

B. HERSHEY.

MACHINES FOR WELDING AND FINISHING CHAIN-LINKS.

No. 193,083.

Patented July 17, 1877.

Fig. 1.

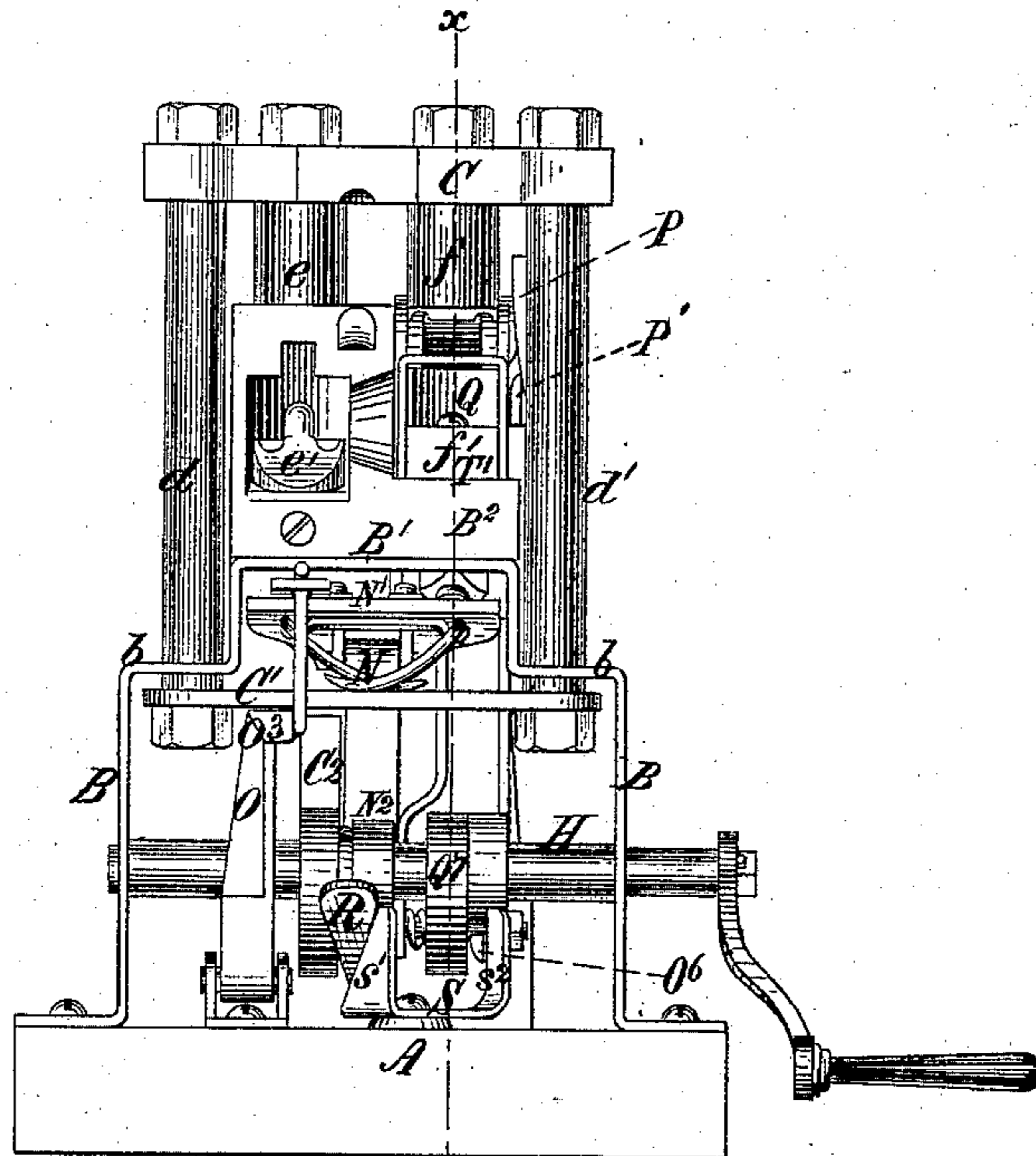
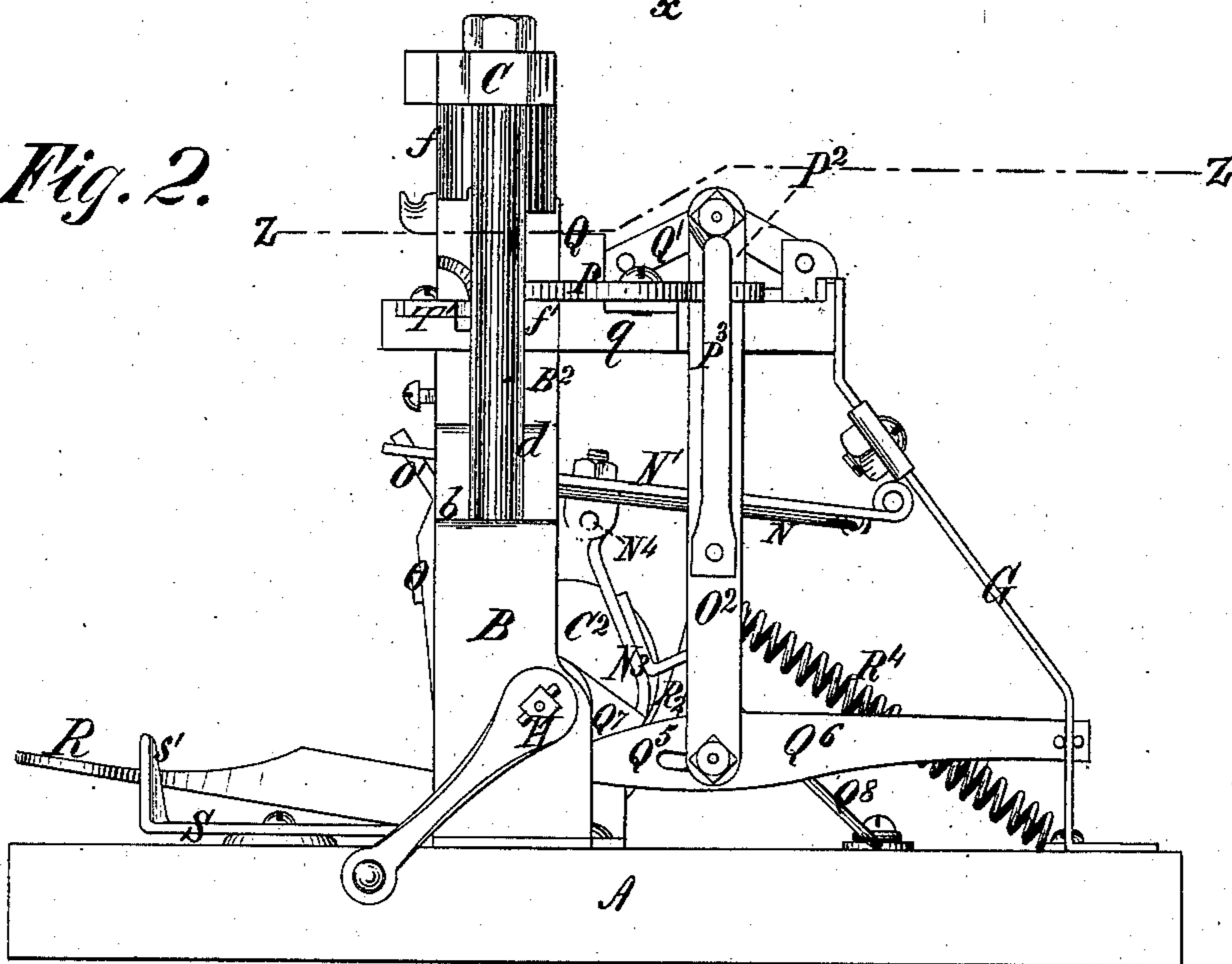


Fig. 2.



Witnesses:

Millard Farr.

Geo. H. Miatt

Inventor:

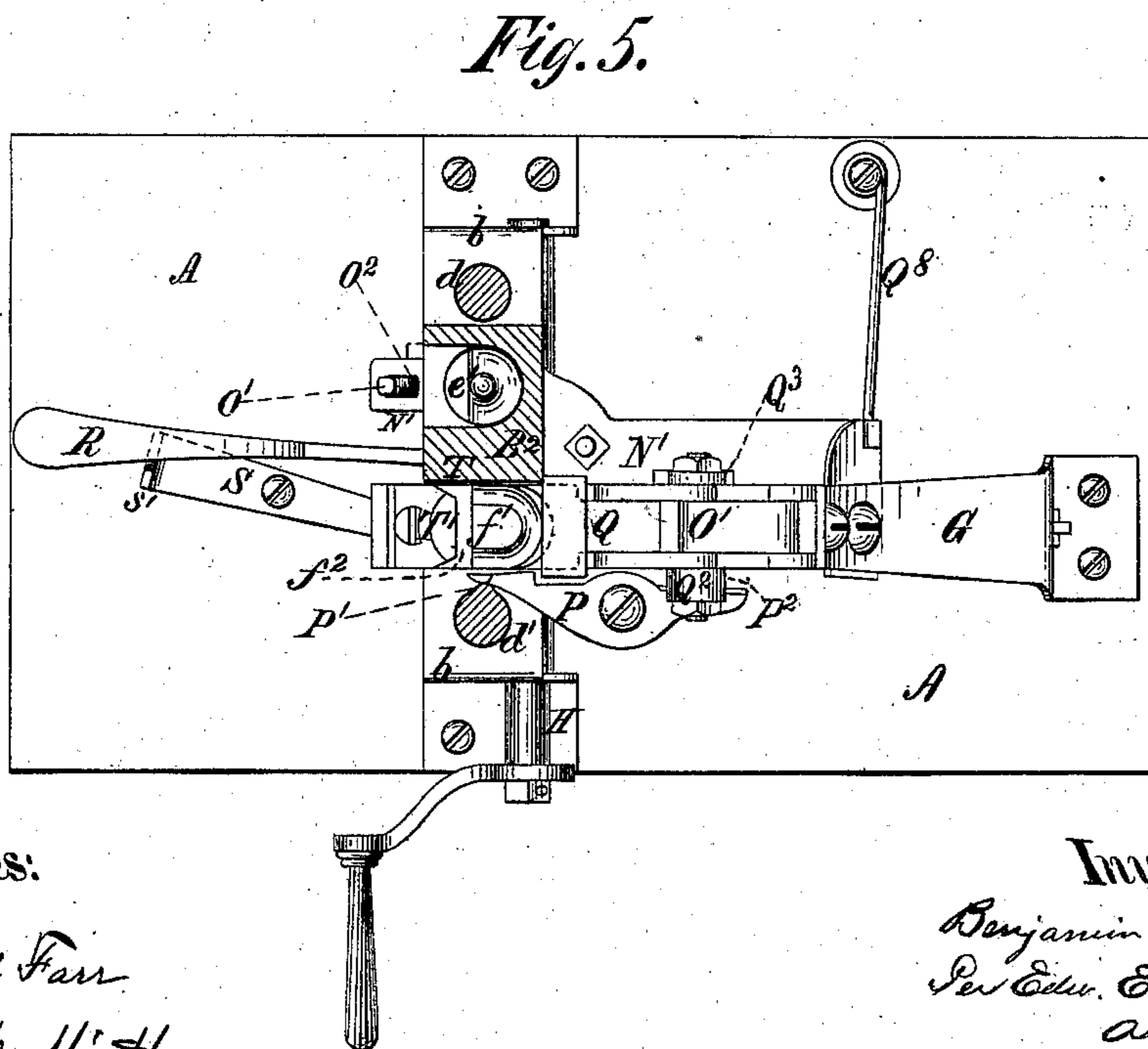
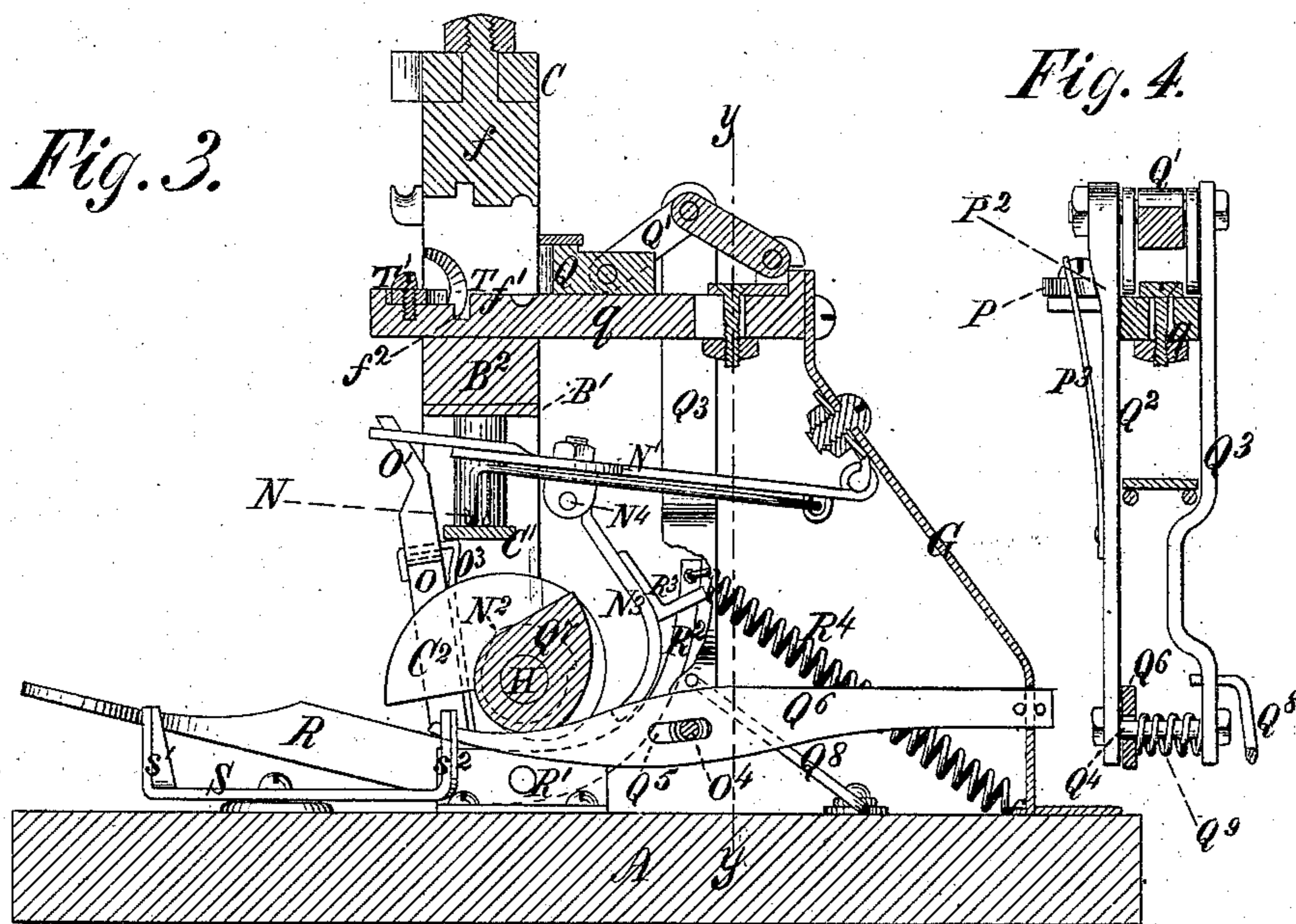
Benjamin Hershey
Per Edw. E. Quincy
att'y.

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Geo. H. Miatt

Inventor:

Benjamin Hershey
Per Edw. E. Zumbly
atty.

Per Editor. E. Zumbly
atty.

at

UNITED STATES PATENT OFFICE.

BENJAMIN HERSHEY, OF ERIE, ASSIGNOR TO PITTSBURG CHAIN AND CAR LINK MANUFACTURING COMPANY, OF NEW BRIGHTON, PENNSYLVANIA.

IMPROVEMENT IN MACHINES FOR WELDING AND FINISHING CHAIN-LINKS.

Specification forming part of Letters Patent No. 193,083, dated July 17, 1877; application filed June 20, 1877.

CASE A.

To all whom it may concern:

Be it known that I, BENJAMIN HERSHEY, of Erie, Pennsylvania, have invented certain Improvements in Machines for Welding and Finishing Chain-Links, of which the following is a specification:

My improvements relate to machines for welding and finishing chain-links.

My invention embraces a peculiar system of combined swaging and compressing dies for giving the final form to a chain-link after it has been welded in swaging-dies resembling those described in the Letters Patent of the United States No. 166,372, issued to me as assignor, &c., August 3, 1875.

My invention also consists in the peculiar organization of the machine, in which the welding-dies and my new finishing-dies are combined, as a result of which the machine is simplified in construction, and its convenience of operation is greatly facilitated.

The accompanying drawings are as follows: Figure 1 is a front elevation of the machine, showing the drop frame or gate which carries the drop-dies in the elevated position which it assumes, and in which it is sustained by a stop when the parts are thrown out of engagement with the cams on the driving-shaft. Fig. 2 is an elevation on the side where the power is applied. Fig. 3 is a longitudinal vertical section through the line *x x* on Fig. 1. Fig. 4 is a transverse longitudinal section through the line *y y* on Fig. 3, showing the toggle-joint for reciprocating the endwise-compressing die Q. Fig. 5 is a longitudinal section of the machine through the line *z z* on Fig. 2.

Referring to the drawings, it will be seen that the bed-plate A affords support for the upright frame, consisting of the standards B B and the cross-piece B¹.

The standards B B are provided with horizontal bearings for the cam-shaft H, and have, near the top, offsets *b b*, which afford vertical bearings for the gate-bars *d* and *d'*.

The gate is composed of the vertical bars *d* and *d'*, which are bolted at the top to the cross-piece C, to which the swaging-dies *e* and *f* are secured. At the lower ends the gate-bars *d* and *d'* are bolted to the cross-piece C¹,

which receives the thrust of the lifting-cam C², which operates to raise the gate preparatory to letting the drop-dies *e* and *f* fall upon the stationary dies *e'* and *f'*.

The stationary dies are screwed to the die-holder B², which is supported upon the cross-piece B¹ of the frame. Torsion-springs N are introduced above the cross-piece C¹ of the gate, for the purpose of giving additional force to the gate in its downward movement.

The stop-lever O is pivoted at its lower end to the bed-plate A. Its upper end is bent outward, as shown at O¹, Fig. 3, and passes through a slotted opening, O², in the hinged plate N¹, to the under side of which the torsion-springs N are affixed.

By the upward movement of the plate N¹ the upper end O¹ of the stop-lever is pulled toward the gate, and a spring-latch, O³, is thus brought under the cross-piece C¹, and prevents the descent of the gate when the machine is not in use.

In the general arrangement of the parts so far referred to, the machine in its organization resembles that shown and described in the Letters Patent No. 166,373, granted to me August 3, 1875.

In the present machine, however, I provide two sets of dies—welding-dies and finishing-dies. The welding-dies are composed of the swaging-die *e* and the stationary die *e'*, and are substantially like those heretofore used by me, and described in my various Letters Patent.

The finishing-dies *f* and *f'* act in conjunction with the compressing-dies, by the operation of which the link, at the instant before it is struck by the drop-die *f*, is compressed both endwise and sidewise. The sidewise compression of the link is imparted by the rocking die P, one end of which is forced toward the die by the wedge P¹, affixed to the side of the gate-bar *d'*, while, at the same time, the opposite end of the rocker P is pressed outward by the wedge P² on the side of the pitman Q². A spring, P³, holds the inner end of the rocker P against the side of the pitman Q² and wedge P². The endwise compression of the link is effected by the reciprocating con-

cave-faced die Q, which is operated by the toggle-joint Q¹. The necessary movement to the toggle-joint is given by means of two parallel pitmen, Q² and Q³, which are pinned together at their lower ends by the pin Q⁴, which passes through the slot Q⁵ in the cam-lever Q⁶. This cam-lever is pivoted to the rear-standard G, which is affixed to the bed-plate at the rear of the machine, and which is bent inward, and at its upper end affords a support to the bed q, upon which the toggle-joint Q¹ and the compressing-die Q are supported.

The toggle-pitmen Q² Q³ are pulled downward by the action of the cam-lever Q⁶; but when the cam-lever Q⁶ is released from the cam Q⁷, the toggle-pitman is thrown upward (thus withdrawing the die Q) by the action of the torsion-spring Q⁸, one end of which is affixed to the bed-plate A, while the other end engages the pitman Q³.

The cam-lever Q⁶ is capable of a slight lateral motion, so that when not in use it can be thrown out of gear with the cam by the action of the spiral spring Q⁹ on the pin Q⁴.

The torsion-springs N are secured on the under side of the plate N¹, the rear end of which is pivoted to the back standard G. The spring-plate N¹ is pulled downward when the machine is in operation by the cam N² acting upon the crooked arm N³, which is secured to the spring-plate N¹ by the pivot N⁴. The spring-plate arm N³ is pulled forward into position to be acted upon by the cam N² by means of the foot-lever R, which is hung upon the pivot R¹, immediately under the cam-shaft H.

The back end R² of the foot-lever is bent upward, and passes through an eye or slot in the plate R³, which is secured to the spring-plate arm N³.

The spiral spring R⁴ is secured to the bed-plate at one end, and to the upper end of the foot-lever R², and tends to pull the end R² backward, and thus to pull the arm N³ out of the range of motion of the cam N².

When the outer end of the foot-lever R is pushed downward the side of the foot-lever acts upon the inclined side of the end s¹ of the rocker S, the opposite end of which, s², strikes against the side of the cam-lever Q⁶, and tends to throw the cam-lever under the cam Q⁷, in position to be engaged and forced downward by the cam in its revolution.

It will be seen that in the machine which forms the basis of my present application, which I have designated "Case A," the link, after being welded in the welding-dies, is finished by being subjected to the combined action of swaging-dies and both endwise and sidewise compressing dies.

I have made a separate application, of even date herewith, which I have designated "Case B," for a patent for a chain-link machine in which the preliminary welding operation is dispensed with, the link being welded and finished simultaneously by the combined opera-

tion of swaging-dies for welding and an endwise-compressing die, which is deeply recessed, and, by means of its projecting side wings, administers sidewise as well as endwise compression to the link.

In the present case the endwise-compressing die has no projecting side wings, and does not act upon the sides of the link, the sidewise compression being effected by the action of the rocking die P.

In the present case the link is supported against the sidewise thrust of the rocking die P by the opposite wall T of the finishing-die chamber. The link is supported against the thrust of the endwise-compressing die Q by the back rest T', which is bolted to the front end of the stationary finishing die f¹, and presents a concave shoulder to receive the end of the link. The stationary die f¹ is provided with a transverse slot, f², to provide for the reception of the chain-link upon which the link about to be finished is hung.

To operate my machine the foot-lever R is depressed. The downward movement of the foot-lever, acting through the rocker S, throws the cam-lever Q⁶ under the cam Q⁷, and pulls forward the torsion-spring-plate arm N³ in position to be acted upon by the cam N². The cam N², in its revolution acting upon the arm N³, pulls the torsion spring-plate N¹ down, and compresses the ends of the torsion-spring N upon the cross-piece C¹ of the gate. By the downward movement of the torsion spring-plate N¹ the inner end of the slot O², acting upon the inclined upper end O¹ of the stop-lever, pushes the stop-lever outward, and pushes the spring-latch O³ beyond the plane of movement of the cross-piece C¹, thus permitting the gate to rise and fall with each revolution of the lifting-cam C².

The link to be welded is introduced into the welding-dies before the foot-lever is depressed, and after the link has been subjected to the requisite number of blows the foot of the operator is removed from the foot-lever, which rises, and thus permits the stop-lever to act in preventing the further descent of the gate, while the operator removes the link from the welding-dies to the finishing-dies. When this removal has been effected the lever is again depressed, and the drop-die f falls upon the link at the instant after the rocking die P has compressed the link sidewise against the wall T of the finishing-die chamber, and the reciprocating die Q has compressed it endwise against the back rest T'.

In making certain sizes of chain it is desirable to have a little extra room in the chamber where the links are welded. I am enabled to have this extra room in my welding-die chamber, because of my provision for the supplementary operation of reducing the link in the finishing-dies to the exact width and length required. The endwise and sidewise compression corrects any expansion of the link which may have been effected by the action of the welding-dies.

My end-compressing die Q performs the further office of compressing those parts of the weld-joint which are not subjected to the direct vertical action of the swaging-dies *f* and *f*¹.

I claim as my invention, in an organized machine for welding and finishing chain-links—

1. The series of dies shown and described, consisting of the welding-dies *e* and *e'* and the finishing-dies *f* and *f*¹, Q, T', and P, constructed and operating substantially as set forth.

2. The swaging-dies *f* and *f*¹, in combination with the endwise-compressing die Q, and the back rest T', and the sidewise-compressing die P, and the side wall T of the die-chamber.

3. The finishing-dies composed of a supporting or stationary die and the drop-die, in combination with endwise and sidewise compressing dies, substantially as shown and described.

4. The foot-lever R, in combination with a rocker, S, and pivoted arm N³, for the purposes of throwing the cam-lever Q⁶ into position to be acted upon by the toggle-cam Q⁷, and simultaneously bringing the arm N³ into the range of motion of the spring-plate cam N², and thus enabling the cam N² to depress the spring-plate N¹, and thereby bring the spring N into action, and dislodge the stop-latch O³ from the under end of the die frame or gate, substantially as set forth.

5. The toggle-cam Q⁷, in combination with the pitmen Q² and Q³, the latter provided with the wedge P², by the operation of which the toggle-die Q and the rocking die P are simultaneously brought into action, substantially as described.

BENJAMIN HERSHEY.

Witnesses:

WM. WARWICK,
GEO. L. SMITH.