

W. Hatch.

Making Spikes and Nails.

N^o 4,668.

Patented Jul. 28, 1846.

Fig. 1.

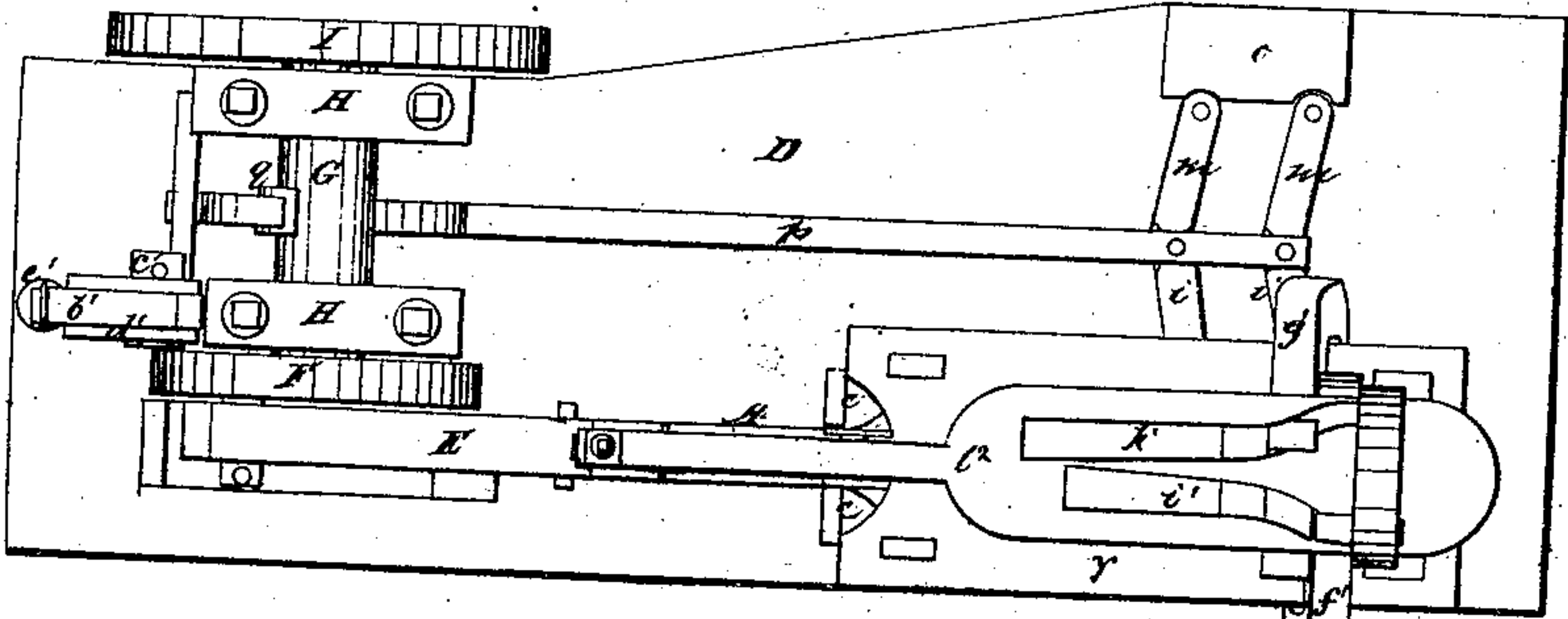


Fig. 2.

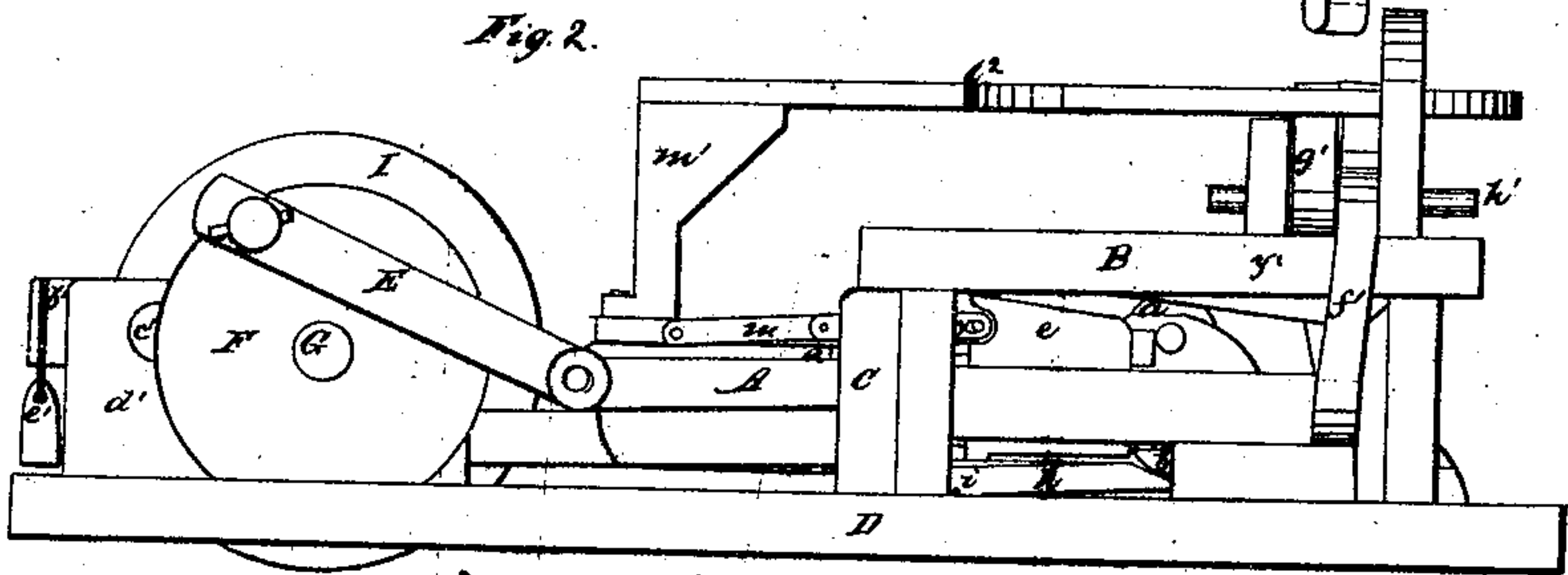


Fig. 4.

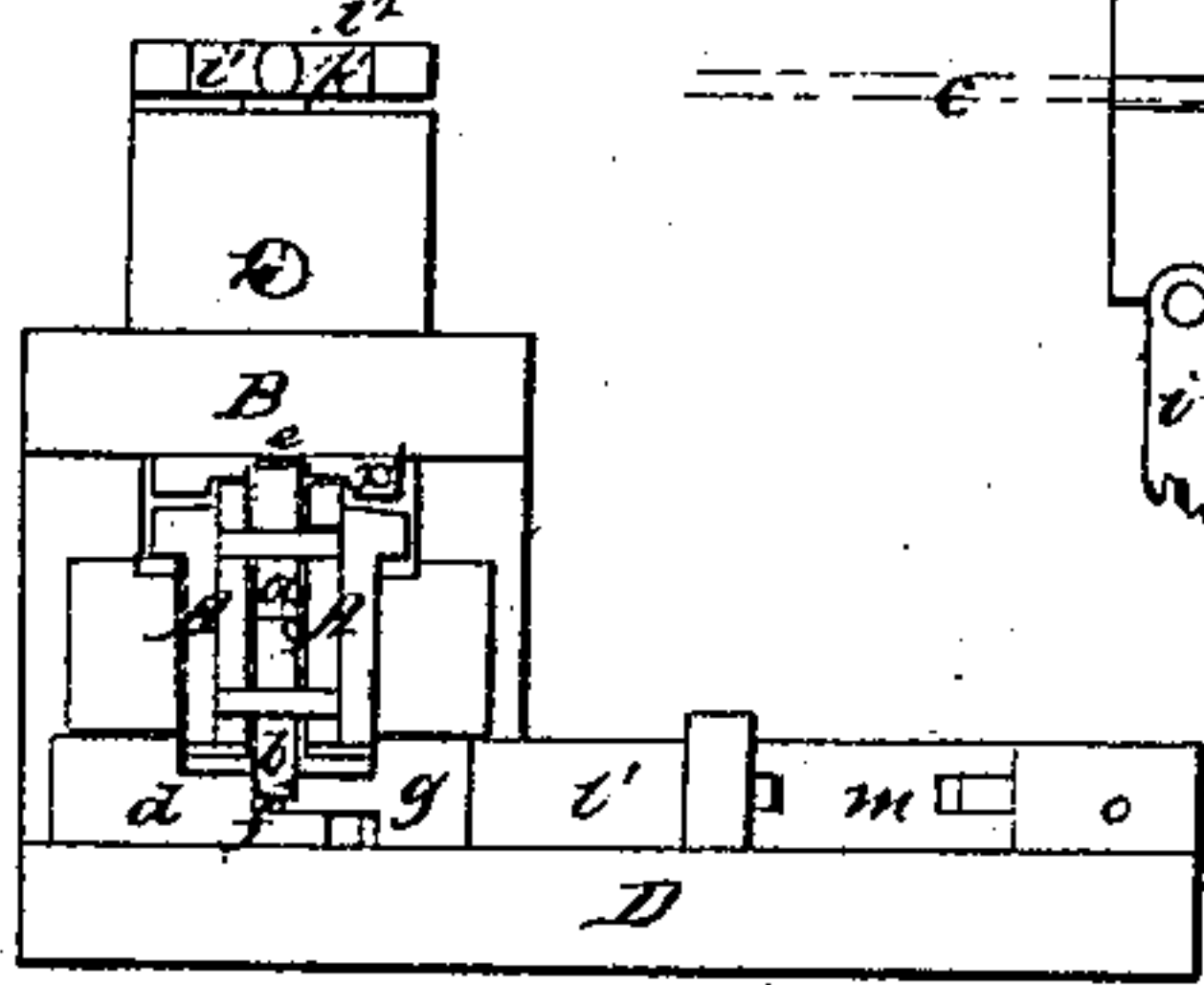


Fig. 6.

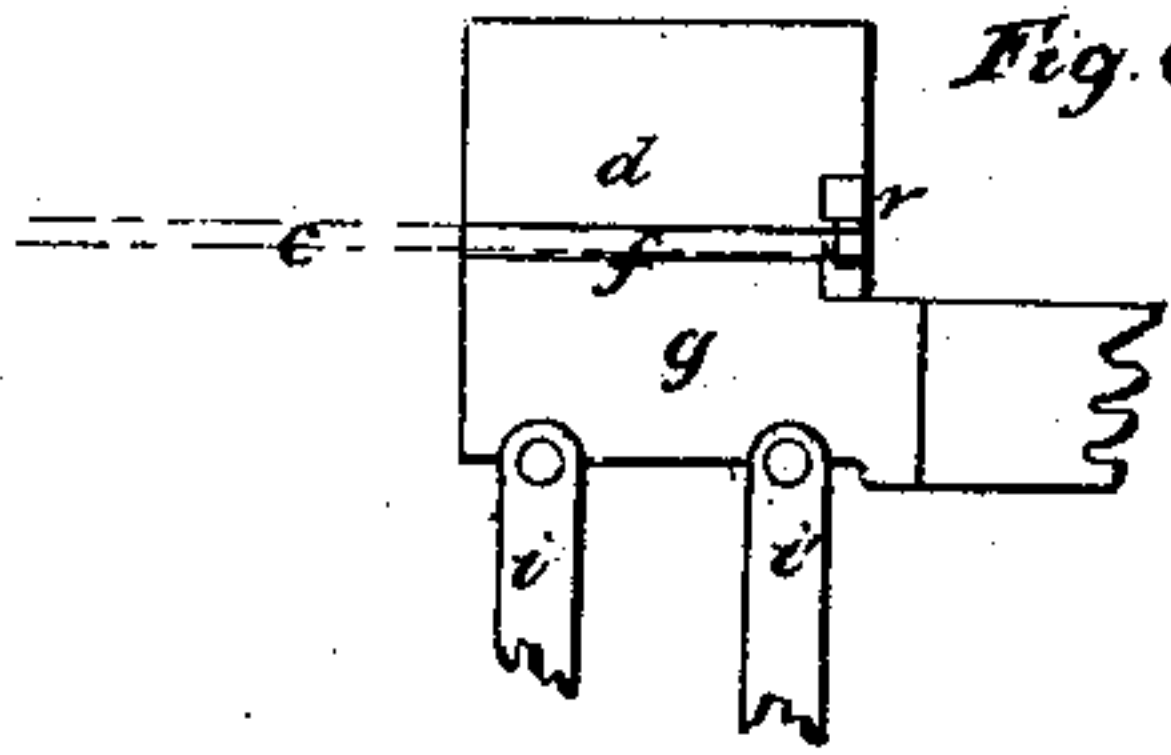


Fig. 7.



Fig. 8.

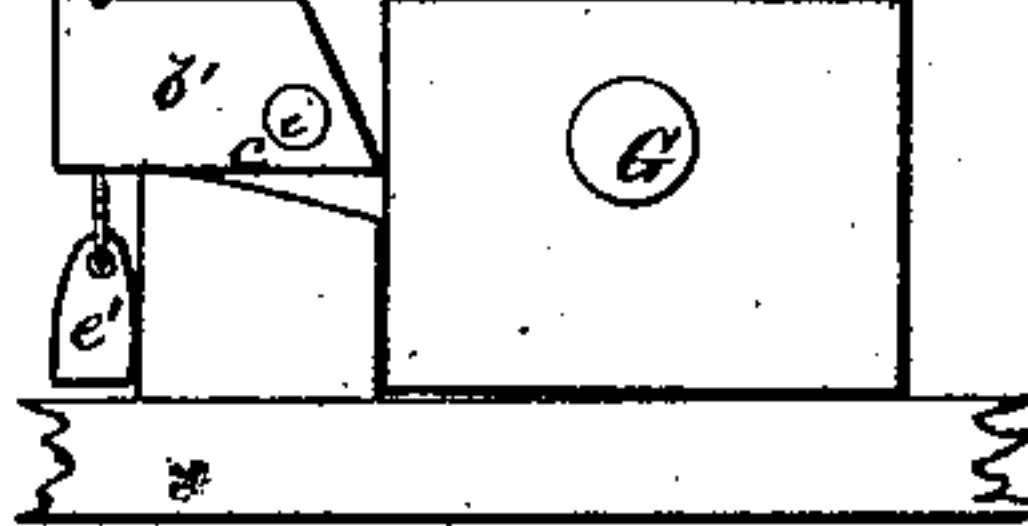


Fig. 3.

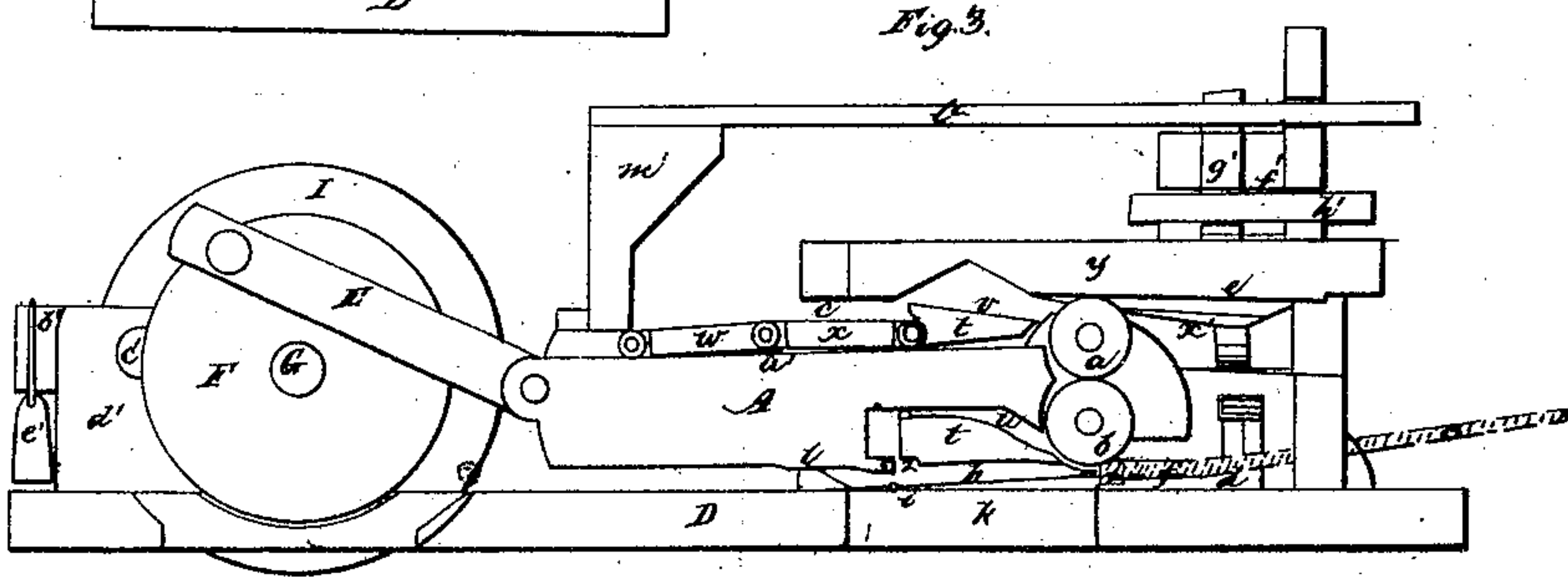
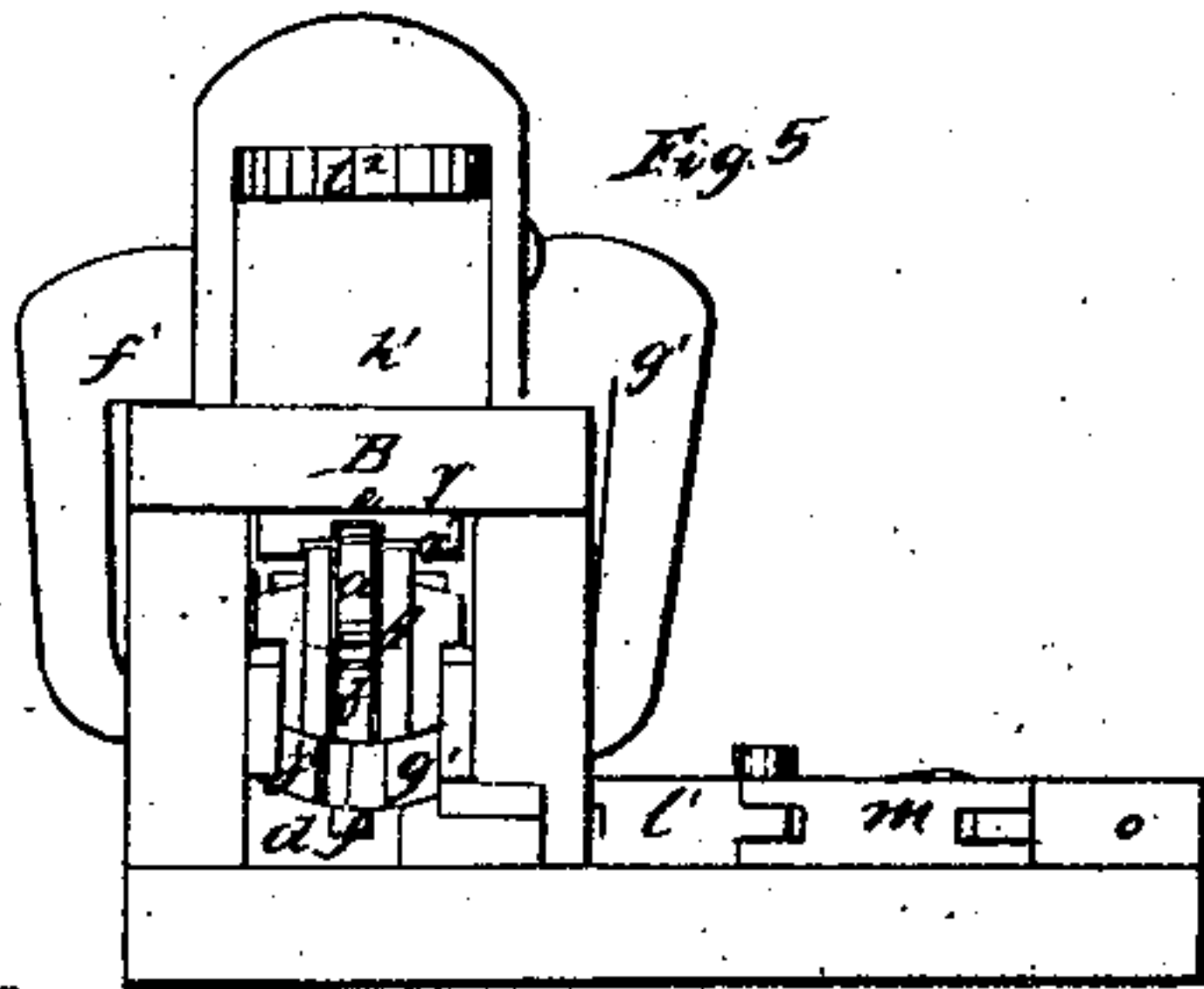


Fig. 5.



UNITED STATES PATENT OFFICE.

WILLIAM HATCH, OF MEDFORD, MASSACHUSETTS.

SPIKE AND NAIL MACHINE.

Specification of Letters Patent No. 4,668, dated July 28, 1846.

To all whom it may concern:

Be it known that I, WILLIAM HATCH, of Medford, in the county of Middlesex and State of Massachusetts, have invented a new and useful improvement in machinery for manufacturing spikes, nails, or various other contrivances of like character which may be successively made by the same; and I do hereby declare that the nature of my invention and the manner in which it operates are fully set forth and described in the following specification, accompanying drawings, letters, figures, and references thereof.

My machine is calculated to perform upon a heated rod of metal, the operations of dividing or cutting it off into lengths, necessary to form spikes, of rolling and pressing down two opposite sides of each of said lengths, to an angular point, of forming a head upon the end of each length, opposite to that on which the point is performed, and finally discharging the spike (when thus completed) from the machine.

For the purpose of particularly explaining the aforesaid machinery I shall proceed to describe the several parts composing it in the following order viz: First, those parts which receive the spike rod and point it. Second, those parts which hold it firmly and make a head upon it. Third, that part by which it is discharged from the machine. Fourth, that by which certain parts of the mechanism are protected from injury or strain arising from the operation of heading the spike. Fifth, that part by which the spike is separated or cut from the rod from which it is made.

Of the aforesaid drawings Figure 1 represents a top view of my improved machine for making spikes. Fig. 2 a side elevation. Fig. 3 a vertical and longitudinal section taken through the swaging roll and dies to be hereinafter described, and Fig. 4 is a vertical and transverse section taken through the said roll and dies, the said roll being moved forward so as to be between the middle of the said dies. Fig. 5 is an elevation of the front end of the machine. Such other figures as may be necessary to a full description and representation of the various parts will be hereinafter referred to and explained.

A, Figs. 1, 2, 3, 4, denotes a long carriage shaped generally as seen in the drawings, and properly supported within a frame B

so as to admit of its being moved forward and back in a longitudinal direction. The carriage is made to slide to and fro between guideposts C C bolted to the frame B and to the bed plate D, upon which the whole machinery is sustained.

G is a horizontal shaft supported in bearings H H applied to the tops of suitable standards raised upon the bed piece D. The said shaft has a driving pulley I placed on one end, and a crank or crank pulley F affixed upon its opposite end. To the said crank pulley and the carriage A a connecting rod E is jointed in such manner that when the shaft G is revolved it will impart a reciprocating rectilinear movement to the carriage A.

I shall now proceed to describe the mechanism by which the spike rod is moved and pointed. Fig. 6 denotes a horizontal section of the block or die *d* which receives the spike rod when it is introduced into the machine, and upon which the said rod rests when a spike is being formed. The said block is made somewhat longer than the length of the spike to be made upon it, and it has a right angular shoulder or space *f* cut down in it as represented in Figs. 5, 6. Another block or holding die *g* operates in connection with the block (*d*) and forms with the shoulder the boundary of the space within which the spike rod is inserted before it is operated on by the mechanism which points and heads it.

The front end of the carriage A sustains two rollers *a*, *b*, the one being placed directly over the other and with its periphery in contact with that of the other. The lower of the said rollers is intended to be rolled over the red hot spike rod, represented at *c* in Figs. 3, and 6, by red lines, and to press it down upon the bed piece *d* and to roll it into the angular shape required to produce a joint upon it. The bed *d* is shaped upon its upper surface to correspond with one of the curved sides of the spike. In order to form the upper curved side of the spike, the roller (*a*) is made to roll in contact with a stationary curved surface or cam plane (*e*) shaped longitudinally so as to correspond with the upper curved surface of the spike. Therefore when the carriage A is moved forward the roller (*a*) in moving over or against the said curved plane (*e*) will be depressed and will depress

the other roller (*b*) in a corresponding degree and thus in connection with the curved bed (*d*), the roller (*b*) will give the angular point to the spike. When the spike rod is introduced into the machine it is passed into the space (*f*) of the bed (*d*) until its end meets or abuts against the front end of a stop lever (*h*) which is arranged as seen in the drawings, and turns vertically upon a fulcrum at (*i*). It has a rectangular space *i'* see Fig. 7 (which denotes a top view of the lever (*h*) as detached from the mechanism) cut through it in a vertical direction, through which space and another *k* made through the bed plate D the spike drops after it has been headed as will be hereinafter described. The stop lever (*h*) is tilted upon its fulcrum (in order to raise its front end) by means of a cam or depression *l* suitably formed or made upon the lower side of the carriage A, the said depression or cam being made to depress the rear end of the stop lever, and by so doing raise its front end after the carriage A has been drawn back far enough to remove the spike from the bed plate or die (*d*). The mode in which such removal is effected, will be hereinafter described.

The next parts of the mechanism to be explained are those by which the spike is grasped, gripped or held firmly, and headed. As soon as the point has been formed or made upon the spike (which previous to being pointed, has been separated from the spike rod, as will be hereinafter described) the holding block *g* is forced laterally against the spike rod and so as to compress or grip it firmly between it (the block *g*) and the shoulder of the rest block (*d*).

The mechanism by which the block *g* is moved toward and from the rest block (*d*) is as follows. Toggle joints *l'*, *l'*, *m*, *m*, or progressive levers are applied to the block *g*, and between it, and an abutting block *o*, secured to the bed plate D, the said levers being properly jointed to the blocks *g* and *o*. They are operated by a connecting bar or rod *p* (jointed to them) and an eccentric or cam *q*, fixed upon the shaft G, the rod *p* being so adapted to the eccentric that the latter will move it back and forth at proper times as it is revolved by the shaft G. When the rod *p* is faced forward it causes the toggles *l' m l' m* to be brought into line with each other, and thereby move or crowd the block *g* against the spike resting upon the block adjacent to it, and thus holds the spike firmly between the two while it is headed. The rear part of the space within which the spike rod is introduced, terminates in a square cavity *r*, which in its transverse section is of the shape of that of the head to be formed on the spike. A small piston or heading tool *s* is fixed to the carriage A, as seen in Fig. 3, the said tool be-

ing made to conform to the cavity. When the carriage A is moved forward far enough the piston *s* is carried into the space *r* and in contact with the end of the spike rod and "upsets" it and forms the head. The spike rod is held down upon the bed (*d*), during the operation of heading by means of a die or frame *t* which is placed upon the carriage A, and so as to play somewhat loosely up and down thereon. In other words, the carriage A passes through a passage *u* made through the die *t*, which passage is deep enough to admit of a slight vertical movement of the die. The die also slides back and forth upon the carriage A, and is attached to it by two toggle joints *w* *x*. The top part of the die is made as an inclined plane as represented at *v*, and when the said die is forced forward to the extent of its motion, the said inclined plane *v* meets another and counter inclined plane *x'* secured to the underside of the top plate *y* of the frame B as seen in Fig. 3. The plane *x'* forces the die *t* down upon the spike, the lower part of the die being shaped so as to correspond with the curve or shape of the upper side of the spike. It is calculated that when the die *t* is forced down upon the spike resting upon the bed *d*, and comes to a stationary position, a small rectangular notch *z* (see Fig. 3) made in the rear part of the lower side of it, shall come directly over the space *r*, and in connection with said space complete the matrix, for the formation of the head of the spike. The two toggles, *w*, *x*, make a very obtuse angle to each other, in a vertical plane; their central joint being made to rest upon a small projection *a'* as seen in Fig. 3. After the die *t* has been thrown forward by the carriage A as far as is possible for it to be moved, it becomes necessary that the carriage A should still continue to advance in order to carry the plunger *s* into the space or matrix *r* and by so doing make the head upon the spike. The said advancement of the carriage A is permitted by the toggles *w*, *x*, which are thrown upward by the force which impels the carriage A forward. During the retraction of the carriage, the toggles or links *w*, *x*, fall down upon it and draw the die *t* from over the bed *d*. The spike is discharged or drawn out of the bed *d*, by means of the notch *z*, of the die *t*, the front part of which (notch), rests against the back part of the upper portion of the head. When the spike is extracted by the notch, it falls through the spaces *i'* and *k* and out of the machine.

The next improvement to be described is that by which we are enabled to prevent the mechanism from being strained or injured during the operation of heading the spike.

In Figs. 1, 2, 3, *b'* denotes a short lever turning upon a fulcrum *c'* supported by a

fixed standard d' . The front end of the lever is beveled off or makes an acute angle with the lower edge of it, as seen in Fig. 8, which denotes a vertical and longitudinal section of the lever, and the support or bearing H in front of it. The said bearing or support rests against the vertex of the angular end of the lever, which vertex is arranged somewhat below the fulcrum of the lever. The mechanism by which the box or bearing or standard, upon which it is sustained, is confined to the bed plate D, should be such as will permit of a slight longitudinal movement of the standard or box either toward or from the lever b' . A weight e' is hung upon the rear end of the lever b' . It may sometimes happen that there may be a surplus of metal within the matrix r , or more therein than is absolutely necessary for the formation of the head of the spike. When such occurs the head would be made somewhat thicker than it otherwise would be. This extra thickness would create an extra strain upon the mechanism by which the heading operation is performed, and in order that no injury might result to it, in consequence of such strain, the counterpoise e' should be of such weight as to hold the lever down until the head of the spike has been formed, and thus permit the extra strain to operate upon the box H in such manner as to move it back a little. When the box so moves back, the rear end of the lever b' will rise upward.

The next part of the mechanism is that by which the spike is separated from the rod from which it is made. This consists

of two lever cutters $f' g'$, whose edges play together like the blades of shears.

They are arranged and shaped and turn upon a common fulcrum h' as seen in the drawings. The upper end of each is inserted and moves in one of two slots $i' k'$ made through a plate l^2 , the shape of said slots being as represented in the drawings. The said plate l^2 is sustained at its rear end upon a standard m' projecting upward from the carriage A, so that when the said carriage is moved to and fro it imparts a simultaneous movement to the plate l^2 . By such movements of the plate l^2 the cutters are opened and closed.

Having thus described my invention that which I claim is—

1. The combination of the holding die t with the carriage A, in the manner set forth, whereby the said die and carriage are operated together as above specified.

2. I also claim the combination of the weighted lever b' with the box or support H of the shaft G, the same being for the purpose of preventing injury to the mechanism by extra strain occasioned in the formation of the head of a spike, as above represented.

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

WILLIAM HATCH.

Witnesses:

R. H. EDDY,
RUGGLES STARK.