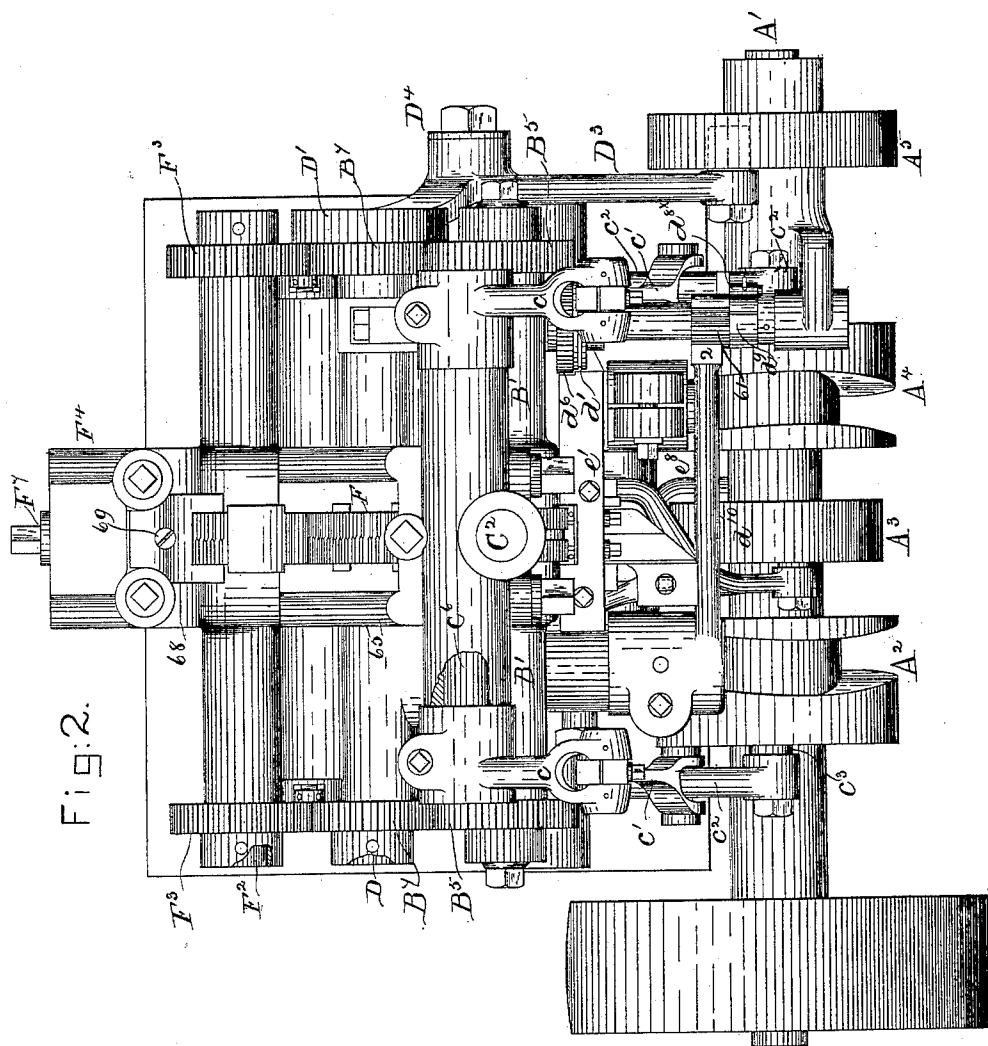
(No Model.)

5 Sheets—Sheet 2.

L. GODDU.
NAIL MAKING MACHINE.

No. 398,891.

Patented Mar. 5, 1889.



Witnesses:

Edgar A. Godkin.

Frederick L. Emery.

Inventor:

Louis Goddu.

by Lemley & Gregory
attys.

(No Model.)

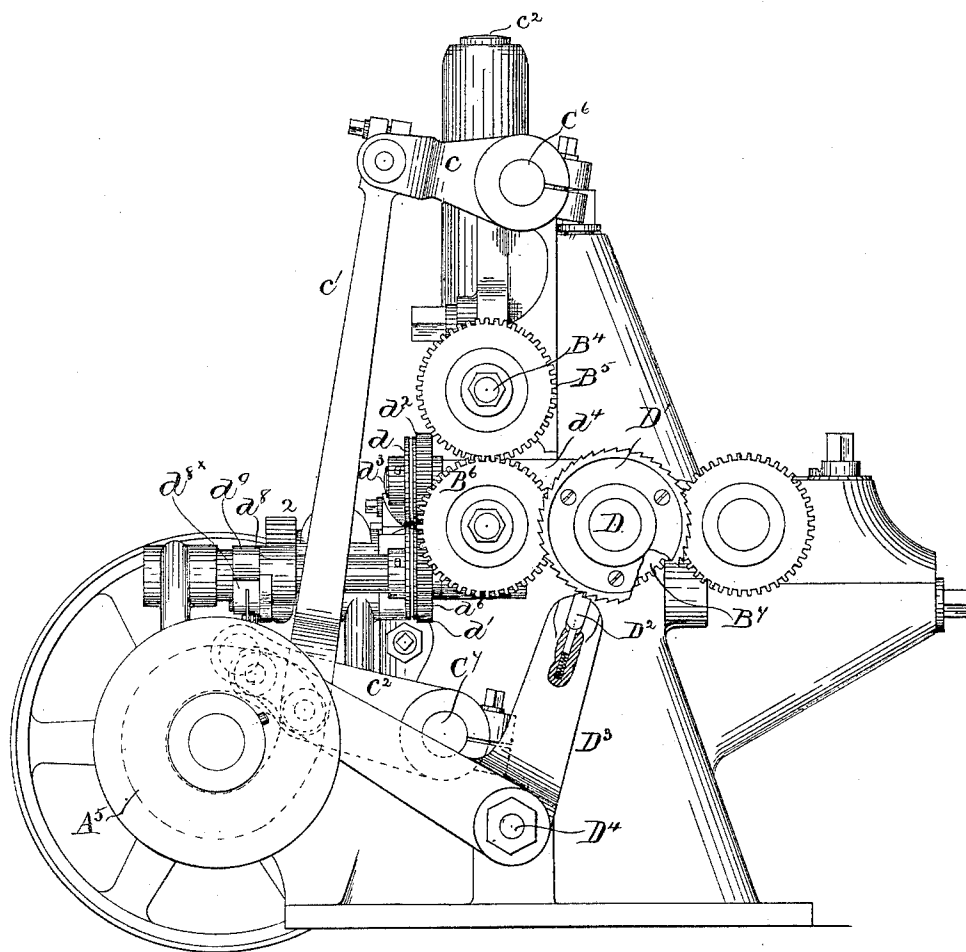
5 Sheets—Sheet 3.

L. GODDU.
NAIL MAKING MACHINE.

No. 398,891.

Patented Mar. 5, 1889.

Fig:3.



Witnesses.

Edgar A. Goddard.
Frederick L. Emery.

Inventor.

Louis Goddard.
by Erviny Gregory attys.

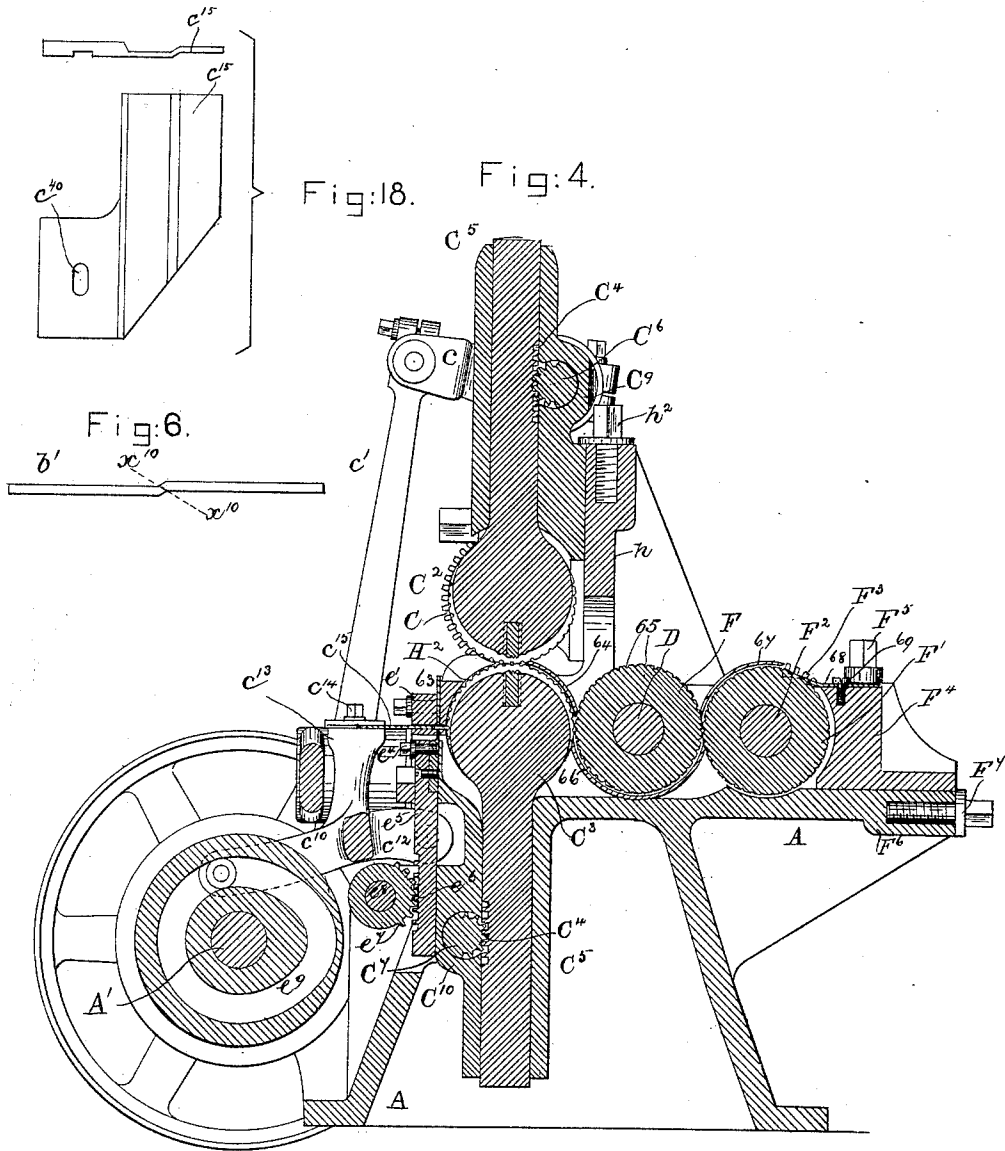
(No Model.)

5 Sheets—Sheet 4.

L. GODDU.
NAIL MAKING MACHINE.

No. 398,891.

Patented Mar. 5, 1889.



Witnesses:

Edgar A. Goddin.

Frederick L. Emery.

Inventor.

Louis Goddu

by Crosby & Gregory

attys.

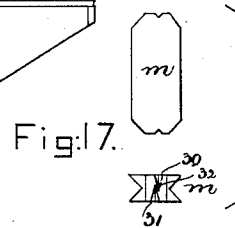
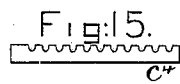
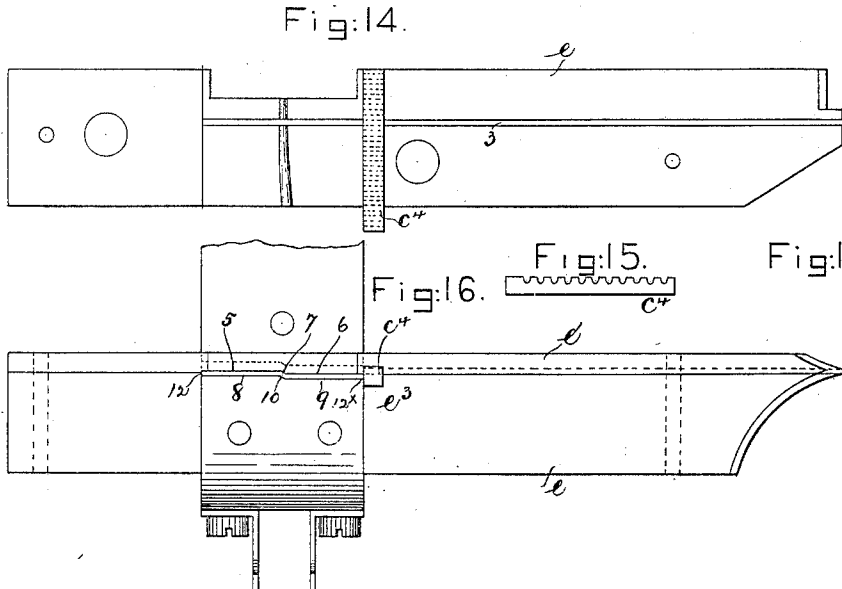
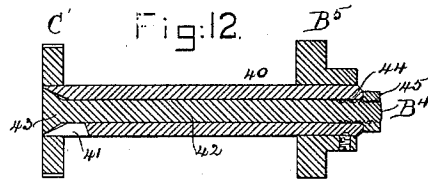
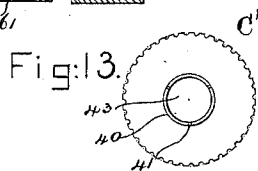
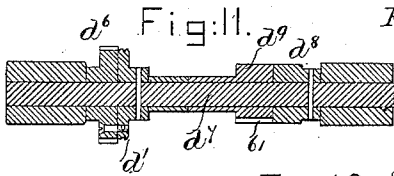
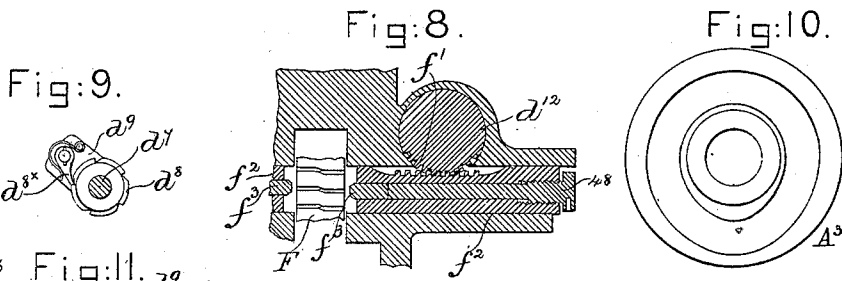
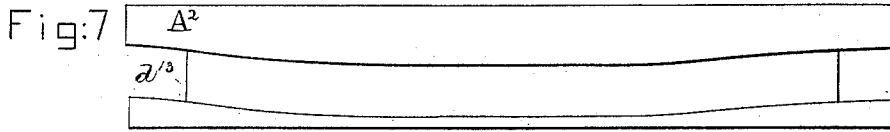
(No Model.)

5 Sheets—Sheet 5.

L. GODDU.
NAIL MAKING MACHINE.

No. 398,891.

Patented Mar. 5, 1889.



Witnesses:

Edgar A. Goddard.

Francis L. Emery.

Inventor:

Louis Goddard.

by Lemby & Gregory
attys.

UNITED STATES PATENT OFFICE.

LOUIS GODDU, OF WINCHESTER, MASSACHUSETTS, ASSIGNOR TO THE GODDU
IMPROVEMENT COMPANY, OF PORTLAND, MAINE.

NAIL-MAKING MACHINE.

SPECIFICATION forming part of Letters Patent No. 398,891, dated March 5, 1889.

Application filed July 12, 1888. Serial No. 279,768. (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 Nail-Making 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 the production of a machine for the manufacture of nails in a rapid manner and practically without waste of stock.

In accordance with my invention the wire fed into the machine is cut off intermittingly in lengths equal to two nails, and the double blank so formed is offset at or between its ends where the points are to be formed, and the offset blank is taken by the carrier, separated at the offset portion thereof, and thereafter each blank while held between die-rolls is subjected to the action of a header, which puts a head upon each nail, the nails so headed being thereafter discharged.

My invention in a machine for forming nails from wire-like material consists, essentially, in the combination of the following instrumentalities, viz: feed mechanism to feed the wire, combined cutting and forming mechanism to sever the wire to form a double blank and offset the same where the blank is to be separated to constitute the points for two nails, carrying-wheels for the blank, cutting mechanism to separate the double blank at its offset portion and form points for the nails, and heading mechanism to head the blanks, substantially as will be described.

Figure 1 is a front elevation of a machine embodying my invention; Fig. 2, a top or plan view; Fig. 3, a right-hand end elevation; Fig. 4, a vertical section in the line x , Fig. 1. Fig. 5 represents the carrying-rolls H^2 H^3 separately. Fig. 6 shows a blank for two nails after the said blank has been offset, the dotted line showing the line in which the offset portion is to be severed to form the points for two nails. Fig. 7 shows the cam A^2 developed; Fig. 8, a sectional detail showing one of the headers, header-carrier, its operating device,

and part of one of the die-rolls, the said figure also showing part of the opposite headers and header-carriers; Fig. 9, a detail of the pawl for rotating the feed-wheels. Fig. 10 shows the cam A^2 in side view; Fig. 11, a longitudinal sectional detail in the line x , Fig. 1, of part of the feed looking up, the shaft d' being reversed end for end; Fig. 12, a sectional detail of one of the carrier-wheels and its shaft. Fig. 13 is a left-hand elevation of the device shown in Fig. 12. Fig. 14 is a top view of the lower part of the wire-guide; Fig. 15, a detail of the stationary cutter; Fig. 16, a detail in front elevation of the wire-guide and its cap, together with the cutters and "former;" Fig. 17, details of the cutter employed to sever the blank at the offset portion to form the points of the nails; Fig. 18, a plan view and cross-section of the transferer.

The frame-work A , of suitable shape to sustain the working parts, has in it a main shaft, A' , provided with several cams, as A^2 , A^3 , A^4 , and A^5 . The frame-work has projecting from it suitable bearing-sleeves, as B' B' B^2 B^2 , which receive in them the compound shafts B^3 B^4 and H H' , to be described, the shafts B^3 B^4 being provided at each end with like toothed gears, as B^5 , the gears B^5 being engaged and rotated by like gears, B^6 , on the shafts H H' , the gears B^6 being engaged by like gears, B^7 , upon a shaft, D . The shaft D has fast upon one end of it a ratchet-toothed wheel, D' , which is engaged by a tooth, D^2 , of an elbow-lever, D^3 , pivoted at D^4 , and having a roller or other stud, which enters a groove at one side of the cam A^5 , the said cam, through the said elbow-lever and ratchet-wheel, rotating the shaft D and the two shafts H H' and B^3 B^4 .

The shafts H H' and B^3 B^4 at their inner ends have applied to them, respectively, the blank-feeding or carrier wheels H^2 H^3 and C C' . The wheels C and C' are provided, respectively, with grooves a a' and the wheels H^2 H^3 with grooves a^2 a^3 , the grooves a being, however, slightly out of line horizontally with relation to the grooves a' and the grooves a^2 with relation to the groove a^3 for a distance substantially equal to half the diameter of the

wire, as best shown in Figs. 1 and 5, or to the extent desired for the point-forming offset, yet the said grooves are substantially parallel. The blank-feeding or carrier wheels H^2 H^3 are in like manner provided, respectively, with grooves a^2 a^3 , slightly out of line, as described, of the wheels C C' .

In the open space between the wheels C C' is a cutter-carrier, C^2 , (see Fig. 4,) and in the space between the wheels H^2 H^3 is a like cutter-carrier, C^3 . Each of these cutter-carriers C^2 C^3 has its shank extended into a suitable guide, as C^5 , and each shank is toothed, as at C^4 , to be engaged by segmental teeth (see Fig. 4) cut into like rock-shafts, C^6 C^7 , one located above the rolls C C' in bearings C^8 , and the other being located below the rolls H^2 H^3 in suitable bearings, C^{10} . The rock-shaft C^6 has at each end a like arm, c , which is connected by a like link, c' , with like arms, c^2 , secured to the rock-shaft C^7 , the said arms c^2 each having a roller or other stud, as c^3 , to enter a cam-groove at the face of both the cam-hubs A^2 and A^4 . The said cams through the said arms and links and rock-shafts operate the cutter-carriers C^2 C^3 simultaneously to act upon and sever the double offset blanks b' (see Fig. 6) in the dotted line a^{10} , the said severance being, it will be noticed, in the offset portion of the wire or metal comprising the blank.

The wire, b , to be made into nails will be taken from a suitable reel (not shown) and be led between the feed-rollers d d' , of usual construction. The feed-rolls d are connected to a gear, d^2 , fast on a shaft, d^3 , in a box, d^4 , and the feeding-roll d' is fast to a toothed gear, d^6 , in engagement with the toothed gear d^2 . The toothed gear d^6 is fast on a shaft, d^7 , having a ratchet, d^8 , which is engaged by a spring-held pawl, d^{8x} , carried by a pawl-carrier, d^9 . (See Fig. 9.) The hub of said carrier d^9 is provided for a portion of its periphery with gear-like teeth 61, (see Fig. 2,) which are engaged by the teeth 2 of a sector-lever, d^{10} , fast upon a shaft, d^{12} . The said lever d^9 has a downwardly-extended arm, d^{12x} , (see Fig. 1,) provided with a roller or other stud, which enters the cam-groove d^{13} in the cam-hub A^2 , the said lever actuating the feeding-wheels intermittingly.

The wire at the rear side of the feeding-wheels enters a wire-channel, 3, formed in a plate, e , (see Fig. 14,) covered by a cap, e' , the plate e being provided with a cross-groove to receive in it the stationary cutter member c^4 , shown separately in Fig. 15 as composed of a bar having a series of grooves, in order that the wire may readily pass into any one of the said grooves. The cutter is provided with a series of grooves, rather than with one groove, in order that when the said cutter member becomes worn by the continuous passage of the wire through it the said cutter member may be cut off or shortened, so as to bring a new groove into operative position with relation to the wire-channel 3, and to co-operate with

the movable cutter e^3 , which as herein shown is also a former.

Immediately opposite the carrier-wheels the plate e is slotted entirely through in the line of the channel 3 to receive within it a combined cutter and former, e^3 , attached by set-screws e^4 to a former-carriage, e^5 , (see Fig. 4,) having rack-teeth, as e^6 , which are engaged by segmental teeth e^7 of a lever, e^8 , having a roller or other stud which enters a groove in the right-hand side or face (see Fig. 10) of the cam-hub A^3 . The groove e^9 (see Fig. 4) at the opposite side of the said cam-hub A^3 receives a roller or other stud at one end of a lever, e^{10} , having its fulcrum at e^{12} , (shown by dotted lines, Fig. 4,) and having an arm, e^{13} , to which is attached, by a screw, e^{14} , in a slot, e^{10} , the transferer e^{15} , (see Fig. 18,) the said transferer having imparted to it a movement at right angles to that of the wire as produced by the feeding-wheels. The forward end of the transferer e^{15} is bent in the direction of its width to correspond with the face of the former e^3 (see Fig. 16) and to the shape given to the blank between the upper end of the said former and the anvil-like face at the under side of the cap e' . The inner end of the horizontally-moving transferer e^{15} rests in a space corresponding in shape with it between the plate e and the cap e' , and it stands with its free end just outside the line of movement of the former e^3 when the latter is raised to bend the blank, and the blank having been bent to conform longitudinally to the ends of both the said former and the said transferer the transferer is started forward and removes the said bent blank from the space between the plate e and cap e' and pushes the blank laterally into the grooves a^2 a^3 of the wheels H^2 H^3 , as will be further described. The cap e' , at its under side immediately above the bender e^3 , has an anvil-like face, (see Fig. 14,) (designated by 5 6,) the two faces being joined by an incline, 7. The transferer is also of corresponding shape in cross-section, (see Fig. 18,) and the top or acting face of the former is of like shape—that is, it has a portion, 8, which is longer than the portion 9, and the two portions are connected by a beveled portion, 10.

After the wire has been fed into the groove 3 until its end meets the stop 12 (see Fig. 16) the cutter and former are operated. The corner 12^x of the former as it rises co-operates with the stationary cutter member c^4 , severs from the end of the wire a blank of a length sufficient for two nails, and at the same time that it severs the wire to form the blank the former and the anvil above it act to offset the blank and leave it in the condition represented in Fig. 6, where the offset blank is designated by the letter b' . The shaft d^{12} and the shaft f parallel to it, (see Fig. 1,) both extended to the rear of the machine, have fastened to or made as part of them like sector-gears, f' , (see Fig. 8,) which engage, re-

spectively, the teeth of two like header-carriers, f^2 , each provided with a header, f^3 , the said headers being operated in opposite directions, so that each will act upon and head that one of the nails which may be presented opposite it and held between the nail-carrying die-rolls $F F'$. The die-roll F is fast upon the shaft D , while the die-roll F' is fast upon the shaft F^2 , having its bearing in a detachable frame, F^4 , secured by bolts F^5 to a strong body, F^6 , projecting from the frame-work. The shaft F^2 has secured to its opposite ends like gears, F^3 , which are engaged and rotated by the gears B^7 , before described, the said gears F^3 on the shaft F^2 being kept firmly in engagement with the gears B^7 on the shaft D by means of a strong screw, F^7 , or other equivalent contrivance, the said screw being herein shown as screwed into the frame, and having an enlarged head or collar to act upon part of the frame F^4 .

The double blank, or a blank of sufficient length for the formation of two nails point to point, after having been offset as described, is acted upon by the transferrer c^{15} . It is moved forward from the line of the groove 3 and placed in the grooves $a^2 a^3$ of the wheels $H^2 H^3$, the latter wheels being moved intermittently in unison, so as to receive one double blank after another in its nearly-parallel grooves, the said blanks being suitably retained in the said grooves by means of fingers 63, connected to the cap e' , (see Fig. 4,) the said fingers being concaved and so located as to nearly or substantially touch the peripheries of the wheels $H^2 H^3$.

At some distance from the transferrer the blanks carried by the wheels $H^2 H^3$ are brought into position opposite the grooves $a a'$ in the wheels $C C'$ corresponding with the grooves $a^2 a^3$, which grooves act to hold the said double blanks until they arrive substantially at the tangent point of the two wheels $C C'$ on one side and the two wheels $H^2 H^3$ on the other side. The two cutter-carriers C^2 and C^3 are operated simultaneously to sever the double blank in the dotted line x^{10} , Fig. 6, and thereafter the two partially-formed nails are carried forward under a shield, 64, until the separated blanks are delivered into the die-grooves 65 of the rotating die-roll F , the latter carrying the said partially-formed nails down under it and between it and a second shield, 66, until the said partially-formed nails are brought into line with correspondingly-shaped die-grooves in the second die-roll F' . The partially-formed nails come into like pockets of the two die-rolls $F F'$ at the tangent points of the said die-rolls, at which time the headers described are operated. The headers act to head the two partially-formed nails while the said two rolls hold the said nails in their die-grooves. A further rotation of the die-rolls F and F' , after heading the said nails, brings them up under the shield or bridge-piece 67 when they fall

off the machine. Should the said nails stick in the die-grooves of the die-rolls $F F'$, then the stripping-plate 68, attached to the block or frame F^4 by the screw 69 and straddling the die-rolls, will remove the nails, making them fall from the machine into any suitable receptacle.

The part of the frame-work having the bearings for shafts $B^3 B^4$ is bolted to a main upright, h , of the frame-work by bolts h' , extended through holes in the frame a little larger, however, than the diameter of the bolt, and the rigid portion of the frame is provided with a headed bolt, h^2 , which, acting against the bearing portion, causes the gears B^3 to be held firmly in mesh with the gears B^4 .

Herein it will be noticed that the wire to be formed into nails is offset where the points of the nails are to be formed, thus enabling the wire to be cut practically at right angles to its center, and enabling the wire severed by a single cut to leave proper points for each nail, the offset portion of the nail when severed leaving the points beveled in two directions, with the apex of the point substantially at the center of the nail, the points being thus formed without waste of stock, and by merely offsetting or bending the double blank centrally and then cutting the blank the point of the nail is not hardened, but is left comparatively soft. The points are practically formed by a cutting rather than by a compressing operation.

The edges of the shields referred to under which the severed blanks travel have flanges opposite the head forming parts of the blanks to prevent the nails moving laterally out of the grooves in which they rest. The die-grooves at their outer ends may be round or of other shape, and be more or less enlarged to enable the metal of the blank when acted upon by the headers to be upset into the said space to give any desired form or shape to the head of the nail.

The inner ends of the grooves and the die-rolls are shaped to conform to the shape desired for the points of the nails, and when the header operates to strike the nail to head it it also moves the nails slightly in the said die-groove, so that the point of the nail will be finished.

The grooves in the rolls $C C'$ and $H^2 H^3$ may be corrugated or indented to corrugate or indent the body of the nail.

One of the steel blocks m , which constitute the working-faces of the cutters to sever the double blank at its offset portion, is shown separately in Fig. 17 on an enlarged scale, and it will be seen that the said block has two depressions, 30 and 31, with a diagonally-arranged cutting portion, 12, between.

I do not claim, broadly, the formation of two nails at one operation, or the severance of a double blank to form two nails.

The compound shafts, to which are secured the carrier-wheels referred to, are all alike, as

represented by Figs. 12 and 13, which show the wheel C'.

The compound shaft is composed of a sleeve, as 40, located internally near one end and slotted longitudinally at 41 in three places to leave short arms, and a rod or bolt, 42, having a tapering head, 43, and screw-threaded at its opposite end, as at 44, to receive the nut 45, by which to drive the said bolt or rod into and so as to expand the split end of the sleeve in the central hole of the carrier-wheel. The gear at the outer end of the compound shaft is secured to the sleeve part of the said shaft.

The headers f^3 are backed up by screw-rods 48. (See Fig. 8.)

I claim—

1. In a machine for forming nails from wire-like material, the combination of the following-described instrumentalities, viz: the feed mechanism to feed the wire, the combined cutting and forming mechanism to sever the wire to form a double blank and offset the same where the blank is to be separated to constitute the points for two nails, the carrying-wheels for the blank, and the cutting mechanism to separate the double blank at its offset portion and form points for the nails, substantially as described.

2. In a machine for forming nails from wire-like material, the combination of the following-described instrumentalities, viz: the feed mechanism to feed the wire, the combined cutting and forming mechanism to sever the wire to form a double blank and offset the same where the blank is to be separated to constitute the points for two nails, the carrying-wheels for the blank, the cutting mechanism to separate the double blank at its offset portion and form points for the nails, and the transferrer, to operate substantially as described.

3. In a machine for forming nails from wire-like material, the combination of the following-described instrumentalities, viz: the feed mechanism to feed the wire, the combined cutting and forming mechanism to sever the

wire to form a double blank and to offset the same, the carrying-wheels for the double blank, the cutting mechanism to separate the double blank at its offset portion and form points for the nails, and the die-rolls having die-grooves, substantially as described.

4. The combination, in a nail-making machine, of a former-bar to bend the stock to form a double blank, and blank-carrying wheels having grooves out of line with each other, as described, and a transferrer to transfer the offset blanks into the said grooves, substantially as described.

5. In a machine for making nails, the former-bar, carrying-wheels having grooves out of line, as described, and a transferrer to transfer the offset double blank into the said grooves, combined with cutting mechanism to sever the offset blank and form points for the nails, substantially as described, without waste of stock.

6. In a nail-making machine, blank-carrying wheels having grooves out of line, as described, and the cutters to sever the offset blanks, combined with die-rolls having die-grooves, and with headers to head the nails held in the said die-grooves, substantially as described.

7. The former and anvil to offset the double blank, the transferrer, the carrier-wheels for the blank, and the cutting mechanism to sever the offset blank, combined with a shield having flanges to permit the escape from the grooves of the separate blanks, substantially as described.

8. In a nail-making machine, the carrier-wheel and the compound shaft 40 42, to which it is attached, substantially as shown and 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,
J. C. SEARS.