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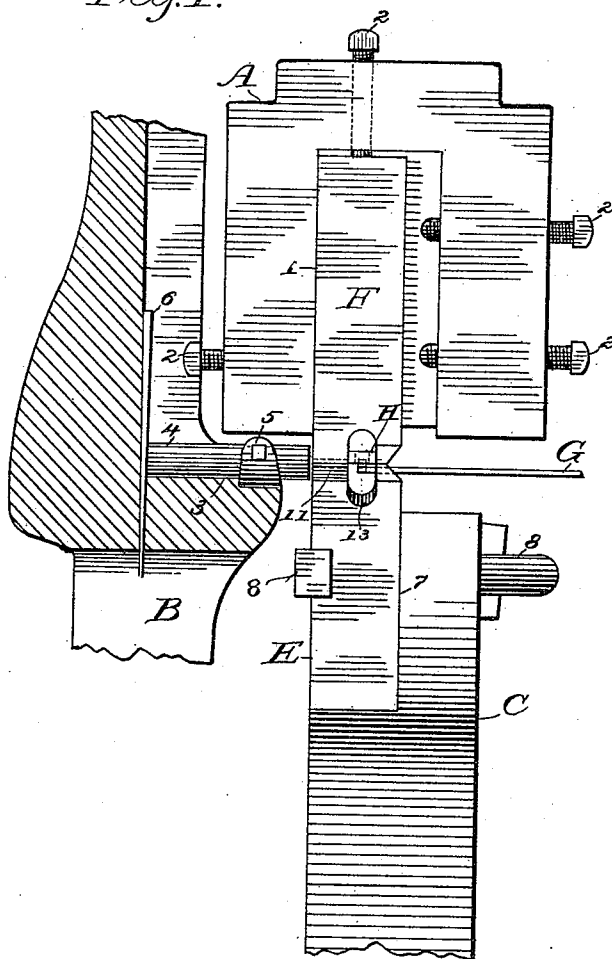
6 Sheets—Sheet 1.

C. E. HOUGHTON.
NAIL MACHINE.

No. 463,362.

Patented Nov. 17, 1891.

Fig. 1.



WITNESSES

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Attorney

(No Model.)

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Fig. 2.

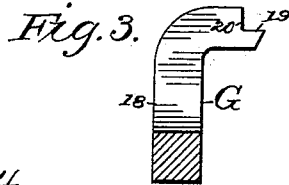
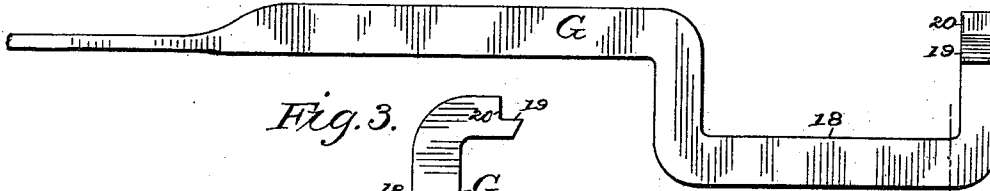


Fig. 4.

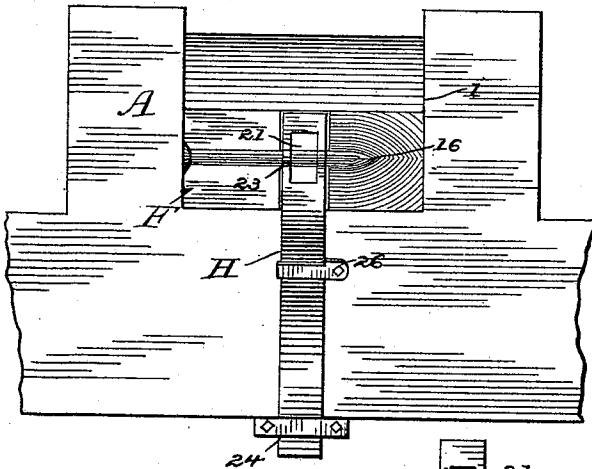


Fig. 5.

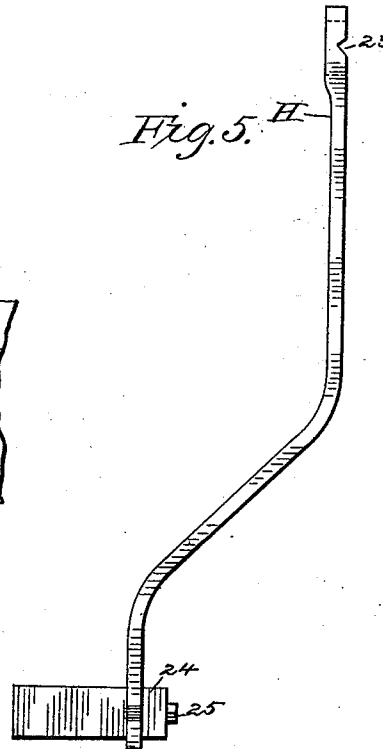
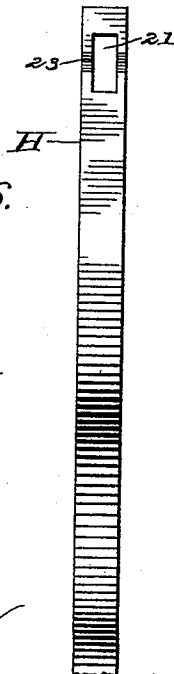


Fig. 6.



WITNESSES

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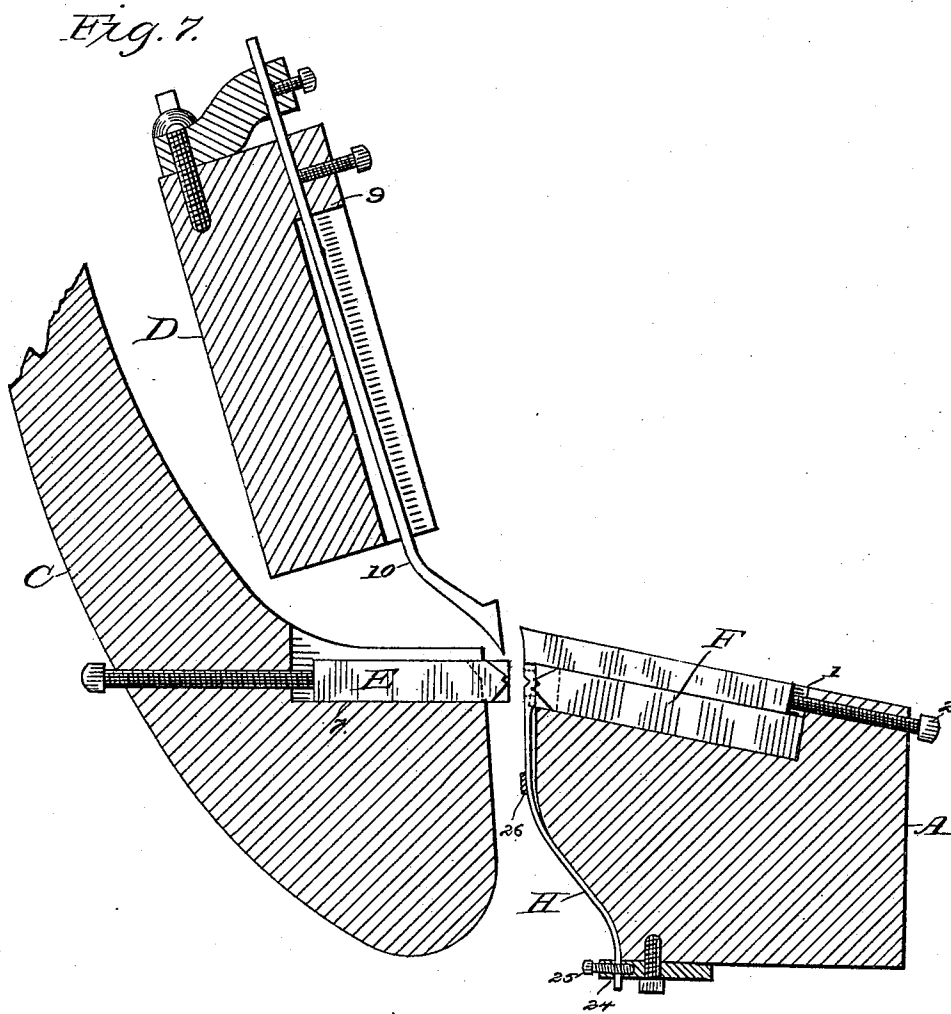
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Fig. 8.

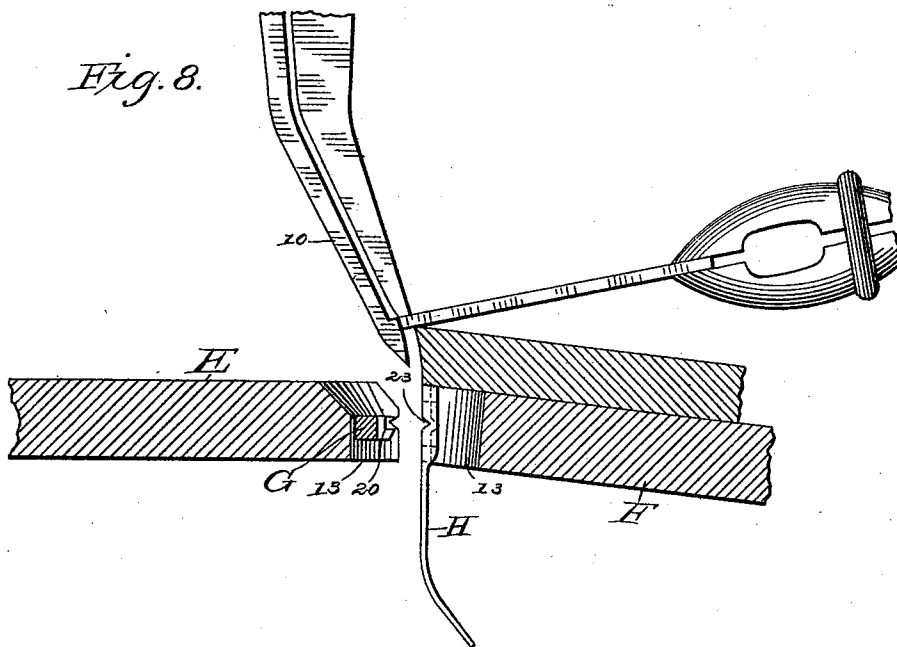
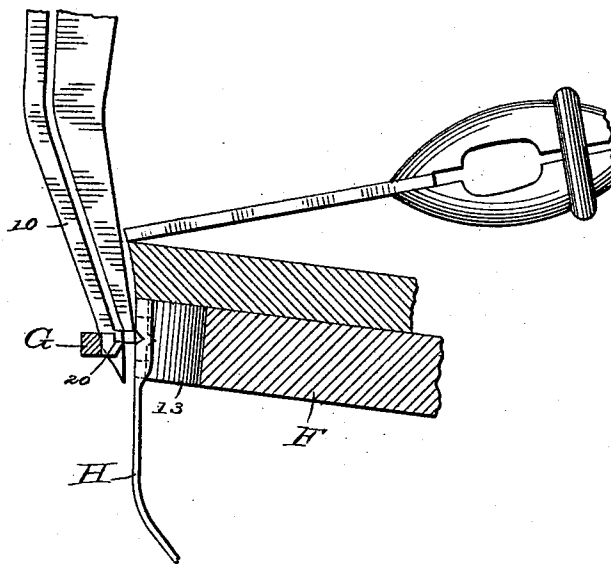


Fig. 9.



WITNESSES

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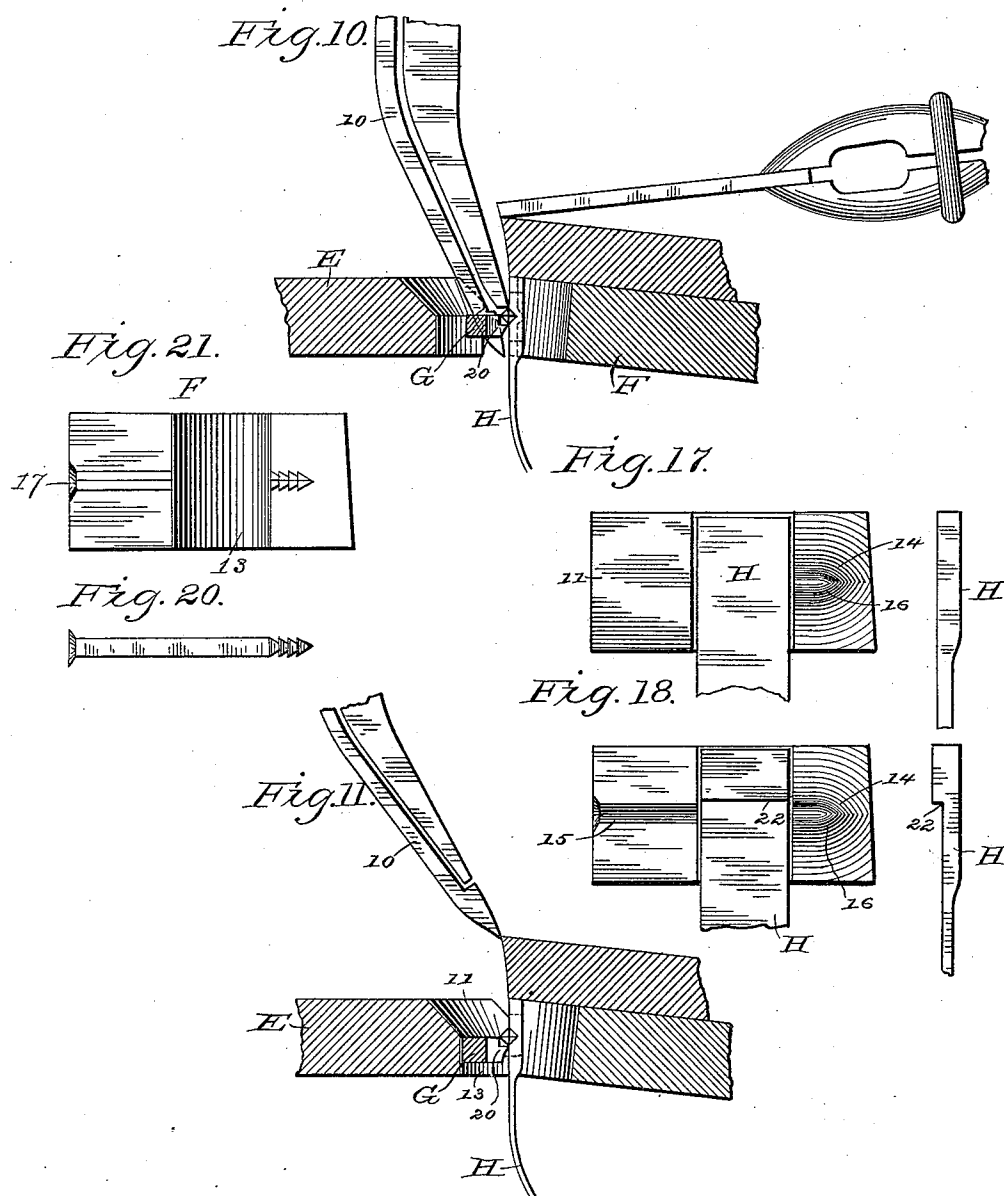
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No. 463,362.

Patented Nov. 17, 1891.



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Fig. 12.

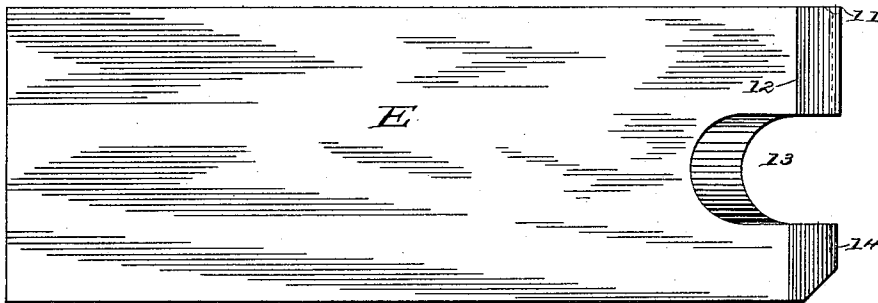


Fig. 13.

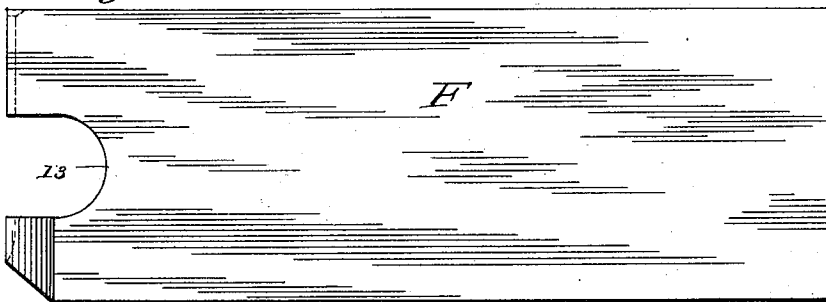


Fig. 19.

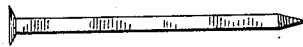


Fig. 14.

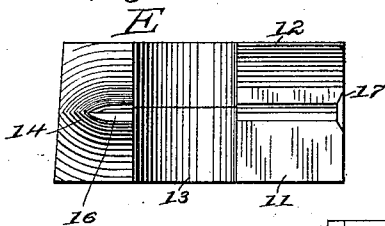


Fig. 15.

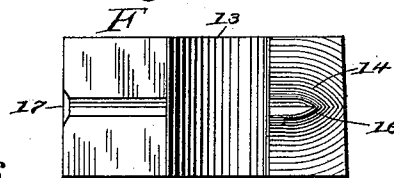
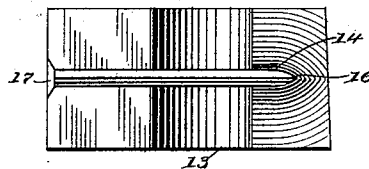


Fig. 16.



WITNESSES

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UNITED STATES PATENT OFFICE.

CHARLES E. HOUGHTON, OF NORTHUMBERLAND, PENNSYLVANIA, ASSIGNOR
OF ONE-HALF TO HORACE RUFUS JOHNSON, OF SAME PLACE.

NAIL-MACHINE.

SPECIFICATION forming part of Letters Patent No. 463,362, dated November 17, 1891.

Application filed February 18, 1890. Renewed October 22, 1891. Serial No. 409,490. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. HOUGHTON, a citizen of the United States of America, residing at Northumberland, in the county of Northumberland and State of Pennsylvania, have invented a new and useful Nail-Machine, of which the following is a specification.

My invention has relation to machines for cutting nails and spikes from common rolled plate sheared to make a blank of the proper width; and the object is to provide a machine for cutting nails and spikes from a common plate and form them with pyramidal or diamond points or barbed or roughened immediately above the points, leaving the body of the blank plain, so that the nail may have all the advantages of the common cut nail, combined with the advantages of the wire nail or hand-made barbed or wickered spike.

I am aware that nails have been made from a square and round wire and from corrugated or roughened wire prepared before cutting, the nails being corrugated their entire length and formed with pyramidal or diamond points, and also that nails have been cut from the plate and formed with chisel points; but I am not aware that nails have been cut from the common rolled nail-plate and formed with pyramidal or diamond points and barbed only at the point at one and the same operation; and hence, as indicated, it is the object of my invention to cut either flat or edge grip nails, and more particularly a straight nail, from a common rolled plate, and forming the same with a pyramidal or diamond point tapered either from the sides of the nail or having the point arranged at an angle to the sides of the nail.

Wire nails are more readily withdrawn from any object than cut nails, owing to the fact that the surface of the former is smoother than the cut faces of the latter; and to remedy the liability of accidental extraction or withdrawal the former are sometimes made from roughened, grooved, or corrugated wire.

To effectuate the objects of my invention, I have invented the mechanism illustrated in the accompanying drawings, wherein—

Figure 1 is a plan view of a portion of the bed, moving die-lever, and heading-lever of a nail-

machine having my invention applied thereto. Fig. 2 is a detail view of my improved nipper. Fig. 3 is a side view of the gripper end of the nipper. Fig. 4 is a view of the inner face of the bed-piece in elevation, showing the bed-die, the bed-knife, and the holding-spring in position. Fig. 5 is a side view of the holding-spring. Fig. 6 is a front view of the same. Fig. 7 is a vertical section of parts of the machine, the cutting-jaw, the gripping-lever, and the bed-knife seat being in relative open position, the last being shown in section and the two former in elevation. Fig. 8 is a similar view showing the cutting mechanism engaging a plate and the gripping mechanism open to receive the cut blank. Fig. 9 is a similar view showing the blank carried down into engagement with the spring and the nipper about to turn the blank into the groove in the spring. Fig. 10 is a similar view showing the blank engaged and turned by the nipper into the groove in the spring. Fig. 11 is another view showing the cutting-jaw returned to its upper position and the blank engaged by the dies to their full force. Fig. 12 is a plan view of the moving die. Fig. 13 is a plan view of the bed-die. Fig. 14 is a face end view of the moving die. Fig. 15 is a face end view of the bed-die. Fig. 16 is an end view of the die, showing a nail therein. Fig. 17 is an end view of the bed-die and a spring adapted to make an edge-grip nail or spike. Fig. 18 is an end view of the bed-die and a spring adapted to make a flat-grip nail or spike. Fig. 19 is a view of the straight nail. Fig. 20 is a view of a barb-pointed nail. Fig. 21 is a view of a die for cutting a barb-pointed nail.

The general mechanism of the machine illustrated in the drawings is that of a well-known and common construction so long in use for making the common cut nail. The parts will be readily recognized by the craft, and their positions, aggroupment, and functions are readily understood by those skilled in the art. My invention is in material changes in the gripping means, being the dies, the nipper, and a spring, as hereinafter specified, and particularly pointed out in the claims. These operative parts of my inven-

tion are adapted to be attached and secured to any of the machines now in use for cutting nails from plates.

Reference being had to the drawings, A designates the bed-knife part of the frame, having formed therein a die and knife-seat 1, and provided with the usual setting-screws 2 for adjusting and fastening the die-bed and bed-knife in their place. B designates the heading-lever, having a header-seat 3 for the header 4, which is secured in place by a clip or clamp 5 and adjusted endwise by a wedge or key 6. C designates the gripping-lever, having a die-seat 7 and the usual clamp 8 to hold the die in position, and D designates the cutting-jaw, having a seat 9 for the moving knife, with the usual gage 10, substantially as shown in the drawings. These elements form no part of my invention and are all of the usual construction.

E designates the moving die, the body of which is of the shape shown in Figs. 12, 14, and 21. The end face or die-face of this die is essentially my invention and is of substantially the following construction: On the outer part is formed an abutting piece 11 and a bevel 12 at the upper portion. In the middle, or nearly so, of the end face is formed a recess 13, carried back far enough to leave free room for the reception and reciprocations of the engaging end of the nipper, and on the inner end face of the die is the nail or spike point cutting portion 14. If it is designed to point an edge-grip nail or spike, this part 11 is left plain, as usual in dies for those nails or spikes, and substantially as shown in Fig. 17 of the drawings; but if it is designed to point a flat-grip nail or spike a groove 15 is cut across the face of that part of the die, as usual in dies of those machines and substantially as shown in Fig. 18 of the drawings; but if it is intended to adapt the die to a square-cut nail or spike the groove across the die part 11 is a right angle in cross-section with the point of the angle forming the central line of the groove, as shown in Figs. 7, 8, 9, 10, 14, and 15 of the drawings. The point-cutting portion 14 of the die is carried up in conical shape, as shown in the drawings, and formed with a point groove or matrix 16, the edges of the conical part and the point-groove being sharp cutting-edges to form the point on the nail or spike. While I have here described the respective construction adapted to different forms of nails or spikes, my preferred construction is a die having an annular groove to receive the nail or spike, which is cut square and straight from its four sides, or forming the point square with the sides. A countersink 17 is made in the die to make the head of the nail or spike, the head in the preferred form being substantially round.

F, Fig. 13, designates the bed-die, which is a duplicate in the construction of the end face

of the moving die, as shown in Fig. 15 of the drawings, except that only the cutting-point portion is beveled, as shown. The point-cutting ends of these dies register, and when brought to their closest relation clip the points into shape.

In Fig. 21 of the drawings is shown the face end of a die formed with a cutting-point groove or matrix having shouldered or corrugated edges immediately above the point to cut barbs or corrugations on the blank, substantially as shown in Fig. 20 of the drawings.

G designates the nipper, the bar of which is of the usual construction; but the end portion is formed to reach under the moving die and projects vertically upward from below into the recess formed in the moving die, as seen at 18. The end of the nipper is formed with a nose 19, having a notch 20 to engage and hold the nail.

H designates the holding-spring, which fills the same office as the tool known to nailers as a "back piece," and is of the form in side view shown in Fig. 5 and in front view of the form seen in Fig. 6 when the square and straight nail or spike is cut, having an aperture 21 into which the nose of the nipper projects when engaging the nail or spike. If the edge-grip nail or spike is made, the face of the spring may be left plain, as seen in Fig. 17, and if a flat-grip nail or spike is made the face of the spring is shouldered across, as seen at 22 in Fig. 18, and when the square nail or spike is made the spring has a rectangular groove 23 cut across its face, as shown in Figs. 5 and 6 of the drawings. This spring is fastened to the bed of the machine by any convenient means. I have shown a clamping-plate 24, having bolts 25 on the bed of the machine let through it and fastening-nuts on the bolts. The upper end or operating end of the spring is arranged in the recess of the bed-die, with its face projecting somewhat in advance of the face of the die, substantially as shown in Figs. 7, 8, and 9 of the drawings, in order that the force may be exerted at the first engagement of the nipper with the nail or spike. A keeper 26 is arranged across the spring to prevent it from being thrown too far in advance of the die.

The operation is substantially demonstrated in Figs. 8, 9, 10, and 11, wherein is illustrated the relation the mechanism assumes in forming the nail or spike. In Fig. 8 the plate has pushed back the gage and the knife is in the act of descending to sever the nail or spike blank, the dies at the moment being wide open and the nipper free and drawn back to its limit. In Fig. 9 the cutting-jaw has pushed the cut blank down to the groove of the dies, and the nose of the nipper is in the position of turning the blank into the groove of the spring. In Fig. 10 the nipper has advanced after turning the blank and engaged it by the seat or notch back of the nose preparatory to

the raising of the knife and advancing of the moving die, which carries back the blank and spring and seats the blank in the matrix of the dies, and in Fig. 11 the knife has moved upward and the dies have pointed and gripped the blank, in which position the header moves up and makes the head on the blank. It will be observed that with dies constructed as shown in Figs. 13, 14, 15, and 16—that is, having the grooves in and the die part 11 angular with the point of the angle forming the central line of the groove and with the cutting-faces of the point-cutting groove 17, with a tapering end and angular side-cutting edges in alignment with the sides of the grooves in the portions 11—a nail is formed like that shown in Fig. 19, having the faces of the tapering point as continuations of the sides of the nail and not arranged across the corners thereof. Such a nail drives well and holds in the wood better than a nail with the point-faces across the corners of the nails. This operation is applicable to the straight square nail or blank, but equally applicable to the other styles of nails and spikes, except that when the edge grip is made the spring is flat, and when the flat grip is made the spring is shouldered. In the edge grip the blank is not turned, but in the flat grip is given a quarter-turn. It will be observed that the blank does not touch the bed-die at the first engagement of the nipper with the blank, but is held by the nipper against the face of the holding-spring until the moving knife ascends and the moving die advances up and carries the spring back until the blank is pushed into the die-groove. The holding-spring stands with its face in advance of the bed-die, as shown, far enough to permit the nipper to turn the blank without touching the bed-die in that operation, and the blank is held between the nipper and the holding-spring until the moving die advances and carries the blank into the matrix of the dies, so that by the time the abutting portions of the dies reach their limit of approach the point is cut, and when in the nearest relation of the dies the header has come up, made the head, and receded the dies separate, the nipper is drawn back, and the return force of the holding-spring throws the nail from the matrix and advances to its normal standing position, being limited in such forward movement by the keeper on its stem.

By this mechanism I form a nail or spike of the form shown in the drawings, having substantially parallel sides, a round head, and a pyramidal or diamond-shaped point, and having barbs or corrugations near the point. The advantages of this nail or spike are that it may be made from cheaper material, has stronger frictional contact with the object into which driven, and more evenly distributed strength than other cut nails. In other respects it possesses all their advantages.

Having thus described my invention, as required by the statute, I now proceed to par-

ticularly point out and distinctly claim the parts, combinations, and improvements I claim as my invention, as follows:

1. In a nail-machine for cutting nails from a drawn plate, the combination of a moving die formed with a gripping-surface to set against the neck of the nail, a point-cutting groove in the end face of the inner portion of the die, and a vertically-arranged recess in the end face between the gripping portion and the point-cutting portion, a bed-die substantially the counterpart of the moving die, and a nipper having its moving end projecting upward from below and arranged normally in the recess of the moving die, substantially as and for the purpose specified.

2. The combination, in a nail-machine for cutting nails from a drawn plate, of a moving die formed with an outer gripping die-piece having a groove horizontally arranged in its face, a vertically-arranged recess in the middle of the die end, and a point-cutting groove in the inner portion of the die-face, a bed-die of substantially the counterpart of the moving die, a spring formed with an aperture to receive the nose of the nipper, arranged in the recess of the die-bed, and a nipper having its free end arranged in the recess of the moving die, substantially as and for the purpose specified.

3. The combination, with the moving die and the bed-die of a nail-cutting machine, said dies having vertically-arranged recesses in their faces and horizontally-arranged grooves to receive the blanks, of a nipper G, bent to have its end portion extend under the moving die and arranged with its free end normally in the recess of the moving die, and a spring arranged in the recess of the bed-die, substantially as and for the purpose specified.

4. The combination, with the moving-die and the bed-die of a nail-machine, said dies being formed with registering recesses in their die-faces, of a nipper reciprocating in the recess of the moving die and a spring arranged in the recess of the bed-die, provided with a groove or shoulder across its face, substantially as and for the purpose specified.

5. In a nail-machine for cutting nails from a drawn plate, the combination, with the moving die formed with a gripping portion having a horizontally-arranged groove across its face, a point-cutting groove horizontally in the inner portion of the end face, and a vertically-arranged recess between the gripping-face and the point-cutting portion, of a bed-die having its end portion substantially a counterpart of the moving die, a spring arranged with its free end in the recess of the bed-die and formed with an aperture and having a groove across its end in alignment with the grooves in the dies, and a nipper having its free end in the recess of the moving die and arranged to engage the spring in the bed-die, substantially as and for the purpose specified.

6. The die for a nail-machine herein described, consisting of a body having an angular groove which grips the nail and an angular point-cutting groove in the end face,
5 having a tapering end and angular side-cutting edges in alignment with the sides of the grooves, whereby there is formed a nail with angular sides and a cut tapering point with the faces of the point arranged as continua-

tions of the sides of the nail and not across its angles, substantially as specified.

In witness whereof I have hereunto set my hand in the presence of two attesting witnesses.

CHARLES E. HOUGHTON.

Witnesses:

EML. WILVERT,
REUBEN JOHNSON.