A. BEAUDRY.

POWER HAMMER.

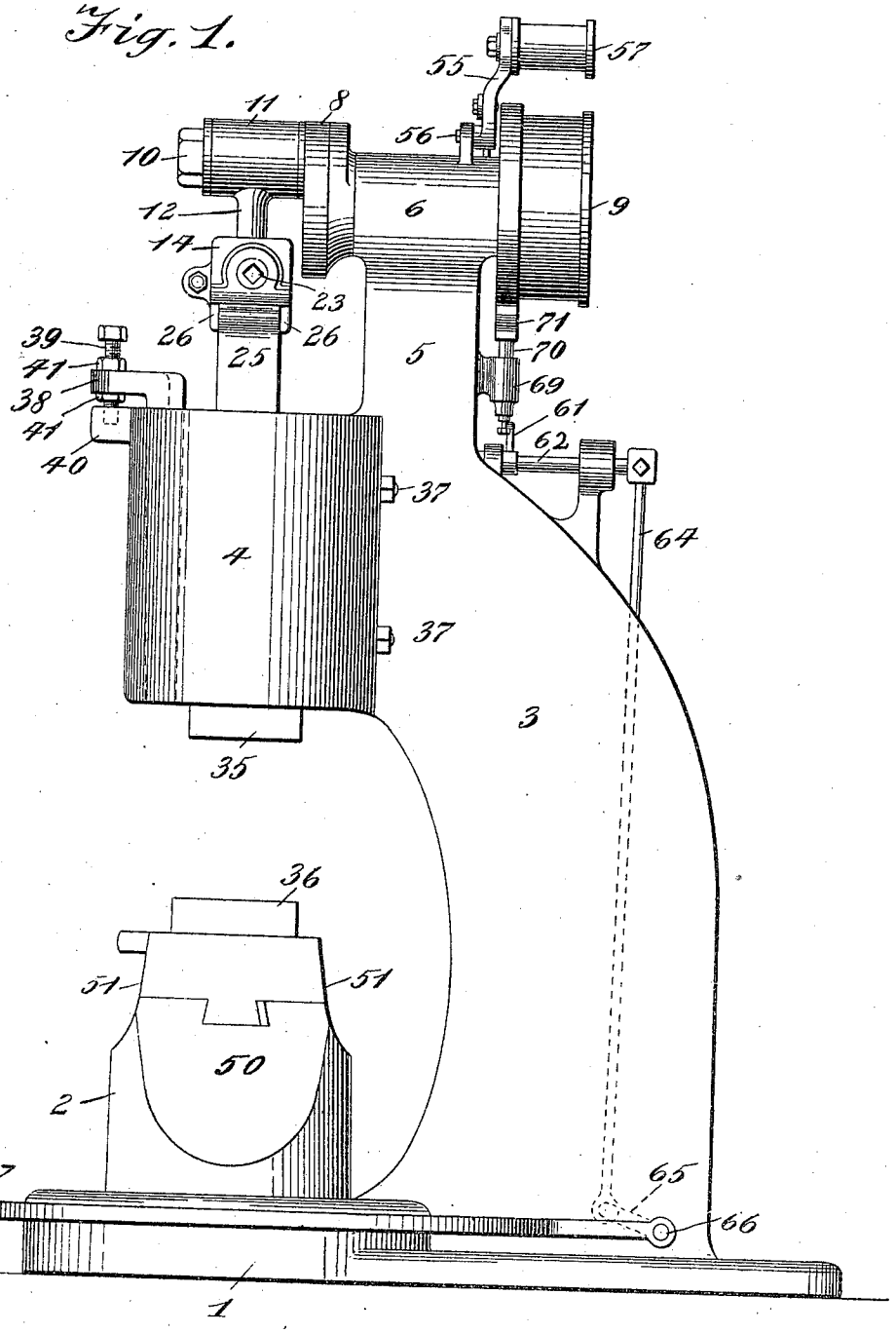
APPLICATION FILED FEB. 18, 1909.

960,785.

Patented June 7, 1910.

4 SHEETS—SHEET 1.

Fig. 1.



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4 SHEETS—SHEET 2.

Fig. 10.

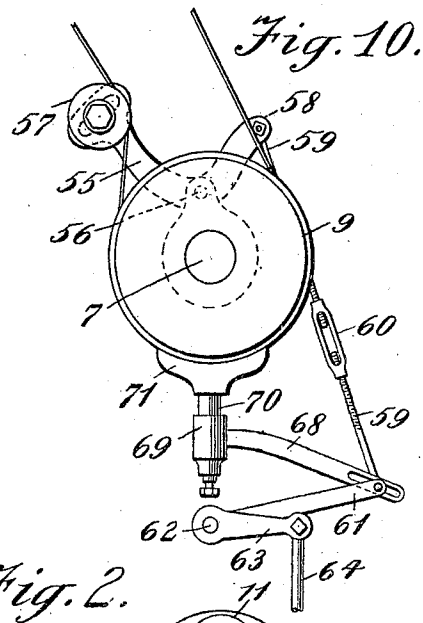


Fig. 4.

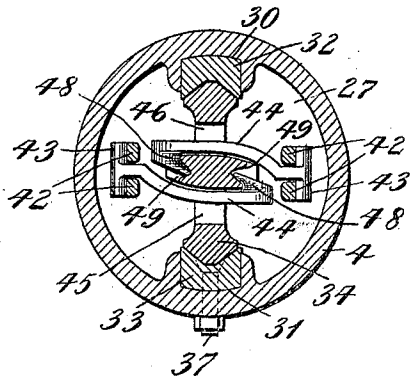


Fig. 2.

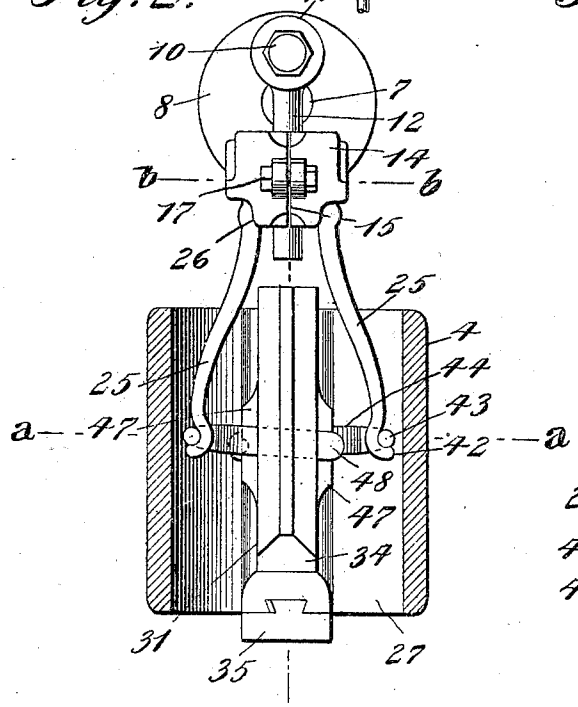
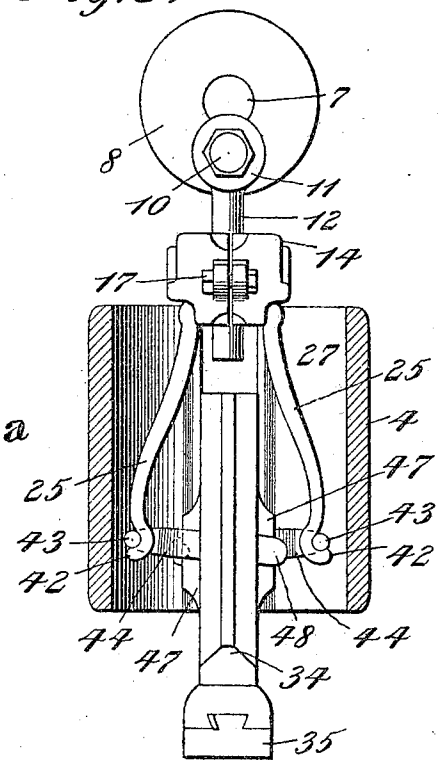


Fig. 3.



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4 SHEETS—SHEET 3.

Fig. 5.

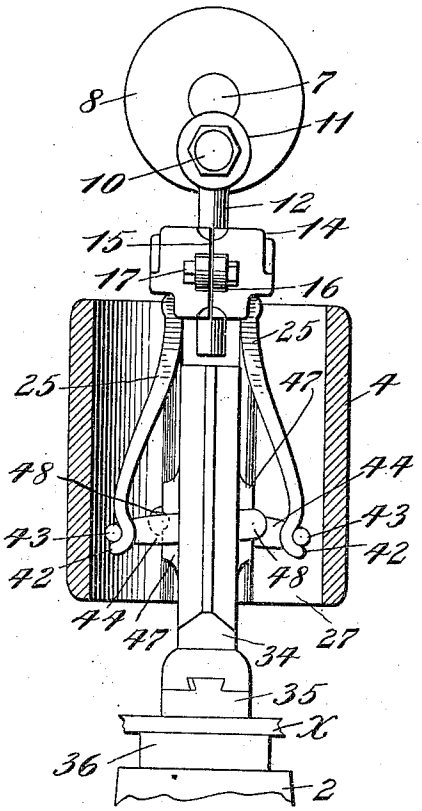


Fig. 7.

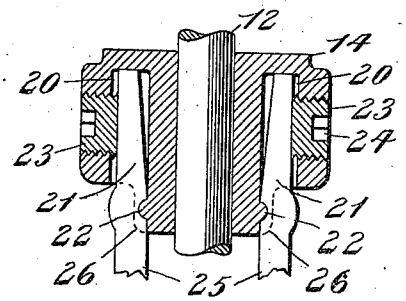


Fig. 8.

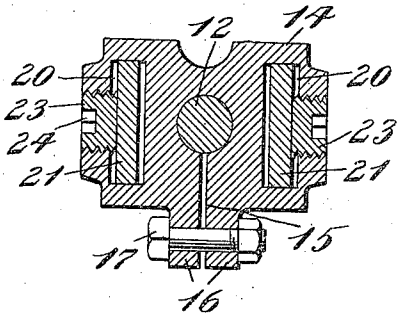


Fig. 11.

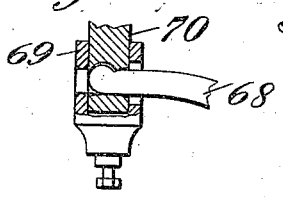


Fig. 6.

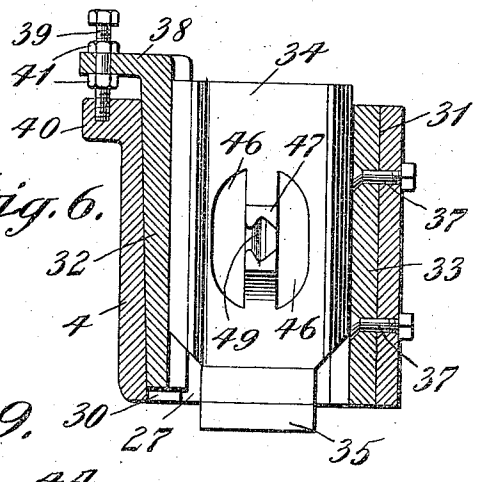
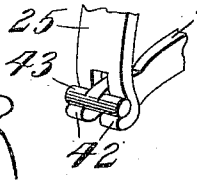


Fig. 9.



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POWER HAMMER.

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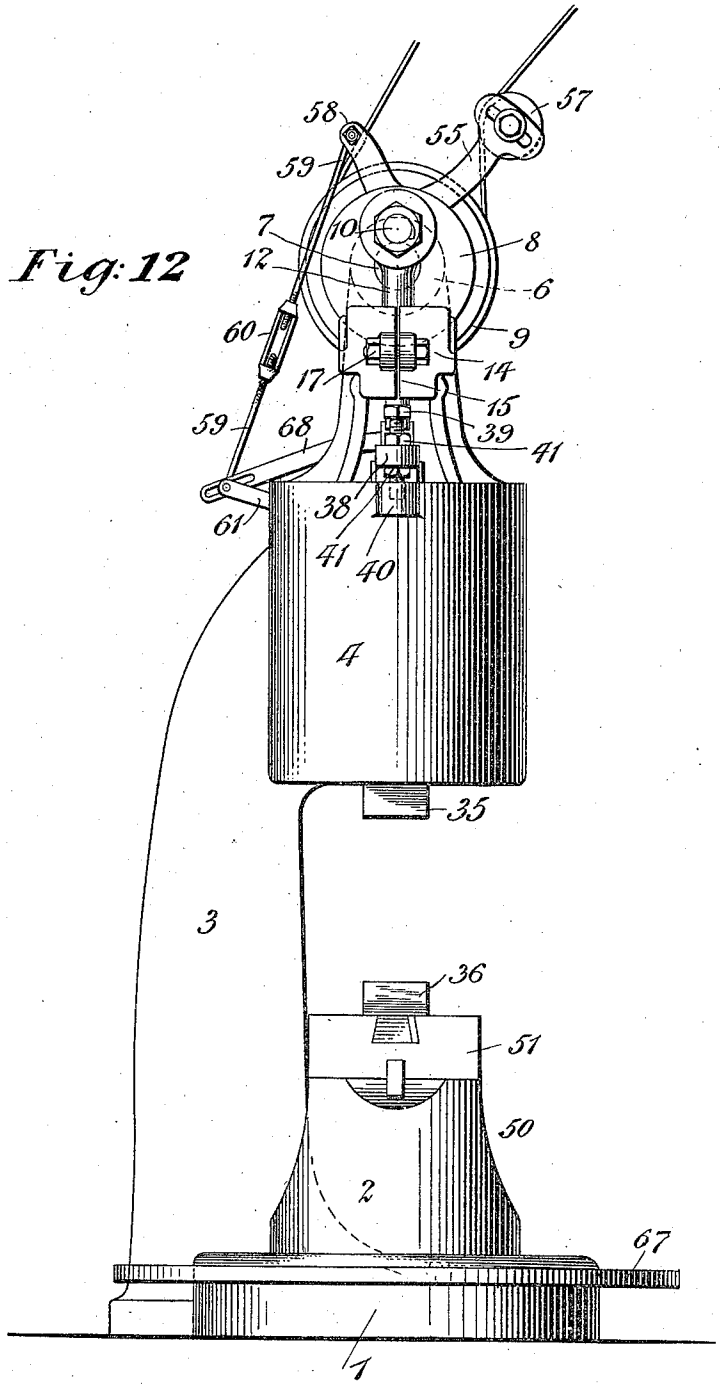
4 SHEETS—SHEET 4.

Fig. 12



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UNITED STATES PATENT OFFICE.

ALEXANDER BEAUDRY, OF EAST WEYMOUTH, MASSACHUSETTS, ASSIGNOR TO BEAUDRY & CO., INC., OF BOSTON, MASSACHUSETTS.

POWER-HAMMER.

960,785. Specification of Letters Patent. **Patented June 7, 1910.**

Application filed February 18, 1909. Serial No. 478,707.

To all whom it may concern:

Be it known that I, ALEXANDER BEAUDRY, a citizen of the United States, and a resident of East Weymouth, in the county of Norfolk and State of Massachusetts, have invented certain Improvements in Power-Hammers, of which the following is a specification.

This invention relates to certain improvements in power hammers, and more particularly in that class of such devices wherein a mechanical connection is interposed between the actuating means and the hammer head for operating the latter, and the object of the invention is to provide a hammer of this general character of a simple and comparatively inexpensive nature, and of a strong and compact construction having certain features of novelty and improvement permitting effective cushioning of the blow struck by the hammer head.

The invention consists, in part, in a power hammer having a head, pivotally movable supporting members connected with the head and each extended from its pivot point across the point of connection of another supporting member with the head, and actuating means having connection with the extended ends of the supporting members for imparting reciprocatory movement to the head.

The invention also contemplates certain novel features of the construction, and combinations and arrangements of the several parts of the improved power hammer, whereby certain important advantages are attained, and the device is rendered simpler, less expensive and otherwise better adapted and more convenient for use, all as will be hereinafter fully set forth.

The novel features of the invention will be carefully defined in the claims.

In order that my improvements may be the better understood I have illustrated in the accompanying drawings one embodiment of my invention, in which drawings—

Figure 1 is a side elevation showing a power hammer constructed according to my invention; Fig. 2 is a fragmentary sectional view taken vertically and axially through the head-inclosing casing of the hammer, the reciprocatory head and its connected actuating means being shown in elevation and in raised position; Fig. 3 is a view similar to Fig. 2, but showing the head in lowered position; Fig. 4 is a transverse section taken through the head and its inclosing casing in the plane indicated by the line *a*—*a* in Fig. 2; Fig. 5 is a vertical sectional view somewhat similar to Fig. 3, but illustrating the operation of the pivotally connected links or members at opposite sides of the head in cushioning the blow; Fig. 6 is a partial vertical section taken through the head inclosing casing in a plane at right angles to the plane of the section in Figs. 2, 3 and 5, and showing certain features of construction which will be hereinafter referred to; Fig. 7 is an enlarged fragmentary sectional detail view showing certain features of construction of the adjustable connection of the upper ends of the spring arms with the actuating means for the hammer head; Fig. 8 is a sectional view of the parts illustrated in Fig. 7, but taken through the same in a direction at right angles to the plane of the section in Fig. 7, as indicated by the line *b*—*b* in Fig. 2; Fig. 9 is a fragmentary perspective view illustrating the conformation of the lower end of the spring arm for engagement with the outer end of the corresponding pivotally mounted link or member; Fig. 10 is a fragmentary detail view showing certain features of construction of a brake mechanism for controlling the head actuating means; Fig. 11 is a sectional detail view showing the connection of the brake member with its actuating mechanism, and Fig. 12 is a front elevation of the improved hammer.

As shown in these views, the improved power hammer has a bed or base 1, from which is upwardly extended an independent anvil 2, and a frame or standard 3, located at the rear of the anvil and rising above the same, and provided at its upper part with a forwardly directed head-inclosing casing 4, herein shown as made cylindrical in form and overhanging the anvil 2. The frame is also provided with an upwardly directed bearing portion 5 rising above the cylindrical casing 4, and provided at its upper end with a bearing 6 wherein is held for rotatory movement the main or actuating shaft 7, the forward end of which carries a crank disk or head 8, while its rear end carries a pulley 9, over which is adapted to be passed a belt or band, as shown in dotted lines in Fig. 10,

for driving the said actuating shaft in a well known way from any suitable source of power.

The crank disk or head 8 at the forward end of the actuating shaft 7 carries an eccentrically set pin or stud 10, preferably adjustably held thereon, and projecting forwardly from said crank disk or head in vertical alinement above the cylindrical casing 4, in position for engagement within a bearing 11 produced at the upper end of a crank rod or plunger 12, upon the lower extremity of which is adjustably held a clamping block or member 14, herein shown as made in a general rectangular form from spring metal and having a slitted opening 15 vertically extended through its forward side, there being lugs 16, 16 produced at opposite sides of said slitted opening for the passage of a bolt or screw 17, which serves, when tightened, to clamp the parts securely in relation, but may be loosened at will to permit the clamping head or member 14 to be adjusted lengthwise along the lower end of the crank rod or plunger 12, as will be readily understood.

At its opposite sides the clamping block or member 14 is provided with vertically extended chambers or recesses 20, 20, open at the lower surface of said block or member so as to be adapted to receive the tapered upper ends 21, 21 of connecting arms, which are spaced apart at opposite sides of the crank rod or plunger 12, and are formed from heavy spring metal with their lower ends made divergent and pendent below the clamping block or member 14, as shown at 25, 25 in the drawings, so as to be adapted to play vertically within the interior chamber 27 of the cylindrical casing 4, for operative connection with the hammer head therein as will be hereinafter explained.

At opposite sides of the clamping block or member 14 are produced spaced vertically directed ribs or shoulders 26, 26, alined with the opposite sides of the open lower ends of the chambers or recesses 20, 20 wherein the tapered upper ends 21, 21 of the resilient connecting arms are engaged, said shoulders 26, 26 being positioned for engagement at the sides of said arms, as shown in Figs. 1, 2 and 3, and between said ribs or shoulders 26, 26 are extended transverse feathers 22, 22 integral upon the opposite surfaces of said clamping head or member 14 in position for engagement in recesses produced in the adjacent inner surfaces of the resilient connecting arms, as clearly shown in Fig. 7, so as to serve as fulcra whereon the said arms are effectively supported for a certain extent of rocking or pivotal movement.

At the opposite sides of the clamping head or member 14 are also arranged screw pins or nuts 23, 23 which have threaded engagement in the outer walls of the chambers or recesses 20, 20 wherein the tapered upper ends of the resilient connecting arms are engaged, and have their inner ends arranged for engagement with said upper ends of the resilient arms in position for holding said arms with their recessed inner surfaces securely engaged with the transverse feathers 22, 22 at opposite sides of the clamping block or member. As herein shown, said screw pins or nuts 23, 23 have angular sockets 24, 24 produced in them to receive a tool or wrench by means of which they may be turned to vary the tension of the resilient connecting arms.

At the forward and rear walls of the interior chamber 27 of the cylindrical casing 4 are produced alined vertically directed channels or ways 30 and 31, wherein are arranged gibs 32, and 33, the inner surfaces of which are provided with alined vertical grooves or guide-ways in which are engaged the front and rear surfaces of the hammer head 34, which is thereby capable of vertical reciprocatory movement within the casing 4, its lower end carrying an upper die 35, alined vertically above a lower die 36 carried by the anvil 2, so as to be adapted for operation upon an article rested upon said lower die, as seen at x in Fig. 5.

The gib 33 at the rear wall of the interior chamber 27 within the cylindrical casing 4 is held in position within its channel 31 in any preferred manner. Preferably, said gib will be secured in position by freezing the same with some suitable metal or alloy, and as herein shown, this gib is further held in position by means of bolts 37, 37 set through it and having nuts outside the rear wall of the casing 4.

The gib 32 at the forward wall of the casing 4 has a tapered or beveled surface as clearly shown in Fig. 6, adapted for sliding engagement with a correspondingly formed surface at the forward side of the way or channel 30 wherein the gib is received, and at its upper end, said gib 32 has a forwardly directed extension 38 extended above a lug 40 at the front of the casing 4, and engaged with a bolt or screw 39, the lower end of which has threaded engagement with the lug 40. The screw or bolt 39 carries nuts 41, above and below the extension 38 of the gib 32, and having threaded engagement with said screw or bolt, so as to be capable of adjustment lengthwise along the same to permit of moving the forward gib 32 vertically in its way or channel 30, whereby the tapered or beveled surface of the gib is caused to play over the corresponding surface of the way or channel 30 in such a manner as to take up wear due to the reciprocatory movement of the head along the guide-ways in the gibs.

The lower divergent ends of the resilient connecting arms are arranged within the

interior chamber 27 of the cylindrical casing 4 at opposite sides of the head 34, and each such arm has its lower extremity formed with spaced hook-like members 42, 42, with which are pivotally engaged oppositely directed pivot pins or studs 43, 43 reversely directed from opposite sides of supporting links or members 44, each of which is passed in a horizontal direction between the spaced hook-like parts or members 42, 42 of one of the said resilient connecting arms, and has its body portion extended through an opening 46 in the head 34 and has its opposite end provided with a hook-like part 48 arranged at the side of the head opposite to that at which such supporting link or member has pivotal connection with the corresponding resilient connecting arm.

The respective supporting links or members 44, 44 are directed in opposite directions from their points of pivotal connection with the resilient connecting arms, and although such pivotal points are alined diametrically of the casing 4, the said links or members 44 are laterally bent as clearly shown in Fig. 4, so as to clear each other in order that they may swing freely in parallel vertical planes. The openings 46, 46 in the head 34 through which the links or members 44, 44 are passed, are produced at opposite sides of a central web vertically extended along the head 34, and the opposite sides of said vertically extended web are arranged to project beyond the opposite sides of the head as clearly shown at 47, 47 on the drawings, and have recesses or sockets 49, 49 produced in their opposite outer surfaces wherein the hook-like parts 48, 48 at the extremities of the supporting links or members 44, 44 are engaged in such a manner as to afford secure pivotal connections between the respective links or members 44 and the opposite sides of the hammer head. By this arrangement of the parts, the head 34 is effectively supported between the divergent lower ends of the resilient connecting arms, the tension whereof is exerted to maintain the supporting links or members normally in a substantially horizontal position as shown in Fig. 2, but capable of upward pivotal movement as shown in Fig. 5, against the tension of the said resilient connecting arms, which are thereby flexed toward each other so as to cushion the blow struck by the head and thereby render the structure sufficiently elastic to adapt the hammer for a wide variety of uses where such increased elasticity is desirable.

As shown at 50 and 51 in Fig. 1, the anvil 2 is flattened and tapered upon its several sides so as to permit the work to be brought up closely adjacent to the lower die during the use of the improved hammer upon angular or irregularly shaped parts.

In order to permit of effectively controlling the operation of the improved hammer, the belt or band from which the shaft 7 is driven may be so loose as to normally slip over the pulley 9, a tightener roll 57 carried upon a bracket or auxiliary frame member 55 pivoted at 56 upon the main frame 3, being arranged for engagement with said belt or band as shown in Fig. 10, so as to tighten the same sufficiently to drive the said shaft 7. The auxiliary frame member or bracket 55 as herein shown has an arm 58 which is connected by a sectional link or strap 59, longitudinally adjustable by means of a turnbuckle 60, with one arm 61 of a rock shaft 62 fulcrumed upon the main frame 3 and having an arm 63 with which is connected the upper end of a link 64, the lower end of which has connection, as shown in dotted lines in Fig. 1, with an arm 65 of the treadle lever 66 with which is connected the treadle 67 adapted to be depressed by the foot of an attendant to force the tightener roll 57 upon the belt or band to tighten the same sufficiently to drive shaft 7 therefrom. When pressure is relaxed at the treadle 67, the weight of the tightener roll 57 and its bracket 55 will serve to withdraw the roll from pressure upon the belt or band and to return the connected parts to their normal inactive positions with the treadle 67 elevated.

One flange of the pulley 9 is shown provided with a wide brake surface whereon is adapted to be engaged a brake shoe 71, having a stem 70 arranged for vertical sliding movement, as shown in Figs. 10 and 11, within a casing 69, suitably mounted upon the main frame. The stem 70 and casing 69 are slotted for the passage of one end of a lever 68, the opposite end of which has connection with the link or strap 59 in such a manner as to compel rocking movement of said lever 68 in unison with the bracket 55. The lever 68 is fulcrumed at the side of the casing in such a manner that its rocking movement is communicated to the stem 70 to move the same upward and force the brake shoe 71 into frictional contact with the brake surface of pulley 9 when the bracket 55 is lowered by gravity to withdraw the pressure of the tightener roll from the driving belt or band, whereby it will be seen that when the attendant withdraws his foot from the treadle 67, the belt or band is loosened and the brake shoe 71 is automatically pressed upon the pulley 9 to check the rotative movement of shaft 7. Similarly, when the roll 57 is pressed upon the belt or band to tighten the same, and thereby drive the shaft 7, the brake shoe 71 is automatically withdrawn from the pulley 9 by the reverse movement of the lever 68.

From the above description it will be seen that the improved power hammer constructed according to my invention is of

an extremely simple, and comparatively inexpensive nature, and is particularly well adapted for use by reason of the strength and compactness of its construction and of the increased efficiency and advantages due to the resilience or elasticity of the connection between the hammer head and its actuating means, and it will also be obvious from the above description that the device is susceptible of considerable modification without material departure from the principles and spirit of the invention and for this reason I do not desire to be understood as limiting myself to the precise formation and arrangement of the several parts herein set forth in carrying out my invention in practice.

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

1. A power hammer having a head capable of reciprocatory movement, members having adjacent ends pivotally connected with the head and overlapping one another and having their opposite ends extended beyond the sides of the head, and actuating means having connection with said members for imparting reciprocatory movement to the head.

2. A power hammer having a head capable of reciprocatory movement, pivotally movable supporting members connected with the head, each such supporting member being extended from its pivot point across the point of connection of another supporting member with the head, and actuating means having connection with the extended ends of said supporting members for imparting reciprocatory movement to the head.

3. A power hammer having a head, overlapping pivotally movable supporting members connected with the head, each such supporting member being extended from its pivot point across the point of connection of another supporting member with the head, and actuating means for imparting reciprocatory movement to the head having connection with the extended extremities of the supporting members in alinement with the pivot points of such supporting members, one of said supporting members having a laterally bent portion at the point where it is lapped over the other supporting member.

4. A power hammer having a head capable of reciprocatory movement, guides engaged at opposite sides thereof, supporting members pivotally connected with the head and extended therefrom in directions at angles to the plane of said guides, and actuating means having connection with the extended ends of said supporting members for imparting reciprocatory movement to the head.

5. A power hammer having an apertured head capable of reciprocatory movement, supporting members each pivoted at one side of the head and extended through an aperture in the head and having an extremity directed beyond the opposite side of the head, and actuating means having connection with the extended extremities of said supporting members for imparting reciprocatory movement to the head.

6. A power hammer having a head capable of reciprocatory movement and provided with a central web and with apertures at opposite sides thereof, supporting members pivoted at the outer parts of the web at opposite sides of the head, and each extended from its point of pivotal connection at one side of the head through one of said apertures and having an extremity directed beyond the opposite side of the head, and actuating means having connection with the extended ends of said supporting members for imparting reciprocatory movement to the head.

7. A power hammer having a head capable of reciprocatory movement, guides engaged at opposite sides thereof, supporting members extended at angles to the plane of said guides and each pivoted at one side of the head and extended through an aperture therein and having an extremity directed beyond the opposite side of the head, and actuating means having connection with the extended extremities of said supporting members for imparting reciprocatory movement to the head.

8. A power hammer having a head capable of reciprocatory movement, a crank shaft, a crank rod connected therewith, a clamping member connected with the crank rod and having chambers produced in it, resilient connecting arms having upper end portions adjustably engaged in the chambers of the clamping member and having divergent lower ends arranged at opposite sides of the head, and a supporting member affording connection between the lower end of each resilient connecting arm and the head.

9. A power hammer having a head capable of reciprocatory movement, a crank shaft, a crank rod connected therewith, a clamping member connected with the crank rod and having chambers at opposite sides and also provided with projections alined with said chambers, resilient connecting arms having upper end portions adjustably engaged in the chambers of the clamping member and provided with recesses wherein the projections of said clamping member are engaged, adjusting screws having threaded engagement with opposite sides of the clamping member and engaged with the upper ends of said resilient connecting arms to hold the same with their recesses engaged upon the projections of the clamping mem-

ber, the lower ends of the resilient connecting arms being divergent and arranged at opposite sides of the head, and a supporting member affording connection between the lower end of each resilient connecting arm and the head.

In witness whereof I have hereunto signed my name, in the presence of two subscribing witnesses.

ALEXANDER BEAUDRY.

Witnesses:
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EDWARD K. PHILLIPS.