

No. 639,538.

Patented Dec. 19, 1899.

H. G. DITTBENNER.
POWER HAMMER.

(Application filed Mar. 28, 1898.)

(No Model.)

2 Sheets—Sheet 1.

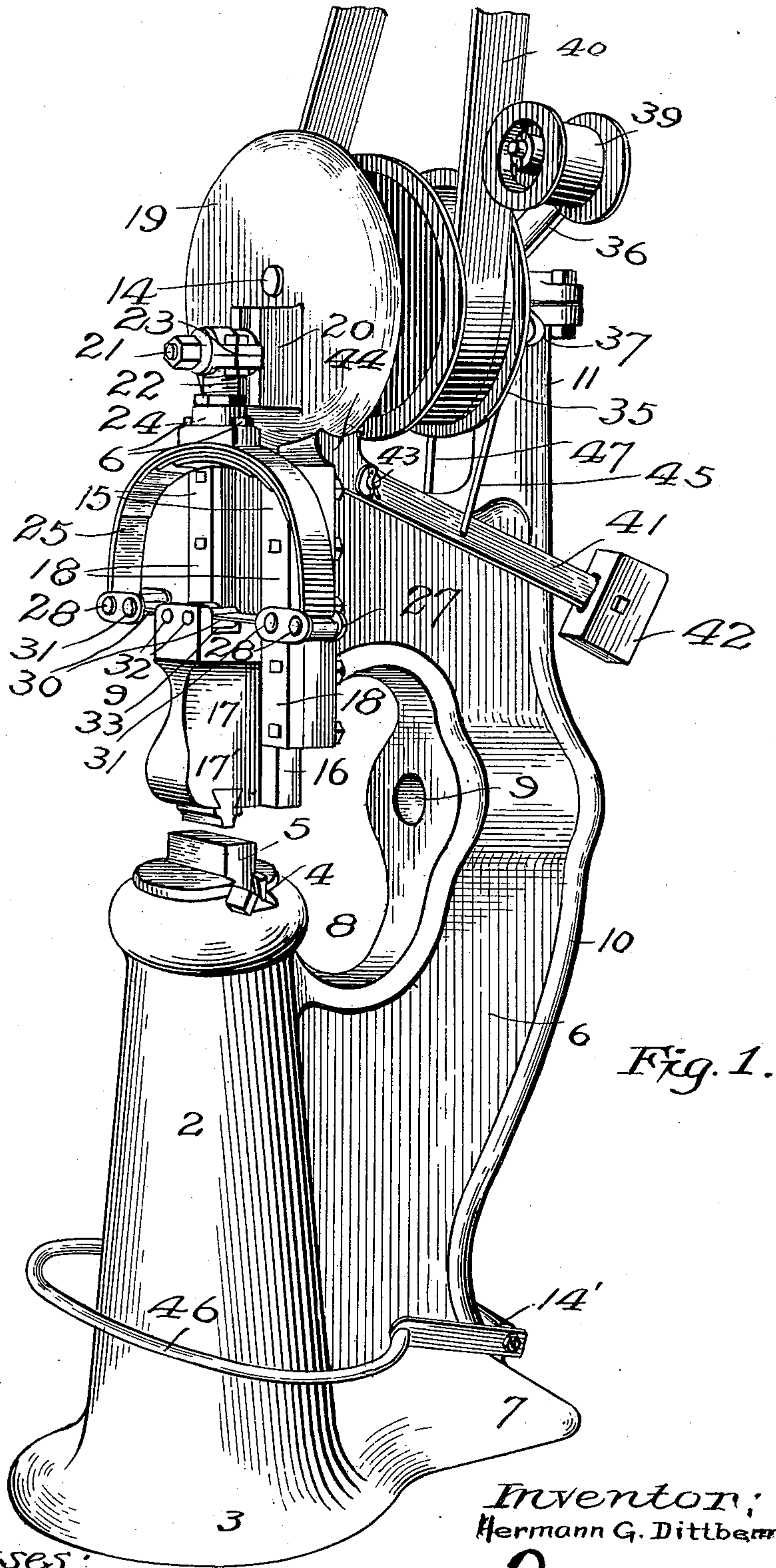


Fig. 1.

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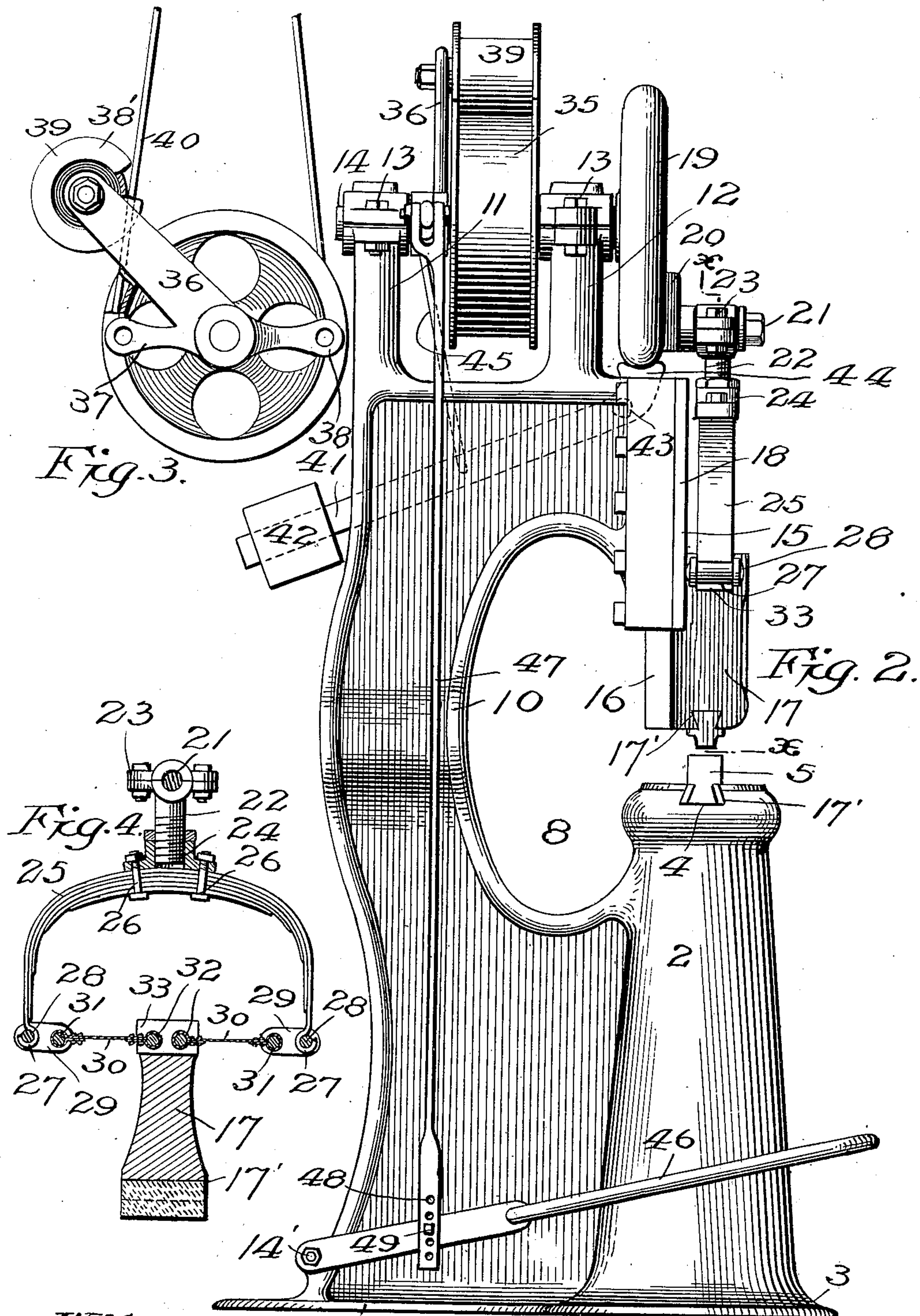
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UNITED STATES PATENT OFFICE.

HERMANN G. DITTBENNER, OF MINNEAPOLIS, MINNESOTA, ASSIGNOR TO
THE MINNEAPOLIS IRON STORE COMPANY, OF SAME PLACE.

POWER-HAMMER.

SPECIFICATION forming part of Letters Patent No. 639,538, dated December 19, 1899.

Application filed March 28, 1898. Serial No. 675,362. (No model.)

To all whom it may concern:

Be it known that I, HERMANN G. DITTBENNER, of the city of Minneapolis, county of Hennepin, State of Minnesota, have invented certain new and useful Improvements in Power-Hammers, of which the following is a specification.

This invention relates to power-hammers, and particularly to that class of power-hammers having the hammers operated by revolving shafts; and the object of the invention is to provide a power-hammer of a light, strong, durable construction, and which may be accurately and positively controlled both as to the number of strokes and the power of the stroke.

Another object is to provide a power-hammer adapted to work on pieces of different dimensions without readjustment in the throw of the operating-crank; and a further object of the invention is to provide an effective brake whereby the hammer may be accurately controlled or stopped quickly at any point; and a particular object of the invention is to so simplify the construction of power-hammers as to materially reduce the cost thereof both to the manufacturer and the user.

The invention consists generally, in a power-hammer, of the construction and combination of parts, all as hereinafter described, and particularly pointed out in the claims.

The invention will be more readily understood by reference to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a perspective view of a power-hammer embodying my invention. Fig. 2 is a side view thereof. Fig. 3 is a detail view showing the belt-tightener. Fig. 4 is a sectional view substantially on the line xx of Fig. 2.

The frame of the machine is a single casting to insure strength, lightness, and cheapness; but the parts may be referred to separately.

2 represents the anvil-block, provided with the flaring base 3. In the top of the block 2 is the transverse dovetailed groove 4 to receive the anvil 5.

6 represents the bracket, which extends from the back of the block 2 and has a flaring base 7, merged into the base 3. This bracket

is provided with the opening or jaw 8 opposite the anvil 5, and in the bracket is the hole 9 to receive the end of a bar placed on the anvil. The bracket is strengthened by the ribs 10, and upon its upper end is provided with the upright arms 11 and 12, upon which are the boxes or bearings 13 for the driving-shaft 14. Upon the upper and front part of the bracket I provide the vertical guides 15, provided with grooves for the ribs 16 on the hammer 17, said hammer being adapted to slide up and down in said guides directly over the anvil. The guides are formed integrally with the bracket and are completed by the face-plates 18, bolted thereto. On the forward end of the shaft 14 is the heavy fly-wheel 19, which rotates above the upper end of the guides for the hammer. On the face of the fly-wheel are the radial ledges 20, between which is a dovetailed or T groove to receive the end of the crank-pin 21. This is a shouldered pin and is adjustably secured to be moved in or out from the center of the fly-wheel.

22 represents a short connecting rod or head provided with the box 23 on the crank-pin. On the lower end of the rod 22 is a T 24, to which the bow-spring 25 is secured by two or more bolts 26. The coupling between the T 24 and the short rod 22 may be adjustable, as illustrated in Fig. 4. The bow-spring 25 has its outer leaf carried downwardly and provided at each end with a hook or sleeve 27 to receive the cross-pins 28 of the short links 29. These links 29 are connected with the head 17 by means of thin flexible steel links 30, which are secured upon the cross-pins 31 in the inner ends of the links 29, and the pins 32, which extend across the transverse slot or groove 33 in the top of the hammer. These links I find to be more durable and to give greater resiliency to the hammer than links that are solid and inflexible, or leather straps. The lower end of the hammer is provided with a dovetailed groove 17' to receive the changeable hammer-block, as shown. The fly-wheel is secured to the shaft 14, as is also the flanged belt-pulley 35. The latter is arranged on the shaft between the two arms 11 and 12. A lever having three arms 36, 37, and 38 is pivoted on the shaft

between the pulley 35 and the arm 11 of the frame. The arm 36 is provided with a stub-shaft 38' for the belt-tightener pulley 39, which swings about the pulley 35 and is adapted to take up the slack in the driving-belt 40, which belt when loose will slip around the pulley 35.

41 represents a brake-lever carrying a weight 42, that is preferably adjustable. This lever is pivoted at 43, near its forward end, on the frame, and the forward end 44 of the lever is preferably enlarged and conforms to the periphery of the fly-wheel 19. The lever is opposite the undergoing side of the wheel and tends to wedge tightly thereon. Between the lever 41 and the arm 37 is the connecting-rod 45, and the three-armed belt-tightener lever is operated by the foot-treadle 46, connected therewith by the upright rod 47. The treadle circles around the front of the base of the machine and is pivoted upon the rear side of the bracket or web 14 of the frame or base. The lower end of the rod 47 is provided with several holes 48 for the pivot-pin 49, that connects the rod to the treadle.

The operation of my drop-hammer is as follows: The driving-belt 40 runs continuously; but as the brake is in engagement with the fly-wheel the pulley 35 and the fly-wheel 19 will be locked against rotation. When, however, the treadle 46 is depressed, the three-armed lever will be swung to lift the brake-lever and release the fly-wheel, and the tightener-pulley 39 will be moved up to tighten the belt 40 upon the pulley 35, whereupon said pulley and the fly-wheel will be set into rotation with a degree of rapidity dependent upon the depression of the treadle and the tightness of the belt. As the fly-wheel rotates it gathers momentum to overcome the inertia of the hammer, and the hammer will be rapidly reciprocated in the vertical guide and will strike forcibly upon any article laid on the anvil. The bow-spring yields to relieve the crank-rod and crank-pin from the jar of the hammer at the end of its stroke in either direction and also yields to permit the full downward stroke of the crank after the hammer has been stopped by a thick piece of work upon the anvil. The flexible links 30 readily assume the different positions and in a large measure relieve the arms of the bow-spring from the sudden jar or stroke of the hammer. A light stroke of the hammer is obtained by slowly applying the brake or by stopping the crank before it has completed its downstroke, so that the hammer completes its downward stroke against the opposing strength of the bow-spring.

The chief advantages of my machine are due to its compactness, its little height and consequent stability, its light weight, its sim-

plicity and cheapness of construction, and the ease with which the hammer-stroke may be perfectly and accurately regulated.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination, in a power-hammer, of the frame comprising the anvil-block 2, the bracket 6, the base portions 3 and 7, the guides 15, and the vertical arms 11 and 12, with the shaft 14 having bearings in said arms 11 and 12, the pulley 35 and the fly-wheel 19 fixed upon said shaft, the three-armed lever pivoted on said shaft, the belt-tightener carried by said lever, the brake-lever 41 pivoted on said frame and adapted to engage said fly-wheel, the treadle, the rods connecting said brake-lever and said treadle with said three-armed lever, the hammer 17 slidable in said vertical guides 15, the bow-spring the links 29, the flexible metallic links 30 connecting the latter with said hammer 17, the crank-pin adjustable on the face of said fly-wheel, and the connecting rod or head between said crank-pin and the top of said bow-spring, substantially as described.

2. The combination, in a power-hammer, of the frame having an anvil and vertical hammer-guides above the same, a hammer slidable in said guides, a horizontal shaft above said guides and having bearings in said frame, a fly-wheel provided on said shaft, a pulley, a three-armed lever pivoted on said shaft, a belt-tightener carried by said lever, a treadle, a weighted lever pivoted on said frame, and means connecting said treadle and said weighted lever with said three-armed lever whereby said belt-tightener may be moved into engagement with or disengaged from the belt passing over said pulley, substantially as described.

3. The combination, in a power-hammer, of a frame having anvil and hammer guides, a hammer slidable in said guides, a shaft having bearings in said frame above said guides, a fly-wheel provided on said shaft, a pulley, a lever pivoted on said shaft, a belt-tightener carried by said lever, a treadle, a weighted lever pivoted on said frame, and means connecting said treadle and said weighted lever with the first-named lever whereby said belt-tightener may be moved into engagement with or disengaged from the belt passing over said pulley, substantially as described.

In testimony whereof I have hereunto set my hand, this 18th day of March, 1898, at Minneapolis, Minnesota.

HERMANN G. DITTBENNER.

In presence of—

RICHARD PAUL,
M. E. GOOLEY.