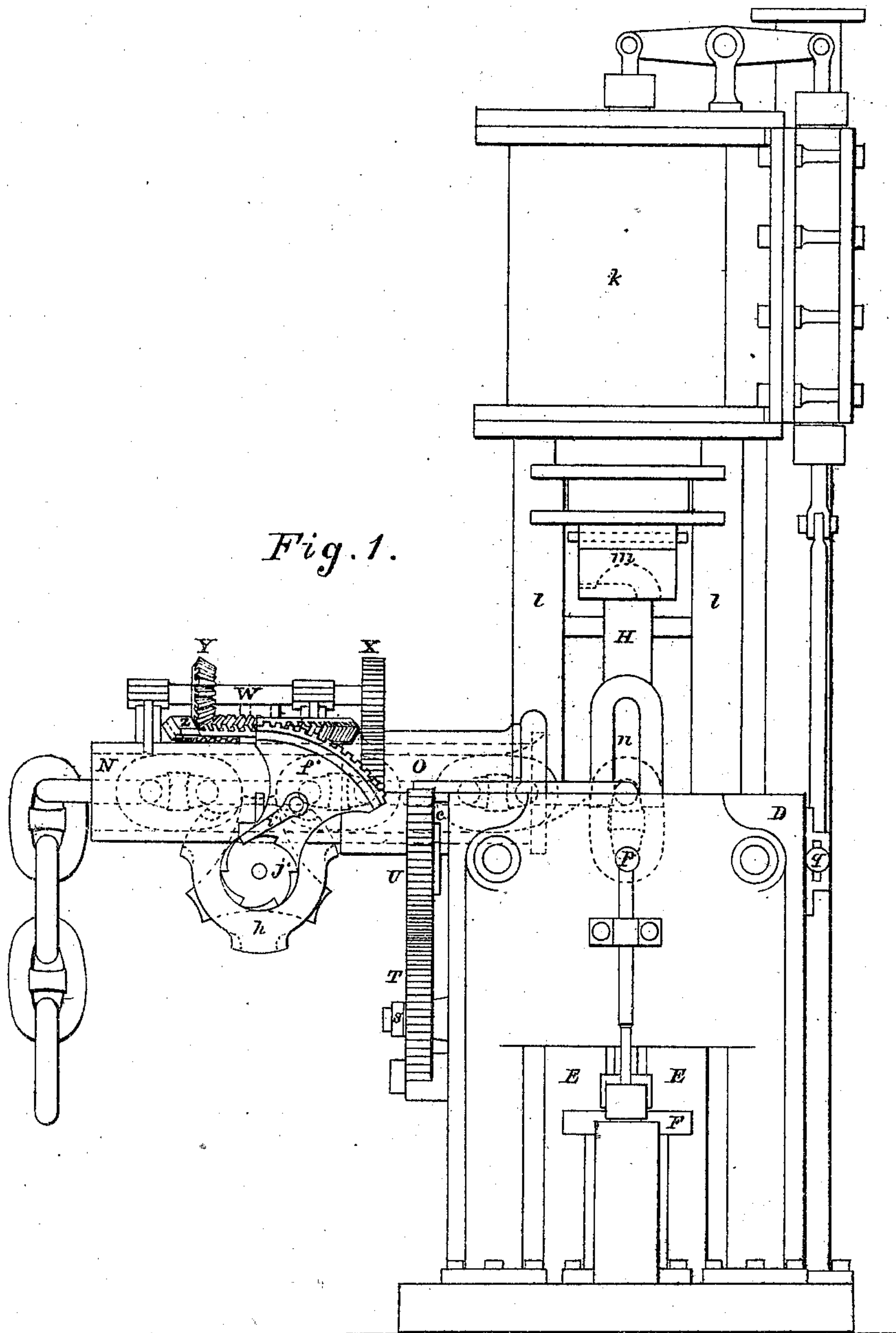


W. Dennison.
Chain Machine.

No. 97,173.

Patented Nov. 23, 1869.



Front Elevation.

Witnesses -

Franklin Dennison.
H. B. Dennison.

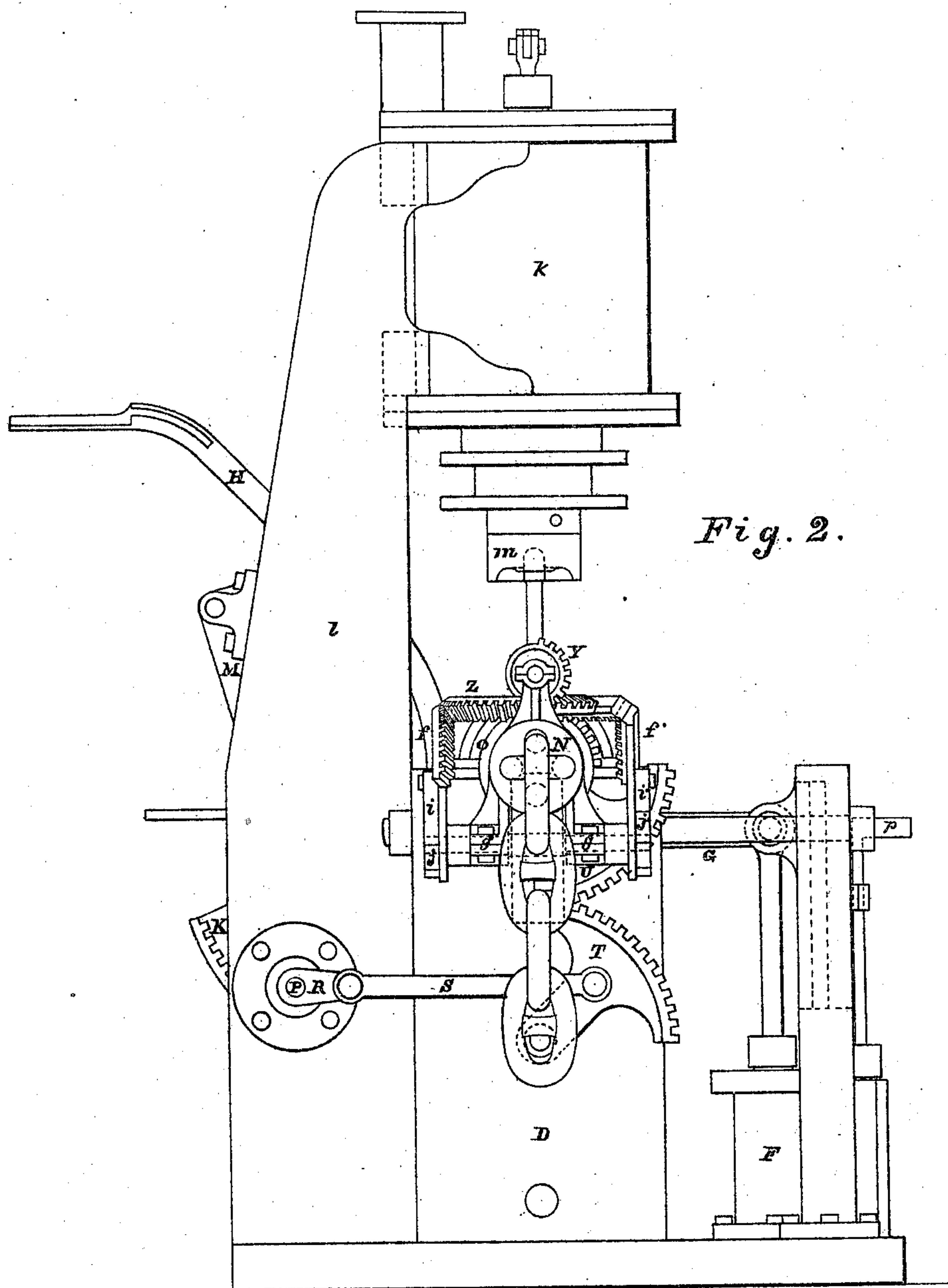
Inventor,

William Dennison.

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Side Elevation.

Witnesses—

Franklin Dennison,
H. B. Dennison.

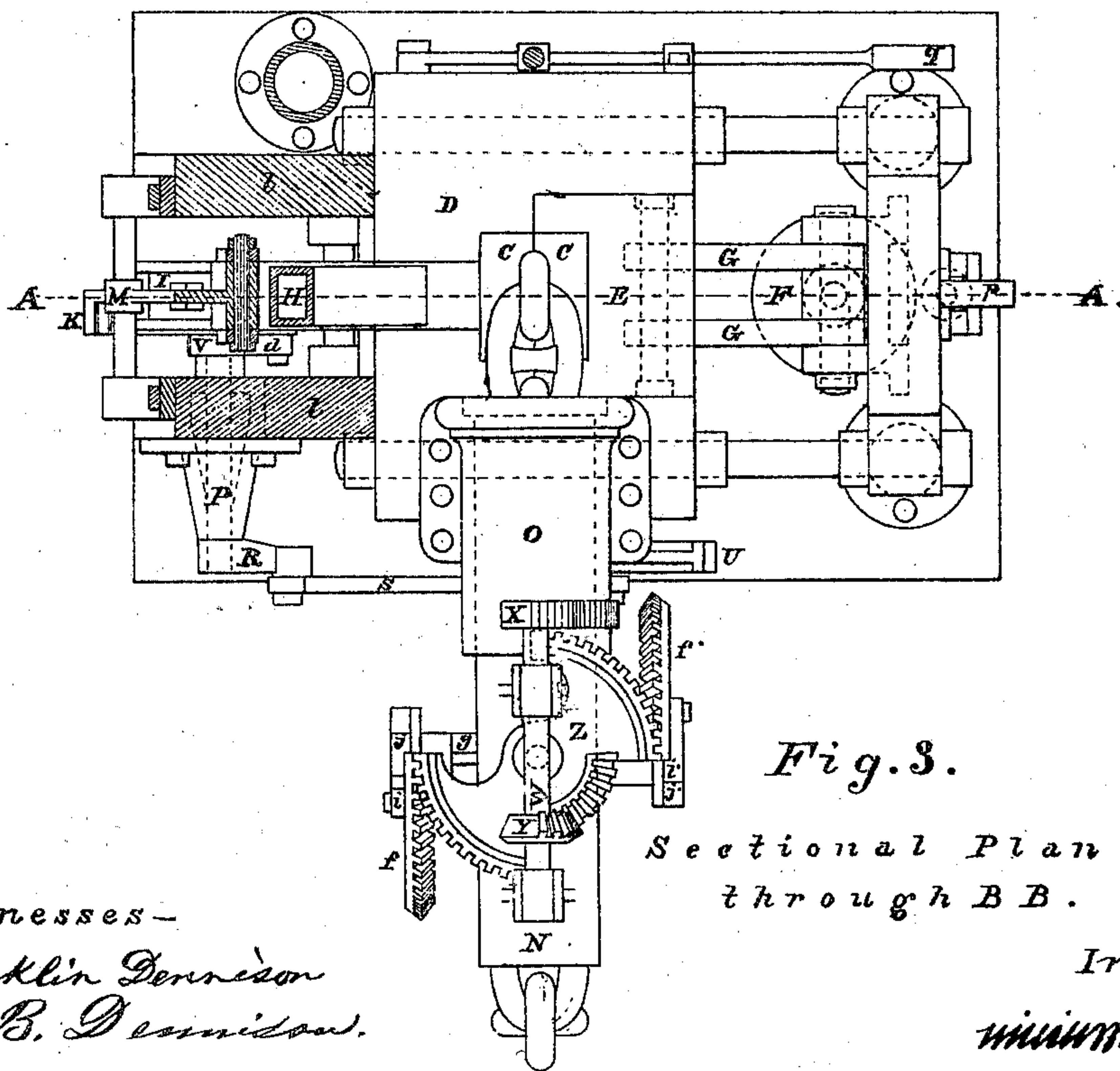
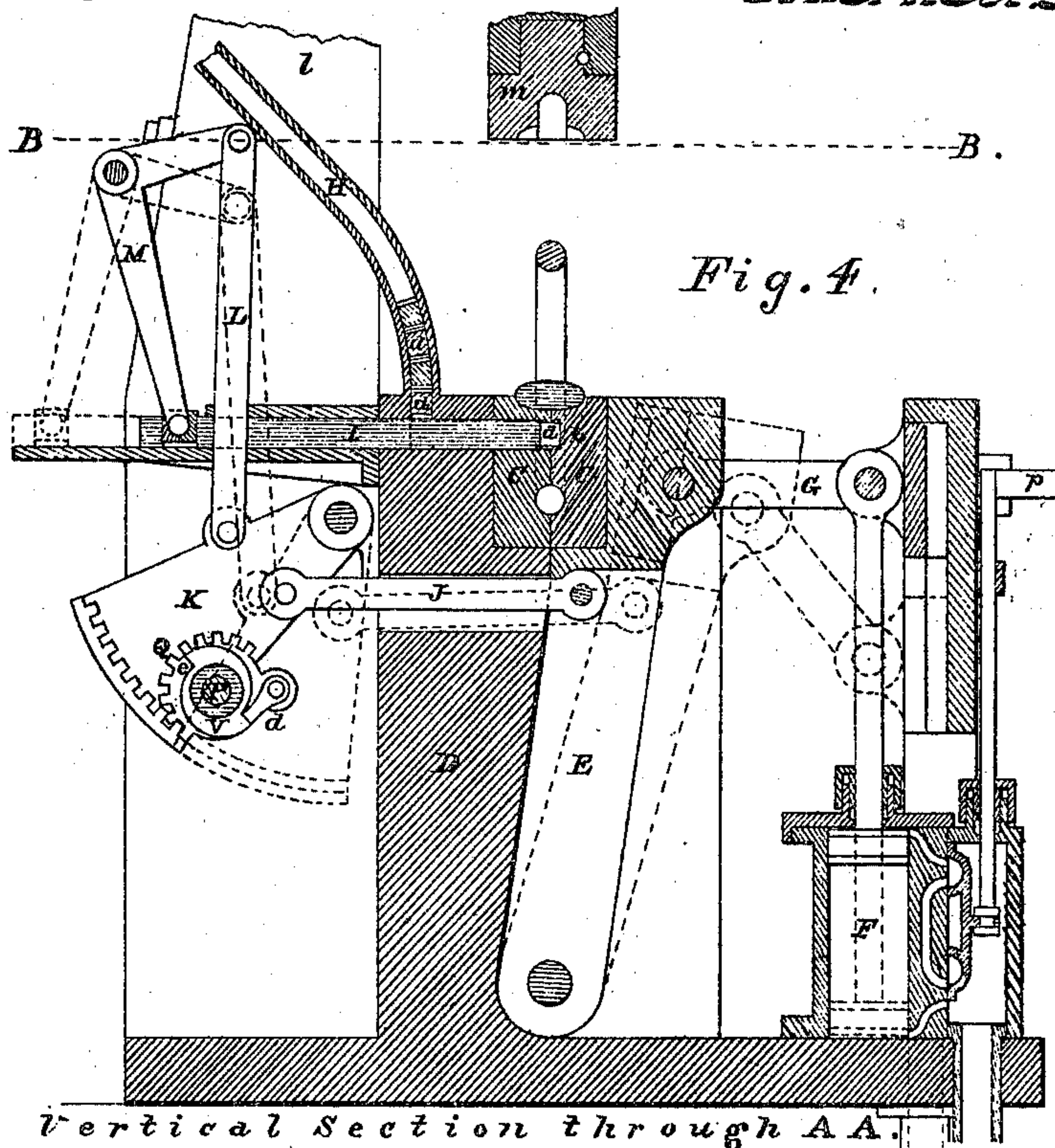
Inventor,

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United States Patent Office.

WILLIAM DENNISON, OF CAMBRIDGE, MASSACHUSETTS.

Letters Patent No. 97,173, dated November 23, 1869.

IMPROVEMENT IN MACHINES FOR MAKING CHAINS.

The Schedule referred to in these Letters Patent and making part of the same

To all whom it may concern:

Be it known that I, WILLIAM DENNISON, of Cambridge, in the county of Middlesex, and State of Massachusetts, have invented a new and useful Improvement in Machines for Making Chain; and I do hereby declare the following to be a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, making part of this specification, in which—

Figure 1 is a front elevation of the machine, showing the position of the chain when in course of construction.

Figure 2 is a side elevation of the same.

Figure 3 is a sectional plan through B B of fig. 4.

Figure 4 is a vertical section through A A of fig. 3.

The same letters, in the different figures of the drawings, indicate the same parts.

The object of my invention is to manufacture better and stronger chain, at less cost than it is now made. By doing so, it would introduce its use for many purposes, where its appropriate use is now much debarred on account of its high cost. I propose to make chain by machinery, in such a way as to finish the links at once, leaving them smooth and perfect, no marks of the hammer upon them.

This machine is designed for making chain with or without bridges, by forcing the links, when heated to a welding-heat, into dies, the cavity in which to be made to the form of the link required. These dies, C C, are to be secured in the top of a cast block, D, which we will call an anvil-block.

A part of this block is made to separate at the division-line between these dies C C, and to be supported and turn on a shaft at its lower end, as seen at E, fig. 4, which we will call a vise.

This vise E is made to open and close, by means of a small steam-cylinder, F, being connected to the piston-rod of the cylinder by the rods or bars G. The dotted red lines show their position when the vise is open.

The vise E, when closed, is held in position through the bars G, by a cross-plate, in which the cross-head of the piston-rod slides. It is supported on columns at the bottom, and secured by bars or rods to the anvil-block at the top.

The bridges *a* are made in the usual way, and are placed in the tube H, from which they are carried and secured within the dies C, by means of the follower I, which receives its motion from the working of the vise E, being connected by the rod J, segment-gear K, rod L, and angle-lever M. By opening the vise, these several parts will assume the position shown by the dotted red lines, fig. 4, when a bridge will fall in advance of the follower I, from the tube H, and (by shutting the vise E) will be carried forward through the passage in which the follower I passes, and be firmly secured within the dies C at *b*, fig. 4.

As the chain is made, it passes through an opening in the cylinder N, formed to suit the chain, by which the chain is fed along and turned over one-quarter turn, so as to place the chain in proper position to receive the next link. It is first turned one way, then the other, to prevent the chain from being twisted.

The cylinder N is secured in position by the cylinder or box O, (in which it turns,) which is secured to the anvil-block D.

The cylinder N is turned by the shaft P, shown by the dotted lines, fig. 3.

Upon the inner end of this shaft is a half-pinion wheel, Q, fig. 4, working in the segment-gear K.

On the outer end of this shaft is a crank, R.

From this crank is a rod, S, connecting it to the segment-gear T, working in the segment-gear U, which is secured fast to the cylinder N by an arm working through a slot in the under side of the cylinder O at *c*, fig. 1.

Upon the shaft P, alongside of the pinion-wheel Q, is secured a ratchet-wheel or clutch, V, figs. 3 and 4.

Its catch or pawl, *d*, is secured to the pinion-wheel Q, which is to turn loose upon its shaft.

Now, by opening the vise E will, by means of the connections J and K, turn the pinion-wheel Q one-half round, when the pawl *d* will catch in the opposite side of the ratchet V at *e*, the ratchet-wheel V not having turned. Now, by shutting the vise E, the motion of the pinion-wheel Q will be reversed, and will turn the ratchet, its shaft, and crank, one-half round, which will, through the rod S, turn the segment-gears T and U to the opposite side, thus turning the cylinder N, with the chain, one-quarter over. It will be seen that the chain is turned only when the vise is being shut; but it can be turned when being opened, if found to be preferable, by simply reversing the ratchet-wheel V upon its shaft.

The chain is fed or moved along, through the cylinder N, by a shaft, W, which turns in boxes cast or secured to the cylinder N, and turns with it.

Upon one end of this shaft is secured a pinion-wheel, X, which works in gear-teeth cast on the cylinder O.

Upon the other end of this shaft is secured a bevel-pinion wheel, Y, working in the inner segment of the gear Z, which has three segments of a gear cast together, and turns on a pin or journal, cast on the cylinder N.

The two outer segments of this gear are opposite each other, and work in the segment-gears *f f'*, which are supported, at each side of the cylinder N, by a shaft turning in boxes *g g*, which are cast or secured to the under side of the cylinder N, and therefore turn with it.

In the centre of this shaft is secured a chain-wheel, *h*, which passes through an opening or slot formed in the cylinder N. This chain-wheel *h* has its periphery

so formed as to pass between the links of the chain, so as, when it turns, the chain will be passed along.

The segment-gears $f'f'$ turn on their shaft in passing back, but are turned with it, when moving forward, by the pawls $i' i'$, secured to the segment-gears $f'f'$, and ratchets $j' j'$, which are secured to the shaft.

Now, as the cylinder N be turned, the gear-teeth upon the cylinder O being fixed stationary, the pinion X, shaft W, bevel-pinion Y, segment-gear Z, and segment-gear f' , will turn and pass the chain along by the ratchet and pawl j' and i' , while the segment-gear f' will be turned back. But when the cylinder N be turned back, the motion of these several parts will be reversed, when the segment-gear f' will carry the chain forward, and the segment-gear f' back, and so on, alternately.

The links are forced into the dies C by a press or hammer, worked by steam or any other power. A steam-cylinder, k , is supported above the anvil-block D and centre of the dies C, by columns $l l$, which are strongly secured to the anvil-block. This cylinder k , with its steam-chest and all its movable parts, is constructed similar to the steam-hammers now in use, and is to be used both as a press and hammer.

Upon the lower end of the piston-rod, or hammer-face, is secured a die, m , formed to fit over the link to be welded, and the link through which the link is to be welded.

The links are to be prepared for the machine by being bent to the form shown at n , fig. 1, which can be done by machines for that purpose now in use.

The machine is operated as follows:

By the handle p of the valve-rod, steam is admitted to the cylinder F, which closes the vise E.

At the same time, a bridge, a , is carried to and secured within the dies C, and by the hand-lever q , steam is admitted to the cylinder k , which raises the press or hammer with the die m . The position of these parts will then be as shown by the drawings. A link, heated to a welding-heat, will now be placed over the opening in the dies C, in the position shown at n . Then, by the hand-lever q , steam is admitted to the cylinder k , and its pressure will force the link into the dies around the bridge, but if not with sufficient force as to make a perfect weld, it can be given one or more blows with the die m , as a hammer.

The vise E will now be opened, by admitting steam to the cylinder F by the handle p , which operation will carry the follower I back and receive another bridge. At the same time the pinion-wheel Q, with its pawl d , will be turned to the opposite side of the ratchet

V, where it will catch on being turned back. Now, by shutting the vise E, a bridge will be carried within the dies. At the same time, the chain will be turned by the cylinder N, and carried forward by the wheel h , which will place the chain upon the anvil-block, in a proper position to receive the next link, which will be forced into the dies, as before.

The first three or four links of a chain will be removed from the dies and placed in position on the anvil-block by hand, until the length is sufficient to reach the chain-wheel h .

When chain is to be made without being bridged, the rods L will be disconnected, and the dies C made without an opening to receive them. The operation in making such chain will then be the same as above described.

Having thus fully described my invention,

What I claim as new therein, and desire to secure by Letters Patent, is—

1. The method herein described, of welding and forming chain-links, that is to say, by forcing them into dies C C by means of die m , as herein described.

2. The combination of dies C C, with bridge-slot within, substantially as set forth.

3. The segment-gear K, rods L, angle-lever M, follower I, and tube H, all arranged as shown, in combination with dies C C, as and for the purposes set forth.

4. The combination of the cross-slatted cylinder N, with mechanism, substantially as set forth, for rotating it, and moving the chain intermittently, as the same is formed.

5. The combination of the vise E, connecting-rod J, segment-gear K, pinion Q, ratchet V, pawl d , shaft P, crank R, rod S, segment-gear T, with segment-gear U, attached to the cylinder N, in the manner and for the purpose set forth.

6. The wheel h , gears $f'f'$ Z Y X, cylinder O, ratchets $j' j'$, pawls $i' i'$, in combination with the cylinder N, constructed in the manner and for the purpose set forth.

7. The vise E, dies C C m , tube H, follower I, cylinder N, and wheel h , combined in the manner and for the purpose substantially as described.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

WILLIAM DENNISON.

Witnesses:

H. B. DENNISON,

J. W. HAMMOND.