F. J. Ayres,

Making Cut Nails,

No. 2,698. Patented July 2 1842.

Fig: 1

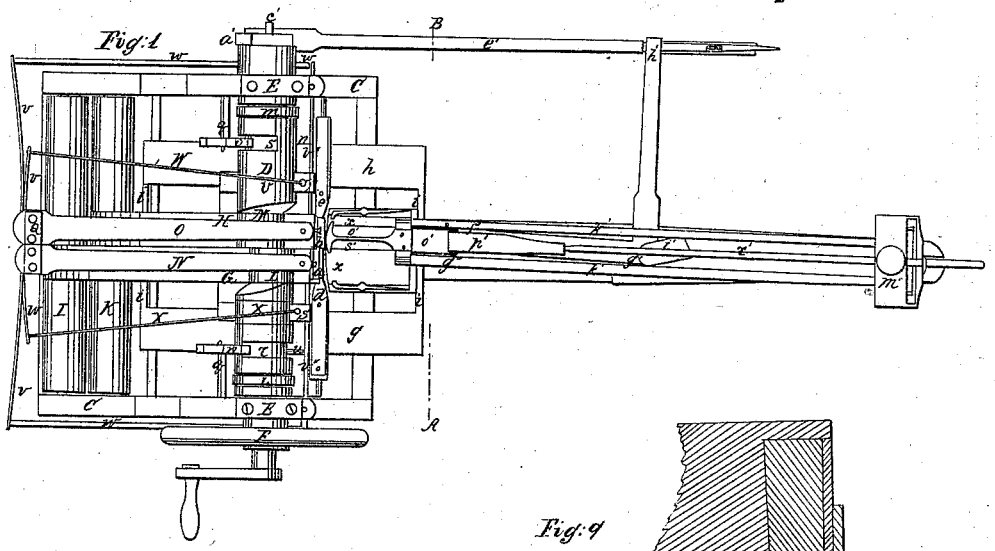

Fig: 9

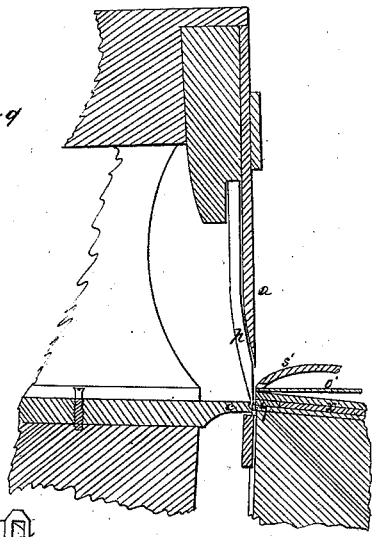

Fig: 8

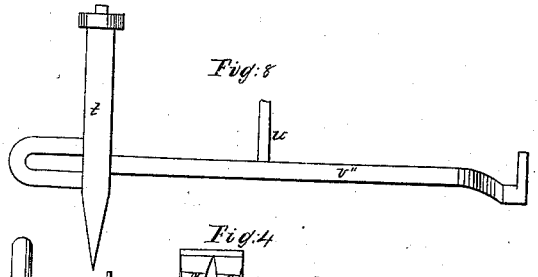

Fig: 4

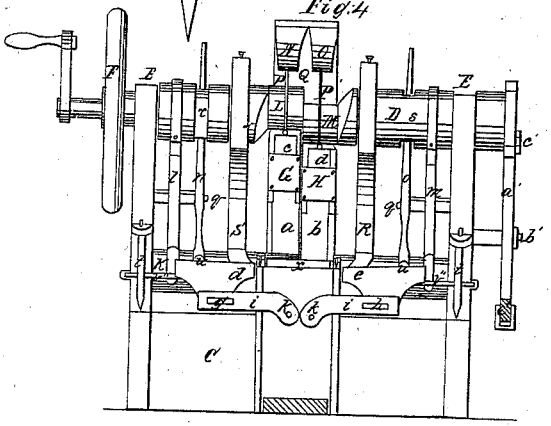

Fig: 11

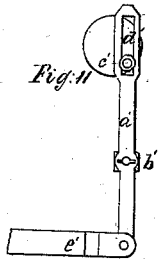

Fig: 10

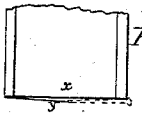

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Fig: 2

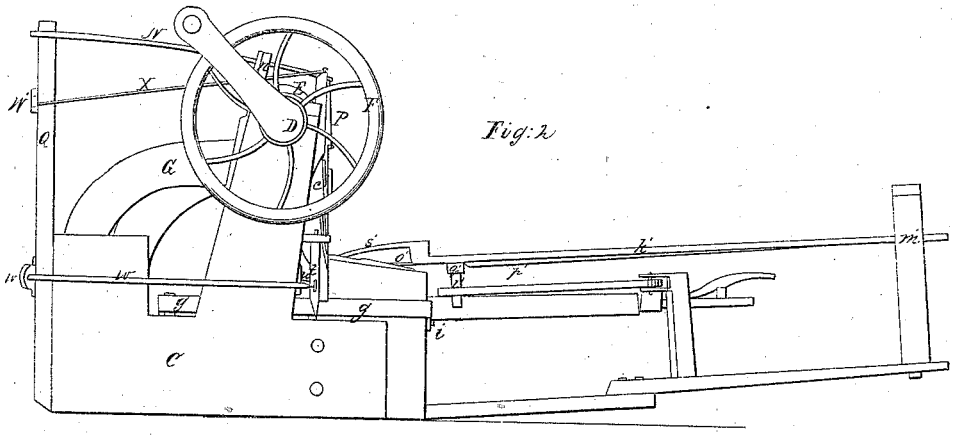


Fig: 6

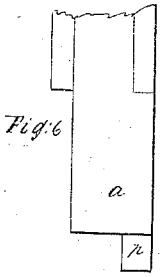


Fig: 4

Fig: 5

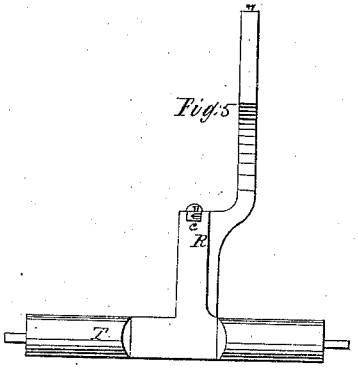
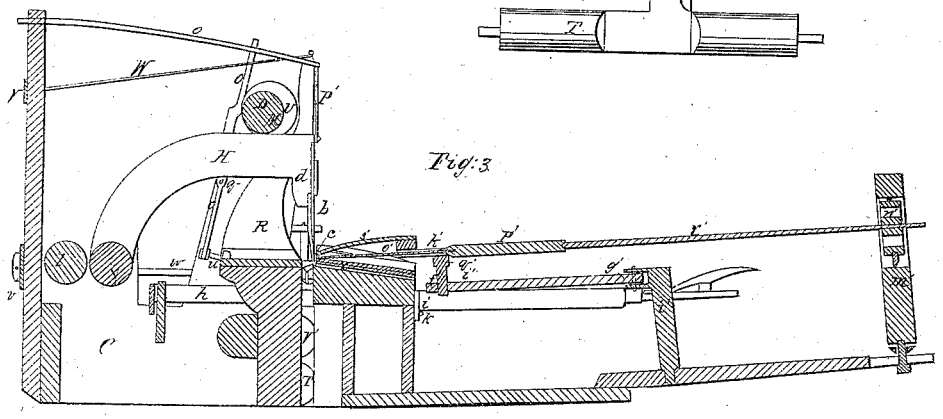


Fig: 3



UNITED STATES PATENT OFFICE.

FREDERICK J. AYERS, OF ROXBURY, MASSACHUSETTS.

MACHINE FOR CUTTING NAILS.

Specification of Letters Patent No. 2,698, dated July 2, 1842.

To all whom it may concern:

Be it known that I, FREDERICK J. AYERS, of the town of Roxbury, in the county of Norfolk and State of Massachusetts, but now residing in the city of St. John, in the British Province of New Brunswick, Canada, have invented new and useful Improvements in Machinery for Cutting Nails; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the drawings which accompany said description and which, combined with it, form my specification.

The principles of my invention, by which it may be distinguished from others of a like character, are herein set forth, together with such parts or combinations of the same, as I claim, and for which I solicit Letters Patent.

Figure 1, represents a ground plan or top view of my machinery. Fig. 2 is a side elevation. Fig. 3, is a vertical, longitudinal and central section. Fig. 4, is a vertical section on the line A B, Fig. 1.

C, Figs. 1, 2, 3, 4, denotes the main body or frame, which is to be composed of cast iron, and suitably shaped and arranged to support the operative parts of the machinery.

D is the spindle or main shaft from which the other parts of the machine derive their requisite movements, by means of eccentrics on the same, the said shaft revolving and being supported in bearings E, E, of the framework. This shaft is turned by hand or by a belt, from the driving power, passing over a pulley suitably arranged on the same. A fly wheel F is also fixed on the shaft D, in order to regulate the movements of the machine.

G, H are the cutting levers whose office is to cut the iron preparatory to its being gripped and headed. They consist of knives *a*, *b*, attached to the extremity of bent arms *c*, *d*, which are hung on arbors or horizontal shafts I, K, situated in the back part of the machine, as seen in Figs. 1, 3. These cutting levers are operated or alternately depressed by eccentrics L, M, on the main shaft. They are raised up by two springs, N, O, to one end of each of which one of the levers is attached by a connecting wire on link P or P′. The other ends of each of the springs are fixed to the top of a perpendicular standard Q of the framework.

R, S, are the gripping levers whose office is to grip the rail so that it may be headed. One of these levers is connected, at its foot, to a horizontal shelf T, extends upward, as seen in Fig. 3, by the side of the main shaft D, and is pressed forward by an eccentric U of the main shaft and drawn back by the action of a spring V, Figs. 1, 2, 3, which is connected with the top of the gripping lever by a rod W. Thus the gripping lever has a slight vibratory motion in the longitudinal direction of the machine. A front view of the gripping lever K with the shaft T is seen in Fig. 5. A small gripping tool, *e*, Figs. 3, 5, 6, is attached to the lever R in the position seen in the drawings. The other gripping lever S is similarly arranged and supported on another horizontal rolling shaft V′, Fig. 3. It is drawn back by a spring W′ and rod X, and pushed forward by an eccentric Y on the main shaft similar to the eccentric U.

d, *e*, Figs. 1, 4, are the heading tools. They are each screwed or otherwise properly fixed down upon a cross bar *g* or *h*. Each of the bars *g*, *h*, is supported at its ends on pieces *i*, *i*, *i*, *i*, Fig. 1, which turn on centers *k k*, Figs. 3, 4. The cross bars *g*, *h*, are lifted up and down, (or vibrate vertically on the centers *k*, *k*), by eccentric rods *l*, *m*, to which the same are hung or jointed. The rods *l*, *m*, are raised and depressed by eccentrics on the main shaft, which are so arranged as to alternately raise and depress the heading tools and bring their ends in contact with the nail, and by pressing on the same to head it.

n, *o*, Figs. 1, 2, 3, 4, are nipper levers, whose office is to press the nippers on the nail when conveyed down by the cutters and gages and to hold it until relieved by the gripping levers.

Fig. 6, is a front view of one of the cutting levers, exhibiting the knife *a* and gage *p* in rear of the same, the gage extending down some distance below the edge of the knife. Fig. 7, is a side view of the gage and knife more clearly showing the gage in rear of the knife. The plate from which the nail is cut is pressed against the gage just before the cutter descends, and as the cutter goes down it removes a portion (or the nail), therefrom which drops or is pressed down by the cutter to the nippers, which come up and hold the same until relieved

by the grippers. Each of the nipper levers *n*, *o*, vibrates on a center or stud *q*, Figs. 1, 3, 4, projecting from the framework, and are vibrated by eccentrics *r*, *s*, on the main shaft. A front view of one of the nippers is shown in Fig. 8, each of said nippers being supported in position in rear of the dies, by a perpendicular spindle or shaft, *t*, Figs. 2, 4, which is permitted to vibrate in bearings at each extremity. A pitman *u* connects the foot of the nipper lever with the nipper, so that when the eccentric on the main shaft causes the top of the nipper lever to recede, the bottom advances, and through the intervention of the pitman presses the nipper forward on the nail. The nipper is withdrawn from the same by the action of a spring *v*, Figs. 1, 2, operating on the external end of the nipper through a rod *w*.

x, *x*, Figs. 1, 3, 9 are the dies, over the inner edge of which, the nail plate is passed against the gage. When the cutting lever descends and removes the nail from the plate, it carries the same down upon a small projection or shelf *y*, Fig. 9, more particularly shown in the top view Fig. 10, on which the nippers receive and hold it, until the grippers next come up and grip it or force it against the die, while the heading tool performs its operation. As soon as the grippers recede, the nail will fall from the angular shelf by reason of the heaviest part of the same resting over the shelf, as exhibited by dotted lines in Fig. 10.

A lever *a'* Figs. 1, 4, turning on a fulcrum at *b'* Fig. 4, is connected at its top to the end of the main shaft by a crank pin *c'* which moves in a slot *d'* of the lever as seen in Fig. 11, which is a side view of the lever. When the shaft revolves a vibratory motion is imparted to the lever. A long bar *e'* is jointed at one end to the foot of this lever the other extremity being joined to the end of one arm of a bent lever *f' g' h'* Fig. 1, and *f' g'* Figs. 2, 3, the said bent lever being jointed or having its fulcrum at *g'* in the top of a standard *i'* Figs. 2, 3. The vibratory frame *k'* Figs. 1, 2, 3, is connected near one extremity to the end *f'* of the bent lever, by means of the cylindrical stud *l'* projecting from the frame *k'* and entering a circular aperture bored through the end of the bent lever. The frame *k'* is supported at its other extremity in the standard *m'*, by a common universal joint N', which permits the frame to be lifted from the bent lever *f' g' h'* and turned aside laterally.

The frame *k'* is for carrying the strip of metal, *o'*, Figs. 1, 3, from which the nails are cut; the said strip having one and inverted in the extremity of a holder *p'*. The holder, resting on the top of the cross piece *q'*, situated transversely underneath the bars of the frame *k'*, and having the stud *l'* depending therefrom, consists of the piece of metal *p'*, having a long rod *r'* inserted in its end, and extending back and passing through the center of the universal joint as seen in Fig. 3, on which said rod is supported and slides longitudinally. The strip of metal *o'*, by the connection of the frame *k'* with the bent lever *f' g' h'*, has a lateral movement back and forth, and consequently presents its end alternately to each of the cutters of the levers G, H, and the strip may be forced up against the gages of the same by the hand of the attendant applied to the extremity of the rod *r'*, or by a string attached to the same, and passing over a small pulley conveniently situated, and having a weight on its other end, which shall act so as to draw forward the rod.

A guide piece *s'* is applied to the frame *k'*, to support the extremity of the strip of metal *o'* adjacent to the cutters.

The similar parts of the above apparatus act in a reverse manner, that is to say, when one cutting lever is in the act of removing a piece of iron from the end of the strip, the other has already performed that duty and is preparing for it again, and so with the other.

This machine bears little resemblance to the common nail machine. The superior advantage of the one over the other, will be obvious, by contrasting them in the following particulars. The common machine can cut but one nail at a single revolution of the balance wheel, while the new one will cut two. The latter can feed itself without manual labor by a vibratory motion of the plate, while the former is subject to the inconvenient method of turning the plate over, and this by hand.

The new machine has two cutting, two gripping, two heading levers, each hung separately on its own supports, whereas in the common machines, there is but one of each description of lever, and in other respects one may be said to be for the most part double when the other is single. Another important distinction is, that the gages, attached to the cutting lever in the new machine and which convey the nail into the dies to be gripped and headed, are made to do the same by the pointed end, and the nippers hold the nail by its center and not by the point, as in the generality of other machines.

The advantages of the new over the single machine so far as regards economy of labor and superior workmanship are obvious, for if speeded at the same rate it will cut double the quantity of nails in the same time and will vibrate a strip of five feet in length, with the same precision as one of two feet length, the latter being the size commonly used in ordinary machines.

Having thus described my improvements I shall claim—

1. The gage p, applied to the rear of the cutting knife a, in combination with the die x, for the purpose of retaining the nail against the adjacent face of the die when separated from the strip o', and while being conveyed by the cutting knife, down upon the shelf y, and also for holding said nail against said face of the die, until it is received by one of the nippers; the same being constructed and operating substantially as above explained.

2. Also, the angular shelf y upon which the nail is deposited by the cutting tool, and sustained by the nipper and gripper, during the heading operation, in combination with the gage p and the die x, the said angular shelf being formed as above set forth, by which peculiar shape the nail (by reason of its heaviest part resting beyond the shelf) is caused by the action of gravity to fall from said shelf on recession of the gripper, the whole being constructed and operating substantially in the manner and on the principles herein before explained.

In testimony that the foregoing is a true description of my said invention and improvements I have hereto set my signature this eighteenth day of October in the year eighteen hundred and forty one.

FREDERICK J. AYERS.

Witnesses:
WM. H. SCOVIL,
R. P. MCGIVENS.