D. NOYES.

MACHINE FOR HAMMERING IRON.

No. 10,170. Patented Oct. 25, 1853.

Fig. 2

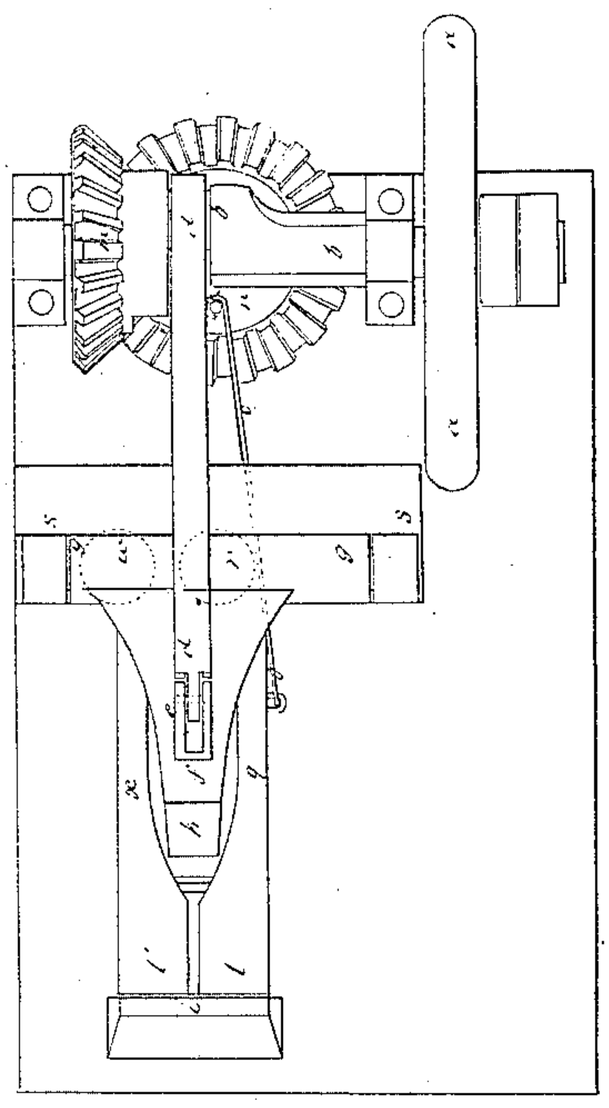


Fig. 3

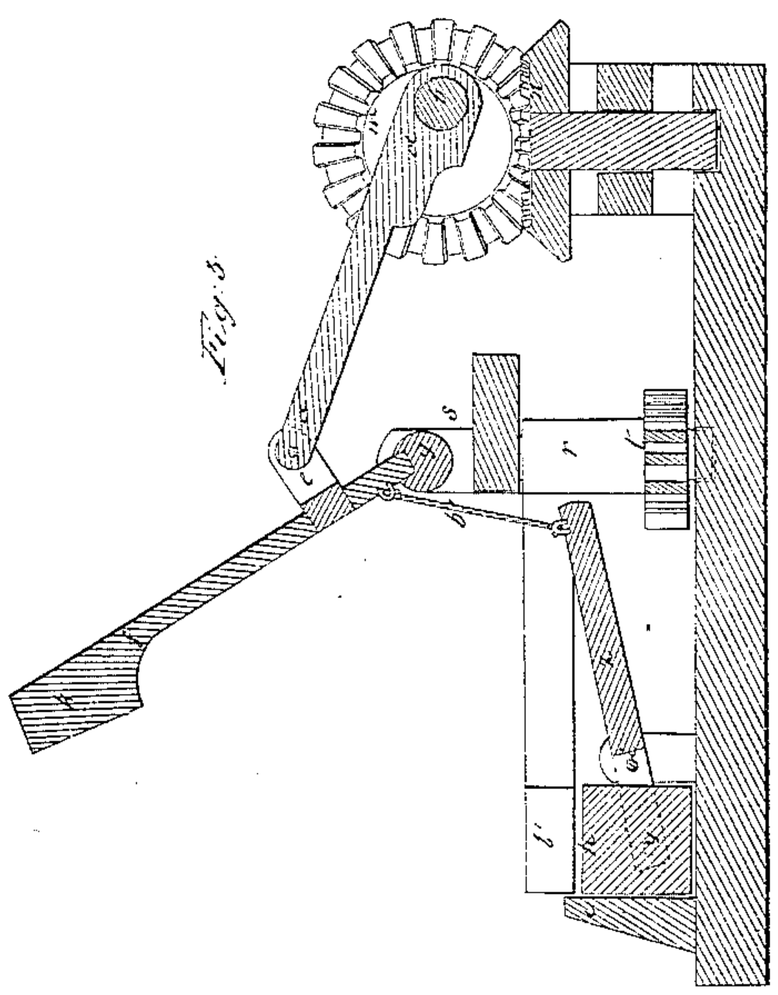
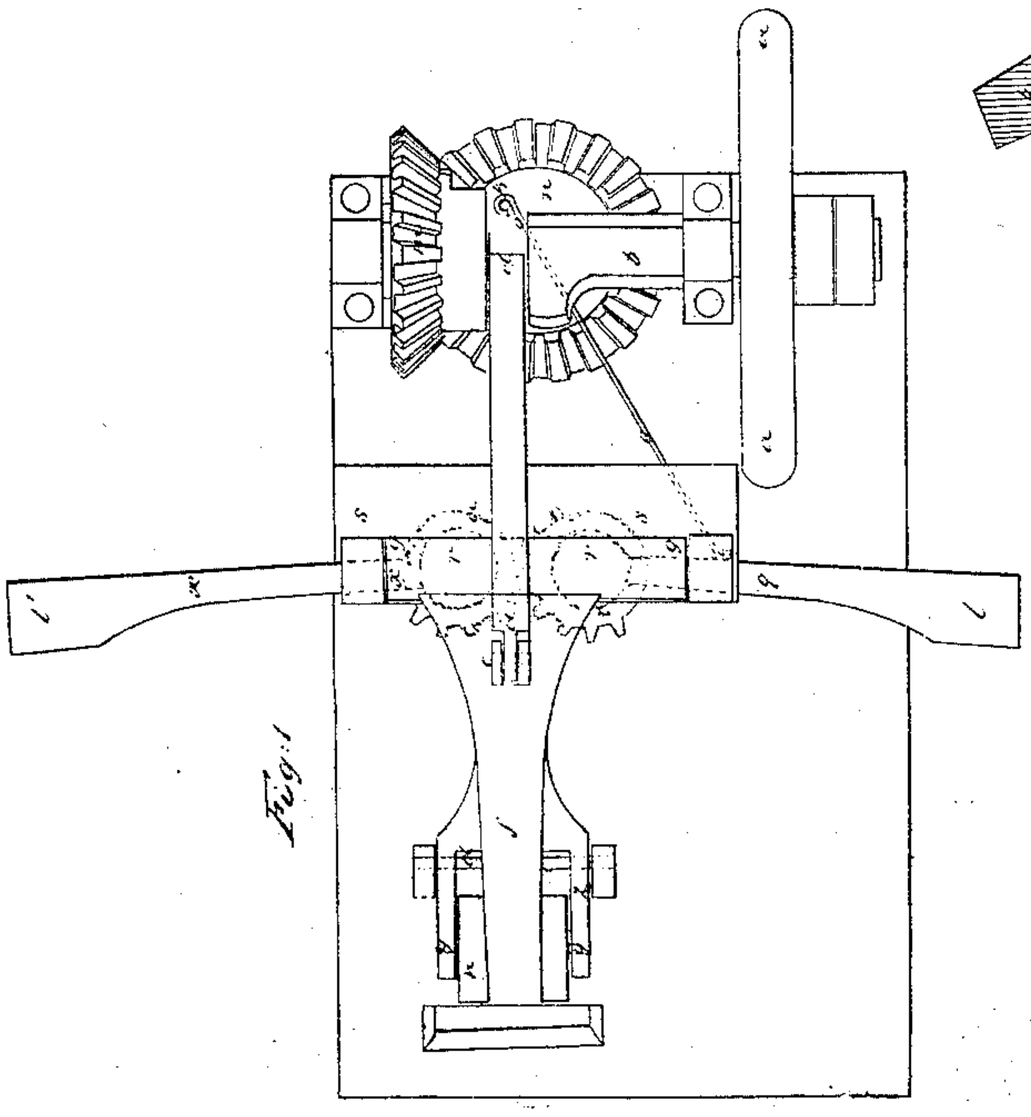


Fig. 1



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UNITED STATES PATENT OFFICE.

DANIEL NOYES, OF ABINGTON, MASSACHUSETTS.

MACHINE-HAMMER.

Specification of Letters Patent No. 10,170, dated October 25, 1853.

To all whom it may concern:

Be it known that I, DANIEL NOYES, of Abington, in the county of Plymouth and State of Massachusetts, have invented certain new and useful Improvements in Machines for Hammering or Forging Iron, and that the following description, taken in connection with the accompanying drawings, hereinafter referred to, forms a full and exact specification of the same, wherein I have set forth the nature and principles of my said improvements by which my invention may be distinguished from others of a similar class, together with such parts as I claim and desire to have secured to me by Letters Patent.

The figures of the accompanying plate of drawings represent my improvements.

Figure 1 is a plan or top view of the machine. Fig. 2 is a similar view showing a different position of the hammers. Fig. 3 is a longitudinal vertical section of the machine taken in the plane of the line A B, Fig. 2.

The essential features of my improvements, consist in a novel arrangement of mechanical devices for hammering or forging iron, whereby it can be brought into any desired shape or form much more expeditiously and with much greater regularity than by any of the modes commonly practised in trip hammers for the purpose. This result I effect by means of hammers, which are so placed and actuated as to strike the iron to be shaped, both on the top and the two sides, the upper hammer having motion imparted to it from a crank on the main driving shaft, and the two side hammers moving horizontally so as to strike the sides of the piece to be forged.

a a in the drawings represents the fly wheel on the crank shaft *b b*. This crank operates a connecting arm *d d* which is connected to and turns on a pivot in the projection or standard *e* on the upper hammer beam *f*. The hammer beam *f* turns on a journal or fulcrum *g g*. The hot iron to be shaped is placed on the anvil *h*, being fed in on the rest *i*. The turning of the crank shaft will, through the connecting arm *d d*, give an up and down motion to the upper hammer *k*, which will strike upon the upper face of the iron on the anvil, and the fulcrum *g g* of the hammer beam is so placed with regard to the ends of the connecting rod, that the end attached to the crank will be traveling upward while the opposite end attached to the hammer beam is moving downward, thus causing the hammer to move rapidly as it is descending and consequently give a powerful blow.

I shall now proceed to describe the manner in which the side hammers *l*, *l'* are operated. On the end of the crank shaft *b b*, is placed a bevel gear *m* which engages with another bevel gear *n*. To the face of the gear *n* and near its outer periphery, is attached one end of a rod *o o* turning on a pin *p* in the said gear *n*. The other end of the rod *o o* is attached to the beam *q* of one of the horizontal hammers *l*, the beam *q* being fastened to the vertical shaft *r* turning in proper journals in the supporting frames which also sustains the journal *g g* of the upper hammer, before referred to. As the rod *o o* is attached eccentrically to the gear *n* (by the pin *p*) the turning of this gear will, through the rod *o o*, give a lateral motion to the horizontal hammer *l* and also turn the vertical shaft *r*, on the bottom end of which is placed a gear *t* which engages with a similar gear *u* placed on another vertical shaft *v*. To this shaft *v* is attached the beam *x x* of the other side hammer *l'*. From this it will be seen, that the revolution of the gear *n* will, through the rod *o o*, cause the hammers *l l'* to approach each other and strike the sides of the iron, and then be retracted into the position shown in Fig. 1, while the upper is giving a blow. The end of the rod *o o* is so placed with regard to the center of the gear *n*, as to be moving, just before the hammer strikes, in one direction, while the end attached to the hammer beam is moving in the opposite direction, so as to give a rapid motion to the hammers *l*, *l'* just before they strike the iron and thus insure a powerful blow.

In order that the hammers *l*, *l'* may strike fairly the whole surface of the sides of the iron, the anvil *h* is made to drop and descend from the iron (which is held horizontally upon the rest *i*) as soon as the upper hammer has given the blow, thus leaving room for the side hammers to strike the lower edge of the sides of the iron. The anvil *h* is made to descend at the proper time, by the upward motion of the hammer beam *f*, being attached by a rod *y* to a beam *z* which turns on a fulcrum at *a'*, and is connected at one end by a rod *b'* to the

underside of the upper hammer beam *f*. Thus the anvil will descend (always keeping its upper face horizontal) just before the side hammers strike, leaving a space between the bottom of the iron (sustained in position by the rest) and the face of the anvil so that the hammers may give a fair blow upon the whole side surface of the iron. The downward motion of the upper hammer beam *f* will, in the same manner depress one end of the tilting beam *z* and elevate the other, and thus bring the anvil up again ready for the blow.

One of the most essential features of the machine as above described, consists in the relative position of the ends of the connecting rods *d d*, *o o*—and the fulcra or journals of the hammer beams, at the time of giving the blow, as the journals or fulcra of all the hammers are so placed as to be in nearly a straight line, at the time of giving the blow, with the connecting rods from which they derive their motion. Just before giving the blow, in consequence of the relative position of the ends of the connecting rods and the fulcra of the hammer beams, one end of the connecting rod is traveling in one direction, while the opposite end attached to the hammer beam is moving in the opposite direction, which necessarily gives a rapid motion to the hammer just before striking. When the hammers are rising or opening, the ends of each connecting rod are moving in nearly the same direction, which thus gives a slow motion to the hammers while opening or rising. The connecting rods also, when in a straight line with the fulcra of the hammer beams, allow the hammer beams to turn freely forward or back on their journals at the time of giving the blow, which is essential in order to give a swinging, elastic blow, whereas when the journals of the hammer beams are not in a line with the connecting rods, the said hammer beams are necessarily rigidly held.

From the above description it will be seen that as the iron to be shaped is first struck by the upper hammer and then simultaneously by the side hammers, the process of forging is much faciliated, and as the faces of any or of all the hammers can be furnished with dies, that any desired shape can be given to the iron, rendering the machine of great service in making various kinds of nails, spikes, &c. It will also be seen that in some kinds of forging or hammering that the upper hammer may be dispensed with, the two side hammers being used alone; or in some cases the side hammers may be dispensed with and the upper hammer used alone, the peculiar swinging elastic blow which the hammers give, as above described, being much preferable to the blow of an ordinary trip-hammer. It will also be evident that the machine is adapted to hammering other materials besides iron.

Having thus described my improvements I shall state my claims as follows.

What I claim as my invention and desire to have secured to me by Letters Patent is,

1. A machine for hammering iron, &c., having the distinguishing features hereinabove enumerated viz., a hammer for giving the blow upon the upper surface of the iron acting in conjunction with two hammers which simultaneously strike the sides of the iron, substantially as above set forth, and I further claim in a machine for hammering iron, the use of these two side hammers, operating as specified, whether used in connection with the upper hammer or without it.

2. I claim so arranging the relative position of the fulcra of the hammer beams and the ends of the connecting rods attached to said beams, and to the crank shaft and gears from which they derive their motion, as to bring the said fulcra and connecting rods in nearly a straight line at the time of giving the blow, for the purpose above specified, the opposite ends of the connecting rods just before giving the blow, moving in opposite directions, so as to give a rapid and powerful blow.

3. I claim, causing the anvil to descend from the iron just before the blow of the side hammers, and to ascend just before the blow of the upper hammer, by means of a rod attached at one end to the underside of the upper hammer beam, and at the other end to a tilting arm which embraces the anvil substantially as above described.

DANIEL NOYES.

Witnesses:

JOSEPH GAVETT,

BERNARD O'KANE,