(No Model.) 2 Sheets—Sheet 1.

A. BEAUDRY.

POWER HAMMER.

No. 281,001. Patented July 10, 1883.

Fig. 1.

Reduced.

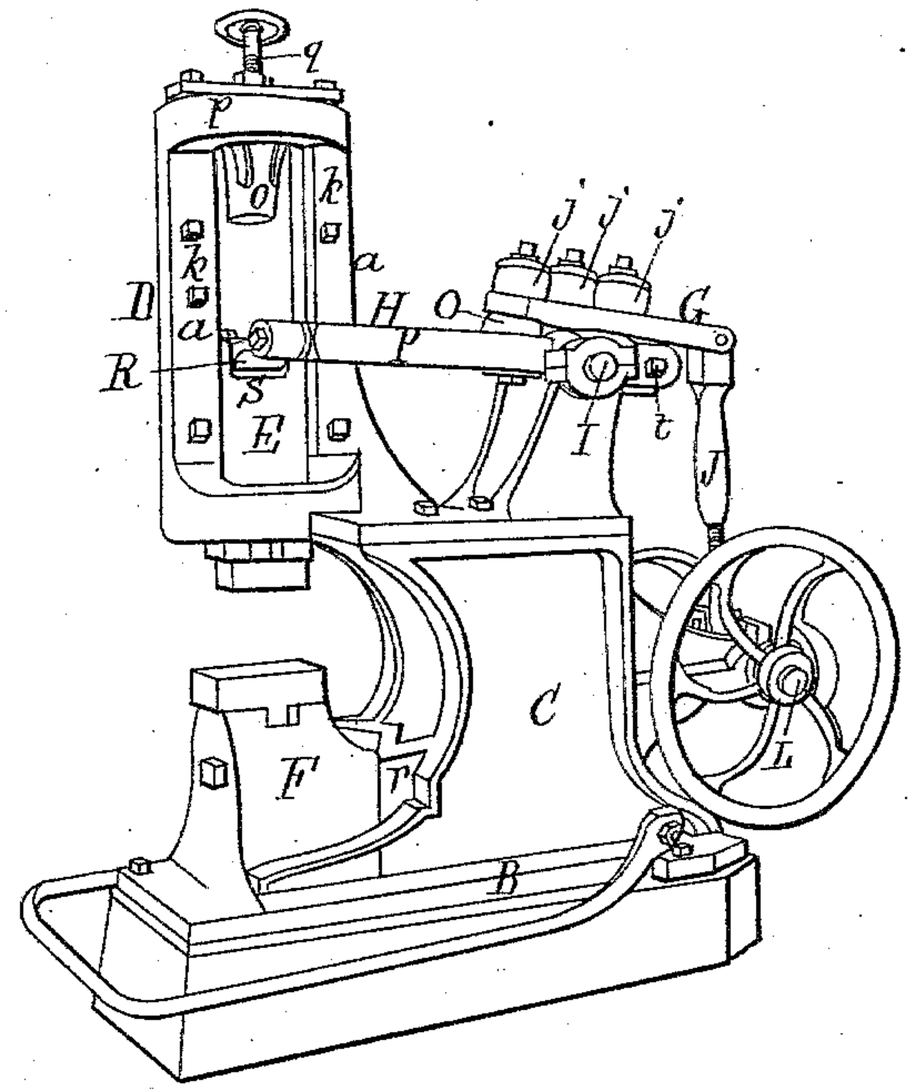
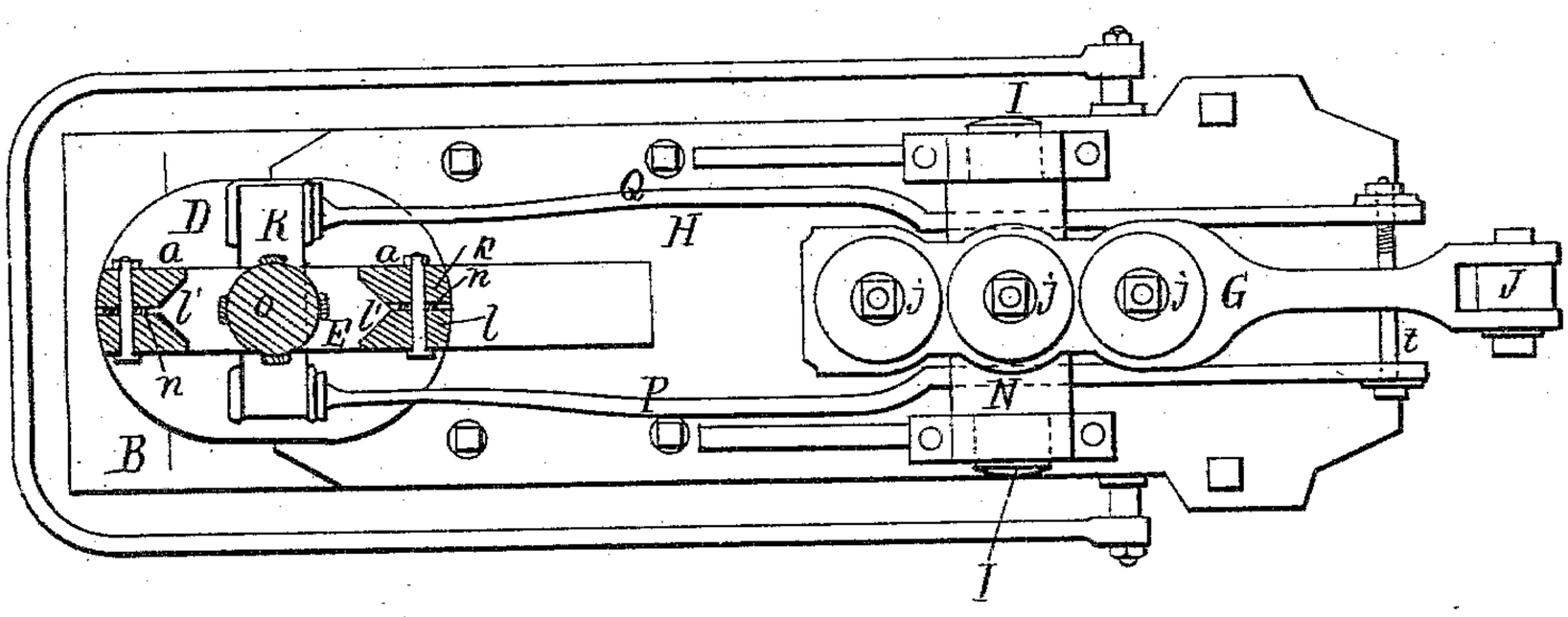


Fig. 2.

On line a.b. of Fig. 3.



Witnesses.
S. C. Clark.
Thos. J. Bailey

Inventor.
Alexander Beaudry.
F. Curtis. Atty.

(No Model.)

2 Sheets—Sheet 2.

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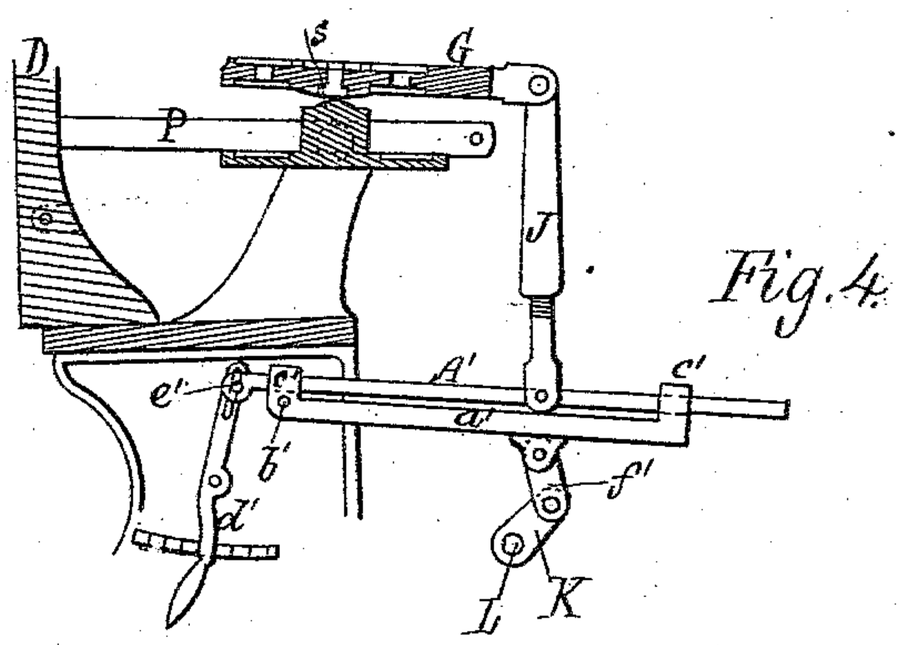

Fig. 4.

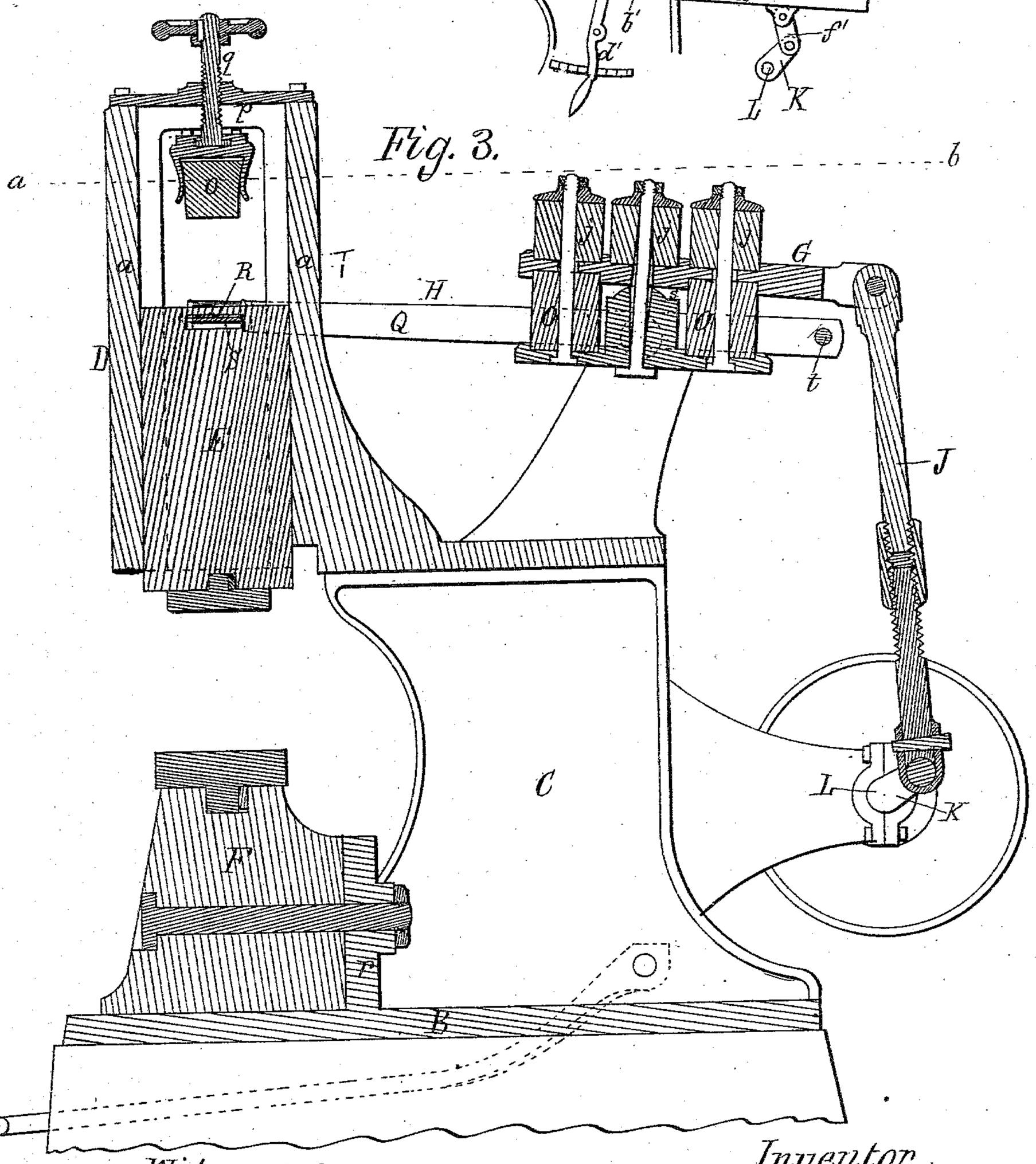

Fig. 3.

Witnesses.

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UNITED STATES PATENT OFFICE.

ALEXANDER BEAUDRY, OF BOSTON, MASSACHUSETTS.

POWER-HAMMER.

SPECIFICATION, forming part of Letters Patent No. 281,001, dated July 10, 1883.

Application filed September 11, 1882. (No model.)

To all whom it may concern:

Be it known that I, ALEXANDER BEAUDRY, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Power-Hammers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

My improvements consist, first, in the peculiar construction of the hammer-beam; second, in the mode of connecting the beam with the hammer-head; and, third, in an adjustable connection between the beam and the driving-crank, whereby the length of stroke of the hammer is varied at will, all as hereinafter described.

The drawings accompanying this specification represent, in Figure 1, an isometric elevation, in Fig. 2 a plan, and in Fig. 3 a vertical section, of a power-hammer containing my improvements. Fig. 4 is a view of a device for varying the length of stroke of the hammer-head.

In said drawings, the frame of the machine is shown as composed of a bed-plate, B, and upright side housings, C C, the latter uniting at their upper front parts in an open head, D, the opposite side bars, *a a*, of which constitute guides to direct the movements of the hammer-head.

E represents the hammer-head as adapted to reciprocate within or upon the upright parallel guides *a a*, while F represents the anvil of the machine with which such hammer-head operates. The beam of this hammer is a compound or double one—that is to say, it is composed of two parts, G H, disposed one above the other. The part G is the uppermost one, and is a rigid bar or arm secured at its front end, in an elastic manner, to the top of a horizontal rock-shaft, I, mounted transversely in the upper rear parts of the housings C C, the rear end of this arm G being pivoted to the upper end of a pitman, J, the lower end of such pitman in turn being pivoted to the wrist of a crank, K, formed upon a horizontal transverse rotary shaft, L, mounted in bearings in the lower part of the housings C C, below the rock-shaft I before named, this shaft L being the driving-shaft of the machine, and rotated by a suitable pulley and band. The arm G is connected with the rock-shaft I as follows: A horizontal head or block, N, is secured rigidly to the top of such shaft and longitudinally of the machine, or forms part of such shaft, and such arm G is disposed somewhat above such head, and is connected with it by suitable bolts, while between the arm and head are disposed several springs, O O, &c., of india-rubber or other suitable material. Between the arm G and the heads of the bolts *i i*, I introduce other springs, as shown at *j j j*, &c. These springs O O and *j j j* constitute an elastic or yielding medium between the arm G and shaft I, which serves to impart an elastic blow to the hammer-head and protects the machine-frame from the thrusts and shocks resulting from overcoming the inertia of the hammer-head by the crank.

The second and lower portion of the hammer-beam is composed of parallel horizontal twin side bars, P Q, the rear end of each of which passes through the rock-shaft I, the two bars extending forward upon opposite sides of the hammer-head, and connected by a flexible strap or band, R, of leather or other suitable material, this strap connecting the outer ends of said bars P Q and passing through an eye, S, in the upper part of the hammer-head. Rotations of the crank-shaft effect rockings of the shaft I, which impart vertical reciprocations to the hammer-head by means of the bars P Q and the strap R. The flexibility of the strap R and the elasticity of the arms P Q aid to a marked degree in imparting an elastic blow to the hammer-head and in relieving the adjacent parts of the machine from the shocks incident to the working of such machine.

It will be seen on reference to the drawings, especially to Fig. 2 thereof, that the guides *a a* of the head D are formed in two parts, *k l*, united by suitable cross-bolts, and that the

joint between such parts *k l* is the center of a V-groove, *l'*, in which each edge of the hammer-head plays, the edges of such hammer being reduced to a corresponding shape. Moreover, I separate the two parts *k l* slightly by inserting between them thin strips, *n*, of wood or other material. As the grooves *l'* and the edges of the hammer-head wear the strips *n* may be replaced by thinner ones, thus bringing the parts *k l* nearer together to compensate for the wear.

To enhance the elasticity of the blow imparted by the hammer-head and to increase the force of such blow, I employ a buffer-spring, *o*, which is suspended from the under side of the upper bar, *p*, of the head D, as shown in Fig. 3 of the drawings, the hammer-head, as it reaches its highest point, abutting against such spring. The resistance of the spring *o* against the hammer-head as the latter completes its upward stroke tends to cushion such stroke and relieve the various parts of the machine from the shocks and strains resulting from the reversal of motion of the hammer-head, while the rebound of the spring *o* increases the power of the blow of the said hammer-head.

To permit of variation in the degree of pressure or resistance offered by the spring *o*, I secure such spring to the lower end of a vertical screw-threaded rod, *q*, which screws downward through the bar *p* before named, such rod having a band-wheel secured to its upper end.

To enable the anvil F to be instantly and accurately adjusted in place in "setting up" the machine, I cast in the front lower part of the conjoint housings C C an abutment, *r*, which is V-shaped, or approximately so, in horizontal section, and I form the rear end of the anvil to fit this abutment, the two being secured together by bolts passing through them. When the anvil is pressed back against the recessed face of abutment *r*, the shape of the recess therein and the corresponding shape of the rear edge of the anvil will necessarily direct said anvil into a central position directly below the power-hammer.

To give full play to the two sets of springs O O and *j j j*, I seat the bar G upon a crowning projection, *s*, (see Fig. 3,) erected upon the top of the head N between the lower springs, O O, this bearing *s* permitting the said bar G to rock longitudinally.

The rear extremities of the bars P Q are connected by a horizontal bolt, *t*. By tightening this bolt, and thereby contracting the rear ends of the bars P Q, the front ends of such bars are expanded and the flexible band R tightened. The bolt *t* thus provides a means for taking up the slack of the band R.

In lieu of a direct crank-connection between the bar G and driving-shaft L, as hereinbefore explained, I propose in some instances to employ an adjustable connection between such points, by which the length of stroke of the beam G and of the hammer-head may be varied. For instance, in Fig. 4 of the drawings I have shown a device consisting of a horizontal head, *a'*, arranged longitudinally of the machine over the crank L, the front end of this head being situated between the housings C C and pivoted to them by a horizontal rod, *b'*.

A' in the drawings represents a straight bar, supported in bearings *c' c'* in the ends of the head *a'* and playing loosely therein, the front end of such bar being pivoted to a shipper-handle, *d'*, disposed between the housings C C and pivoted at its middle thereto. The head *a'* is pivoted at its under side to the upper end of a pitman, *f'*, the lower end of such pitman being pivoted to the wrist of the crank L. The bar A' is pivoted to the lower end of the pitman J. Under this construction of parts rotations of the crank-shaft L effect vibrations of the head *a'* upon its pivot, and this imparts, through the agency of the pitman J, vibrations or oscillations of the bar G.

It will be seen that by changing the position of the bar A' by means of the shipper-handle *d'* and throwing the pitman J out of the perpendicular to a greater or less extent the length of stroke of the hammer-head may be varied.

Having thus explained the nature and purposes of my improvements, I claim, and desire to secure by Letters Patent of the United States, the following:

1. The combination, with the hammer-head, the driving-shaft, and a suitable frame supporting the same, of the rock-shaft I, bar G, springs O O, and the bars or arms P Q, connecting the rock-shaft with the hammer-head by a suitable connection.

2. The combination, with the hammer-head and a suitable machine-frame, of the driving crank-shaft, the rock-shaft I, bar G, springs O O, &c., the arms P Q, and an elastic connection between said arms and the hammer-head.

3. The rock-shaft I and bars P and Q, in combination with bar G, connected to said shaft, or to a boss secured rigidly to such shaft, the pitman J, pivoted to the opposite end of such bar and connected with the crank of the driving-shaft, and the springs O O, &c., interposed between the bar G and rock-shaft, the said rock-shaft being connected with and operating the hammer-head.

4. The mechanism herein described for varying the effective stroke of the hammer-head, the same consisting of the head *a'*, pitman *f'*, bar A', shipper *d'*, pitman J, and bar G, and crank-shaft L, arranged, connected, and operating as hereinbefore described.

5. An anvil having a V-shaped rear edge, in combination with a bed-plate having an abutment raised thereon, which is constructed with a V-shaped recess arranged to receive said rear edge and direct the anvil into position to receive the stroke of the power-hammer.

6. The crowning seat or bearing *s* upon the head N of the shaft I, in combination with the

bar G and springs O O and *j j*, as and for the purposes stated.

7. The arms P Q, in combination with the shaft I and hammer-head D, when such arms are connected with the hammer-head by a flexible band at front, and at rear by an adjustable connection for tightening such band, substantially as explained.

In testimony whereof I affix my signature in presence of two witnesses.

ALEXANDER BEAUDRY.

Witnesses:
H. E. LODGE,
F. CURTIS.