WIGGIN & HOARD.

Making Cut Nails.

No. 36,629. Patented Oct. 7, 1862.

Fig. 2.

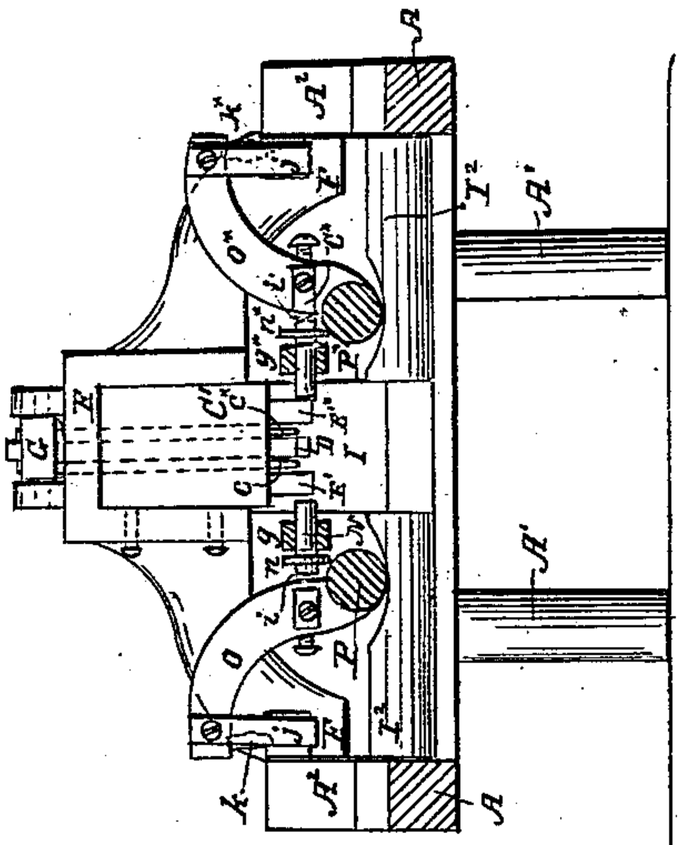


Fig. 4.

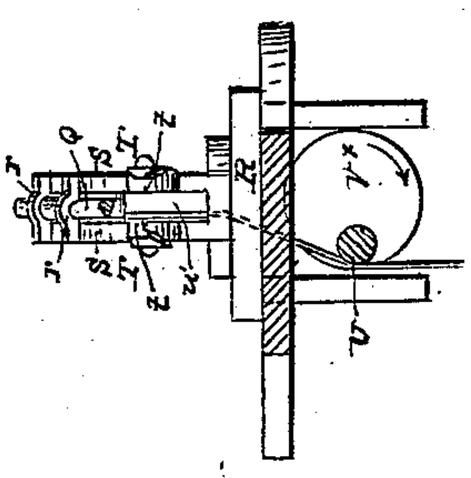


Fig. 1.

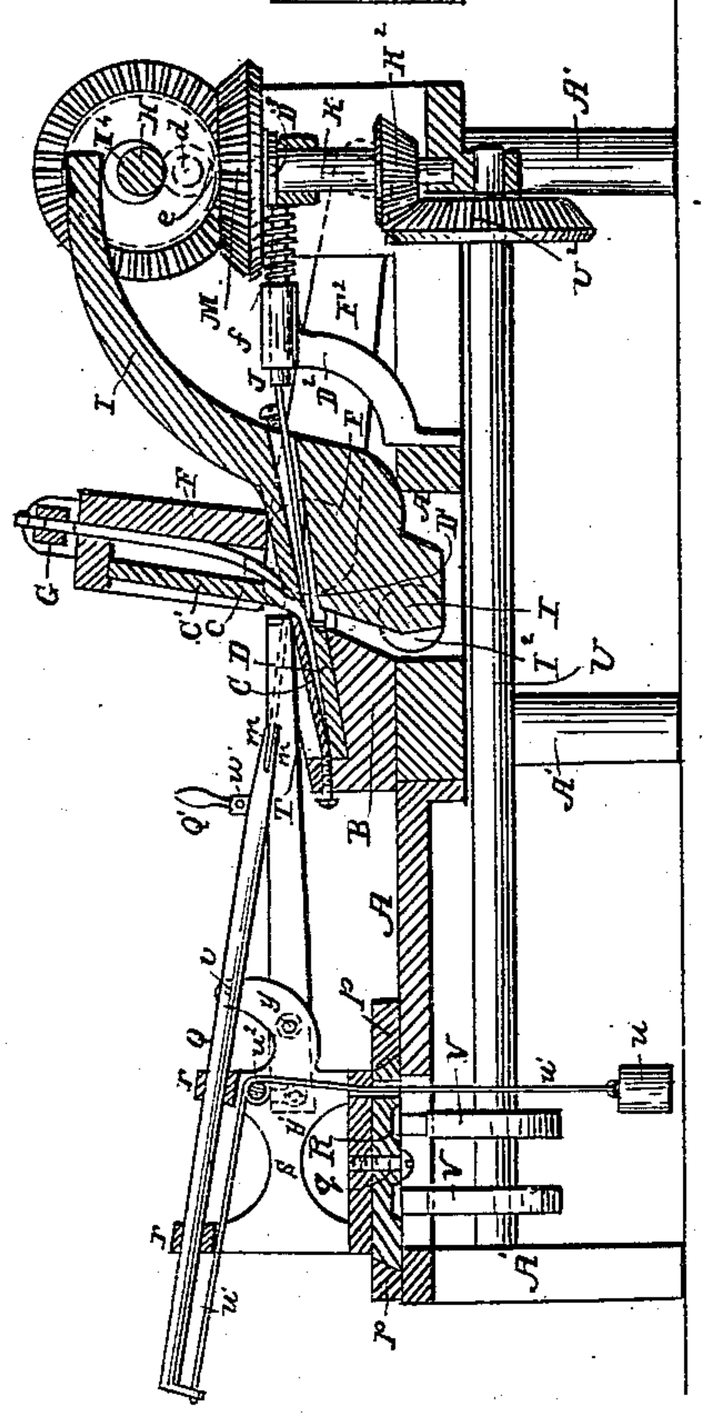
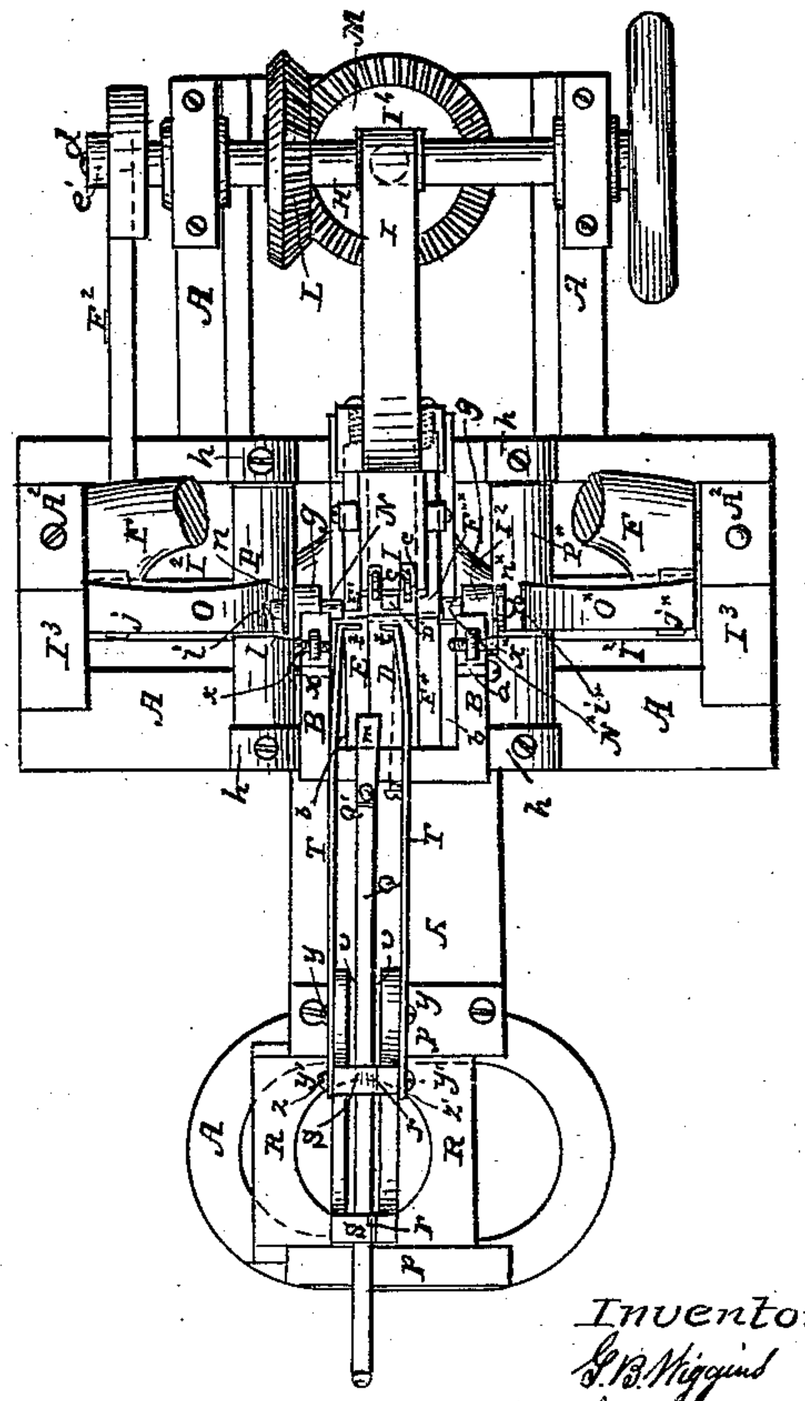


Fig. 3.



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UNITED STATES PATENT OFFICE.

GEORGE B. WIGGIN AND J. W. HOARD, OF PROVIDENCE, RHODE ISLAND.

IMPROVEMENT IN NAIL-MACHINES.

Specification forming part of Letters Patent No. **36,629,** dated October 7, 1862.

To all whom it may concern:

Be it known that we, GEORGE B. WIGGIN and JOHN W. HOARD, both of the city of Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Cut-Nail Machines; and we do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a central longitudinal vertical section of a machine with our improvements. Fig. 2 is a transverse vertical section of the same directly in front of the upper cutter and of the heading apparatus. Fig. 3 is a plan of the same with the cutters and the rocking frame which supports the upper one removed to expose the parts below them. Fig. 4 is a front view of the feeder, with the lower part of its carriage in section.

Similar letters of reference indicate corresponding parts in the several figures.

These improvements are more especially applicable in connection with the use of a double set of cutters and heading devices, and of a feeder, which operates in combination therewith to provide for the cutting of the nails with a proper degree of taper without turning over the plate, but some of them are or may be applicable with equal advantage in machines which have but a single set of cutting and heading apparatus, and which turn over the plate between the successive cutting operations.

The said improvements relate to the heading apparatus and to the feeder.

To enable others skilled in the art to make and use our invention, we will proceed to describe its construction and operation.

A is the horizontal main framing of the machine, supported on standards A′ A′, and supporting all the working parts of the machine.

B is the bed, in which are secured the lower fixed cutter, C, the fixed jaw D of the nippers, and the fixed jaws E E* of the two pairs of holding-dies which hold the nails during the heading. The holding-jaws E E* and the nipper-jaw D are arranged below the cutter C in the same manner as when a single pair ol holding-jaws is used, and secured in the usuaf manner by set-screws *a a* and packing-pieces *b b*. The holding-jaws E E* are arranged on opposite sides of the nipper-jaw. The cutter C is of a greater width than that commonly used, in order that it may present a cutting-edge of a length about equal to double that of the longest nails to be cut in the machine.

F is an oscillating cutter-head, carrying the upper or movable cutter, C′, and the two gages *c c**. This beam is arranged to oscillate in the usual manner in fixed bearings A^2 A^2. The cutter C′ is of the same width as C and applied in the usual manner. The gages are of the same kind commonly used singly, and attached in the usual way to a small rocker, G, and they are arranged at equal distances from the center of the cutter C′, on opposite sides thereof. The oscillation of the cutter-head and movement of the cutter C′ are effected by a crank-wrist, *d*, at one end of the main shaft H of the machine, the said wrist being connected by a rod, *e*, with an arm, F^2, rigidly attached to the cutter-head F.

I is a powerful lever, carrying the movable jaws E′ E′* of the holding-dies, attached to a rock-shaft, I^2, which works in fixed bearings I^3 I^3. This lever is operated in the usual manner to close the holding-jaws for gripping the nails during the heading operation, by means of a cam, I^4, on the main shaft H of the machine. The heading-jaws are opened by the weight of the lever when permitted to do so by the cam.

The movable jaw D′ of the nippers, by which the nail-blanks, after being cut from the plate and before being gripped by the holding-dies, is formed by the end of a plunger, J, which works through the lever I and through a fixed guide, D^2, and it is operated by means of a cam, D^3, on an upright shaft, K, arranged below the horizontal main shaft, and a spiral spring, *f*, the said cam operating to drive the said plunger forward to make the jaw D′ turn the nail-blank, and the spring which is coiled around the said plunger operating to draw it back again. The shaft K derives motion from the main shaft H through a pair of miter-gears, L M. The one pair of nippers, D D′, being made wide enough and arranged in the center of the machine, serve to operate in combination with both pairs of holding-dies.

N N* are the heading-dies, made in the form

of cylindrical plungers, with flanged heads *n* *n**, and fitted to work through guides *g* *g**, formed on or secured to opposite sides of the bed B. O O* are the levers, by which the necessary pressure is given to the said plungers to produce the heading operation. These levers are attached to rock-shafts P P*, arranged on opposite sides of the bed B in fixed bearings *h* *h*, such arrangement being the same as in the single machines in common use, except that only one heading-die and lever are used in those machines and that the heading-die is usually attached rigidly to the lever instead of being a separate plunger. The levers O O* are fitted with hardened-steel plugs *i* *i** at the points where they come in contact with the heading-dies. The said levers derive their movement from the oscillating cutter-head F, which carries the upper cutter, being connected with the said head by means of stirrups *j* *j** and single toggle-levers *k* *k**, so as to be operated substantially in the usual manner. The drawing back of the heading-dies is effected by means of hooks *l* *l*'*, rigidly attached to the levers O O*, and operating on the inner faces of the flanges *n* *n**.

By constructing the heading-dies in the form of plungers two important results are obtained, viz: First, they are made to operate rectilinearly and so to upset the heads evenly; and, secondly, they are allowed to turn between the successive heading operations, so that every portion of their faces may be brought into action, and hence they are made to wear evenly all round instead of all in one place, as when they are rigidly connected with the levers. The turning of the said dies is effected by the peculiar action of the hooks *l* *l** upon their flanges *n* *n**, which is as follows: The hooks, moving in circles described from the axes of the rock-shafts P P*, have a slight upward movement in drawing back the dies, and, as they are arranged to act on the flanges *n* *n*' at the sides of the plungers, they are caused to turn the latter slightly in their guides *g* *g**.

The feeder consists of a pair of spring-tongs, *m* *m*, firmly secured to the end of a cylindrical rod, Q, fitted to slide longitudinally and turn in a carriage, R S, and a pair of elastic guides, T T, also secured to the said carriage. The carriage is composed of two principal parts, viz.: a slide, R, arranged to slide in a direction at right angles to the feed-movement in fixed guides *p* *p*, secured to the framing A A, and a standard, S, secured to the said slide by an upright pivot, *q*, on which it is free to turn. The slide R has prior to each cutting operation a movement to the right or left in the guides *p* *p*, such movement being produced to the right and left alternately by means of two cams, V V*, on a horizontal shaft, U, arranged in suitable fixed bearings under the framing A, the said shaft deriving motion from the upright shaft K at the rate of one revolution for every two of the latter shaft and of the main shaft through two bevel-gears, K^2 U^2.

The rod Q, carrying the tongs *m* *m*, works in guides *r* *r* in the standard S, and has a downward inclination toward the cutters, and the said rod is kept continually pressing forward toward the cutters by means of a weight, *u*, suspended by a cord, *u*', which is attached to the rear end of the said rod, and which passes over a pulley, u^2, turning on an axle secured in the standard S. The jaws of the tongs *m* *m* are made narrower at the back than at their extremities, and by this means they are enabled to be opened for the reception of the plate by the action of two fixed pins, *v* *v*, secured within the standard S in such positions on opposite sides of the rod Q and tongs, as shown in Figs. 1, 3, and 4, that by drawing back the tongs by hand by means of the lever Q', attached to this rod Q by the pin *w*, the said pins are caused to enter between the jaws on both sides thereof, and by continuing to draw back the rod the tongs are caused to be opened by the said pins to liberate the fag end of the plate and prepare for the reception of a new one. The lever Q' in drawing back the tongs serves as a mere handle; but it serves also another purpose, in which the function of the lever is developed—viz., that of starting the tongs forward from the pins *v* *v* when the plate has been placed within them, which is effected by pushing the handle of the lever toward the cutters and so causing its point to press against the lower guide, *r*.

The guides T T, which are elastic in a lateral direction, are attached to the sides of the standard S in such a manner as to permit them to press sufficiently against the side edges of the nail-plate, and so steady it in the tongs and cause it to be properly presented to the cutters, but not sufficiently to interfere with the movement of the plate between the said guides toward the cutters. The said guides have at their extremities projecting lips *t* *t*, to lap over the plate and press it down upon the lower cutter, C, such pressure being produced very near to the lower end of the plate, and consequently to where the cutting takes place. Opposite to these guides T T there are screwed into suitable lugs standing up from the sides of the bed B two screws, *x* *x**, one on each side, which serve to regulate the lateral vibration of the standard S, the tongs, and the guides T T upon the pivot *q*, such vibration serving to present the plate obliquely in opposite directions alternately to the edges of the cutters to produce the taper of the nails and to cut the points from opposite edges of the plate alternately. These oblique positions of the plate are produced by the guides T T being brought into contact with first one and then the other of the screws as the standard, tongs, and guides are carried back and forth across the machine with the slide R, the friction between the standard and the slide being sufficient to enable the latter to carry the former back and forth across the machine without any movement taking place

on the pivot *q* until the guides come in contact with the screws *x x*, when the continued movement of the standard with the slide produces a slight turning of the standard S on the said pivot. The movement of the feeder across the cutter *c* places the nail-plate alternately opposite to each half of the length of the edges of the cutters and in position to deliver the nails one after the other to one and the other of the two pairs of holding-dies E E′ and E* E′*, to have their heads produced by one and the other of the heading-dies N and N* alternately. The movement of the plate toward the cutter C′ is produced by the weight *u* and regulated by the gages *c c*, which, as before stated, operate in the usual manner.

The operation of the cutters, the nippers, the holding-dies, and the heading-dies are essentially the same as in other cut-nail machines. Both holding-dies open and close together and both heading-dies move together, but only one pair of the said dies and one heading-die and one-half the length of the cutters operate at a time, because the nail-plate is only presented to one at a time.

In Fig. 3 the header N* on the right side of the machine is represented as in the act of heading a nail-blank held by the dies E* E′*, but the plate has been moved by the feeder across to the other side of the machine preparatory to the next descent of the cutter C′ to cut off a blank to be taken hold of by the dies E E′ and headed by the die N on the left side. The next cutting operation will be on the right side, and so the operation will proceed until the plate is all cut up, the plate being moved from one side to the other of the machine and the nails being produced on one side and the other alternately. When the plate has been cut up as close to the tongs as possible, the attendant draws back the rod Q and the tongs till the lever Q′ comes in contact with the lowest guide, *r*, and the tongs are opened by the pins *v v*, upon which they will remain fast while a new plate is put in. When the new plate is put in the tongs, they are started from the pins *v v* by means of the lever Q′, as before described, and so permitted to grasp the plate, which, on the machine being set in operation, is fed forward to the cutters, as before described. The taper of the nails may be varied by giving a greater or less movement to the slide R, and so causing the nail-plate to be presented to the cutters in a more or less oblique direction. To increase the taper, a greater length of stroke is given to the slide, and vice versa. The thickness of the heads is regulated by means of the screws *x x**. By screwing back the said screws, to permit the plate to move farther to the right and left, a greater portion of the blank is caused to be presented beyond the outer ends of the holding-dies to the action of the heading-dies, and consequently a thicker head is produced, and by screwing in the said screws an opposite effect is produced.

In order to permit the cutters and dies to be taken out of the machine for regrinding or repair without entirely removing the feeder, the elastic guides T T are each attached to the sides of the standard S by means of two screw-bolts, *y y′*, of which *y* passes through a hole in the guide just large enough to fit it, and the other one, *y′*, has provided for it in the guide a slot, *z*, which is open at the top, as shown in dotted outline in Fig. 3. By unscrewing the bolts *y y′* slightly the front ends of the guides T T are permitted to be raised up high enough to enable them to be swung aside over either of the screws *x x*. When the guides T T are thus swung aside, the cutter and dies can be removed on the screws or other contrivances which hold them in place being slackened.

In the operation of the machine the rod Q, carrying the tongs, being cylindrical, is free to turn in its guides *r r*, and hence accommodate itself to any twist or winding of the nail-plate, the lower part of which is kept flat upon the under cutter by the pressure of the tips *t t* of the elastic guides T T, which in their operation of guiding the plate and assisting to carry it across from one side of the machine to the other accommodate themselves to any variation in the width of the plate.

By cutting and heading at opposite sides of the machine alternately the feeder, not being required to turn the plate over, as is done in machines with a single set of cutters and dies, is made very much simpler than the automatic feeders heretofore used, and a machine having double cutters and dies can run more than twice as long or make more than twice as many nails without the sharpening of the cutters as a machine with a single set, as not only is each cutter subjected to but one-half the amount of work, but each one is capable of doing more, as the repetition of its use not being as quick it does not get so hot.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. The combination of the heading-die levers O O*, stirrups *j j**, and toggles *k k** with the oscillating cutter-head F in the manner herein shown and described.

2. So applying the heading-dies N N* in the form of plungers that they may be free to turn on their axes, substantially as and for the purpose herein specified.

3. The employment, for drawing back the heading-dies N N*, of hooks *l l**, attached to the heading-levers O O*, and arranged to operate, substantially as described, upon flanges *n n**, provided on the said dies, for the purpose of turning them.

4. The arrangement of the single pair of nippers D D′, to operate in combination with the two sets of holding-dies, substantially as herein specified.

5. Supporting the whole of the feeder in a carriage, R S, composed of a transversely-moving slide, R, and a standard, S, pivoted to the said slide, substantially as herein specified.

6. The opening of the tongs by means of two pins, *v v*, arranged to operate substantially as herein set forth.

7. So applying the guides T T in combination with the carriage of the feeder as to permit them to be raised up high enough to allow the feeder to be turned away from the cutters, substantially as and for the purpose herein specified.

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