March 31, 1931. L. F. KOTT 1,798,378

POWER HAMMER

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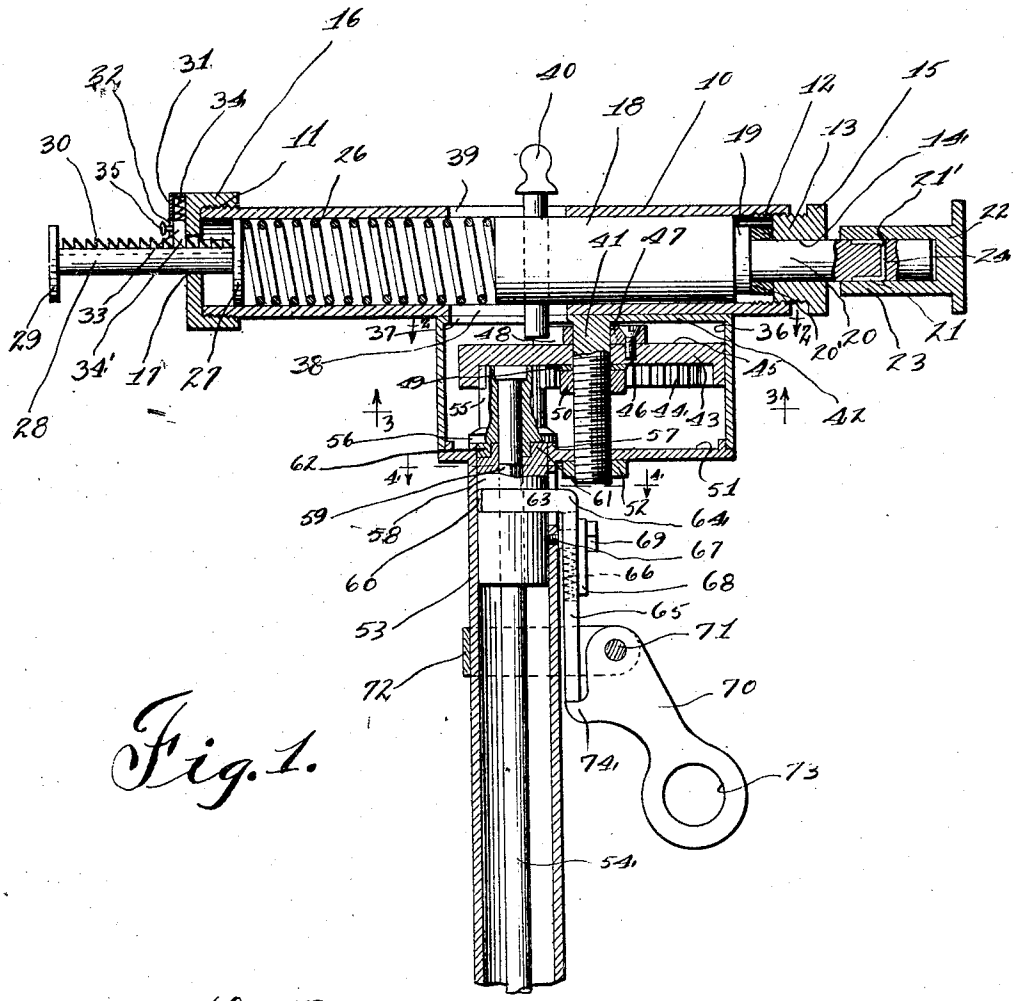


Fig. 1.

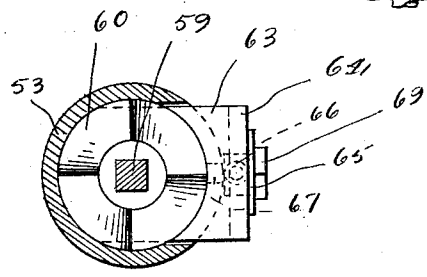


Fig. 4.

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POWER HAMMER

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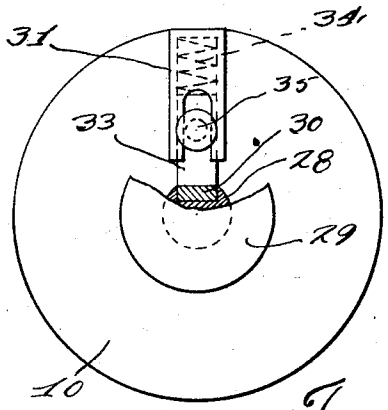


Fig. 6.

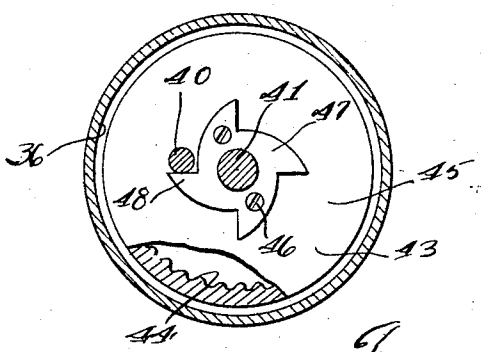


Fig. 2.

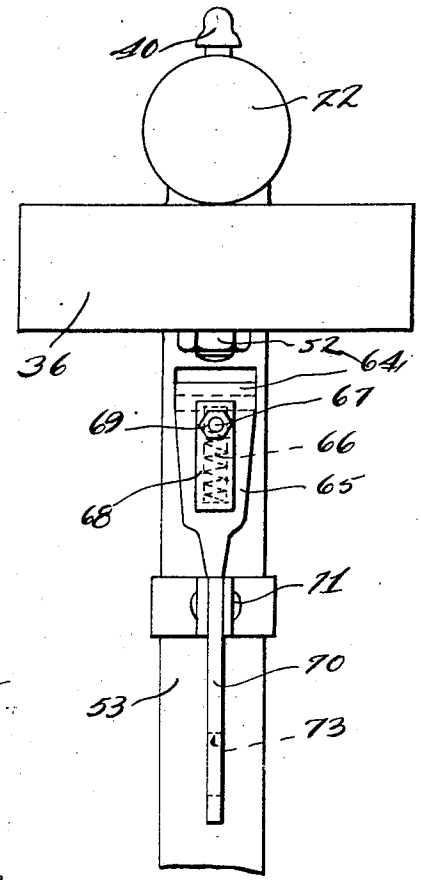


Fig. 5.

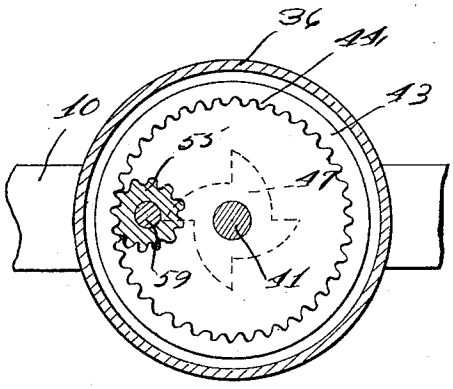


Fig. 3.

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UNITED STATES PATENT OFFICE

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POWER HAMMER

Application filed August 8, 1927. Serial No. 211,591.

This invention relates to power hammers and has as an object to improve generally and render more efficient devices of this character.

A further object of this invention is to provide a power hammer which is simple in construction, compact, and of such a size that it may be readily transported from place to place.

A further object of this invention is to provide a power hammer in which dependence is not placed on the motor actuated mechanism for imparting the working strokes to the hammer.

A still further object of this invention is to provide a power hammer having novel means for adjusting the force with which the hammer operates, which means is independent of the operation of the motor actuating mechanism.

Other objects and advantages of my invention will become apparent as the description proceeds.

In the drawings wherein one illustrative embodiment of my inventive idea has been diclosed somewhat in detail:

Figure 1 is a transverse sectional view through a hammer constructed in accordance with my invention;

Figure 2 is a sectional view taken on the line 2—2 of Figure 1;

Figure 3 is a sectional view taken on the line 3—3 of Figure 1;

Figure 4 is a sectional view taken on the line 4—4 of Figure 1;

Figure 5 is a side elevational view of the hammer; and

Figure 6 is an end view of the plunger casing showing more particularly the latch mechanism associated with the same.

Referring more particularly to the drawings wherein like reference characters designate corresponding parts throughout all views of the same, the numeral 10 designates an elongated casing which will hereinafter be referred to as the plunger casing. While it is obvious that this casing may have any desired cross section, the same is preferably cylindrical and externally threaded on one end as at 11 and internally threaded at its other end as designated by the reference character 12. Threadedly engaging the internally threaded end 12 of the plunger casing is a closure plug 13 provided with a central bore 14 and a shouldered end portion 15. This closure plug is threadedly adjustable longitudinally of the casing for a purpose to be hereinafter described. Threadedly engaging the externally threaded end 11 of the plunger casing is a cap 16 provided with a central aperture 17 for a purpose hereinafter to be described.

Mounted for reciprocation within the casing 10 is a plunger 18 having one end adapted for abutting engagement with the head 19 of an impact member 20. The shank portion of this impact member is journalled in and projects through the bore 14 of the closure plug 13 and is provided in its opposite sides with grooves 21, the bases of which are connected by a transverse bore 21′. If desired, suitable packing 20′ may be provided between the head 19 and the member 13 to slightly cushion the movement of the impact member. Detachably mounted on the outer end of the impact member 20 is the hammer head 22, the shank portion 23 of which receives the shank of the impact member. Any suitable means may be provided for limiting outward movement of the hammer head 22 this means in the present embodiment constituting a U-shaped spring 24 having its base arranged in the bore 21′ and its legs in the grooves 21. The legs of the U-shaped spring bear outwardly against the interior of the shank 23 of the head thus frictionally preventing outward movement of the head. It is obvious that a new hammer head may be quickly substituted for the old one by pulling the old one off against the frictional grip and forcing a new head on the impact member into engagement with the spring, the legs of the spring seating in the grooves to permit this movement.

Mounted within the casing 10 is a spring 26 having one end in engagement with the plunger 18 and its opposite end in engagement with the movable abutment plate 27. An arm 28 is secured to the outer face of the movable plate 27 and projects through the

aperture 17 in the cap member 16. The outer end of the arm 28 may be provided with a head 29 and one edge of this arm is provided with a plurality of ratchet teeth 30.

Carried by the cap 16 is a latch mechanism for engagement with the ratchet teeth 30 on the arm 28. This latch mechanism includes a housing 31 secured to the cap 16, which housing is open at its lower end and is provided in its outer face with a slot 32. Slidably mounted within the housing 31 is a latch member 33 yieldably urged downwardly by a spring 34 arranged between the upper end of the latch member 33 and the top of the housing. The latch 33 has a cam engaging portion 34' which engages the ratchet teeth 30 to prevent outward movement of the arm 28. As clearly illustrated in Figure 1 of the drawings, these teeth are so arranged that if the arm 28 is pressed inwardly, the cam surfaces of the teeth and the latch member cooperate to force the latch member upwardly against the tension of the spring. To release the latch member to permit outward movement of the arm 28, there is provided a stem 35 carried by the latch member and extending through the slot 32 formed in the housing 31.

Secured in any suitable manner to the under side of the casing 10 is a gear casing 36. This casing is provided with a slot 37 which is in alignment with slots 38 and 39 formed in the upper and lower walls respectively of the casing 10 and there is provided a pin 40 which extends through the plunger 18, and the slots 37, 38 and 39 respectively as clearly illustrated in Figure 1 of the drawing. The casing 36 is also provided with a centrally arranged boss 41 which in the preferred construction, is integral with the bottom 42 of the casing.

Rotatably mounted on the boss 41 is a gear member 43 having internal gear teeth 44. The gear member 43 has an upper plane surface 45 to which is secured, as by screws 46, a cam member 47 provided with a plurality of spaced cams 48. As clearly shown in Figure 2 of the drawings these cam members 48 are adapted to engage the lower end of the pin 40 whereby rotation of the gear member 43 and the cam member 47 moves the pin 40 in the slots 37, 38 and 39, the plunger 18 being carried by this movement, away from the impact member 20 against the tension of the spring 26. Any suitable means such as a washer 49 and a nut 50 may be provided for securely positioning the gear member 43 on the boss 41.

Closing the outer side of the casing 36, is a cover 51 which cover may be held in place by a nut 52 threaded on the outer end of the boss 41. The cover and nut cooperate to brace the outer end of the boss 41 to prevent breaking of the boss at the point where it projects from the bottom 42 of the casing. This cover 51 carries a depending casing 53 which casing forms a housing for the drive shaft 54.

Loosely mounted on the upper end of the drive shaft 54 and in meshing engagement with the gear teeth 44 is a driving pinion 55 having a bearing engagement as at 56 with a suitable flange 57 extending inwardly from the cover 51 and in alignment with the walls of the casing 53.

For coupling the drive shaft 54 to the driving pinion 55 there is provided a clutch mechanism which includes a movable clutch member 58 mounted on a squared portion 59 of the shaft 54. The movable clutch member is provided with a groove 60 adjacent its upper end and has formed on its upper face, a clutch surface 61 adapted to be moved into engagement with the corresponding clutch surface 62 formed on the lower end of the pinion gear 55.

For sliding the movable clutch member 58 into engagement with the pinion 55 there is provided a bifurcated yoke 63 which engages the slot 60 formed in the movable clutch member. This yoke 63 is bent as at 64 to form the downwardly extending portion 65 which extends parallel to and adjacent the casing 53. For normally urging the yoke 63 and the clutch member 58 downwardly, a spring 66 is arranged between the furcations of the yoke, this spring having its lower end in engagement with the base of the furcations and its upper end in engagement with a bolt 67 carried by the casing 53 and projecting through the furcations of the yoke. A suitable cover plate 68 is provided for holding the spring in place and this cover plate is secured in proximity to the outer face of the yoke by the nut 69 which threadedly engages the outer free end of the bolt 67.

To actuate the yoke 63 there is provided, a lever 70 pivoted as at 71 to a band 72 which encircles the casing 53. As will be clearly seen from Figure 5 of the drawings, the bolt 71 serves not only as a pivot for the lever 70 but also as a means for uniting the free ends of the band 72 whereby this band is rigidly clamped on the casing 53. The lever 70 is provided with a finger opening 73 and a shouldered portion 74 which shouldered portion is adapted for engagement with the lower free end of the yoke 63.

In operation, the shaft 54 is rotated by any suitable motor. The rotation of this shaft is transmitted through the clutch member 58 to the pinion 55 which pinion in turn rotates the internal gear 44 which carries the cam member 47. Rotation of the cam member 47 forces the pin 40 and the plunger 18 backwardly against the tension of the spring 26 until the peak of the cam 48 moves out of the path of travel of the pin 40 whereupon the plunger 18 is released and forced forwardly by the tension of the spring 26. In

its forward movement the plunger 18 engages the impact member 20 and the force of the impact is transmitted to the hammer head 22 which engages the work to be hammered. To increase the force of the stroke the abutment plate 27 is adjusted longitudinally of the casing 10 to increase the compression of the spring 26.

To decrease the stroke of the plunger the plug 13 is threaded inwardly whereby the impact member and plunger are both moved longitudinally of the plunger casing toward the cap 16. This decreases the travel of the pin 40 in the slots 37, 38, and 39 and consequently the stroke of the plunger.

The shoulder 15 on the plug 13 engages the end of the casing 10 after a predetermined adjustment to prevent movement of the pin 40 beyond a point where it would be out of the path of the cams 48.

It will thus be seen that I have provided a novel means for actuating a power hammer, which means is independent insofar as its force is concerned, of the speed of the motor used for actuating the hammer. The motor driven mechanism merely functions to retract the plunger while the spring 26 serves to provide the force with which the blow is struck. By virtue of the means provided for adjusting the tension of the spring and by virtue also of the ready accessibility of the spring whereby a stronger spring may easily be substituted in the event it is desired, it will be seen that I have provided simple and effective means for regulating the force of the blows struck by the hammer.

While one embodiment of my inventive idea has been described somewhat in detail, it is to be clearly understood that these drawings and description are for the purpose of illustration only and are not to be construed as definitive of the limits of the invention. The right is therefore reserved to make such changes in the details of construction and arrangement of parts as will fall within the purview of the accompanying claims.

What I claim as my invention is:

1. A power hammer including in combination, a plunger casing, a plunger reciprocable within said casing, a spring within said casing for urging the plunger in one direction, means for moving the plunger in opposition to the force exerted by said spring, and means for adjusting the tension of said spring, said last mentioned means including a plate like member engageable with the free end of the spring and adjustable longitudinally of the said casing, an arm carried by the plate like member and means engageable with the arm for locking the plate like member in adjusted position.

2. A power hammer including in combination, a plunger casing, a plunger reciprocable within said casing, a spring within said casing for urging the plunger in one direction, means for moving the plunger in opposition to the force exerted by said spring, and means for adjusting the tension of said spring, said last mentioned means including a plate like member engageable with the free end of the spring and adjustable longitudinally of the said casing, an arm carried by the plate like member ratchet teeth formed on the said arm, and a latch member engageable with the said ratchet teeth for locking the plate like member in adjusted position.

3. A power hammer including in combination, a plunger casing, an apertured cap closing one end of the said casing, a plunger reciprocable within said casing, a spring within said casing for urging the plunger in one direction, means for moving the plunger in opposition to the force exerted by said spring, a plate engageable with the free end of the said spring, the said plate being movable to adjust the tension of the said spring, an arm secured to the said plate and projecting through the aperture in the cap, a housing carried by the cap adjacent the aperture therein, a latch within the said housing and a spring urging the latch in engagement with the said arm, the said latch being operable to prevent movement of the said arm in one direction.

4. In a power hammer, a slotted plunger casing, a plunger within the said plunger casing, a spring constantly urging the said plunger in one direction, a pin carried by the said plunger and projecting through the said slots in the plunger casing, a second casing secured to the said plunger casing, the said second casing being provided with a slot registering with the slots in the plunger casing, a cam within the said second casing engageable with the pin carried by the plunger, a drive shaft, a movable clutch member on the drive shaft for coupling the said drive shaft to the said cam, and L-shaped yoke for actuating the said movable clutch member, and a pivoted lever engageable with the free end of the said yoke for moving the same.

5. The combination in a power hammer, of a plunger, a cam for moving said plunger, a drive shaft, a drive shaft casing, a clutch for coupling the said drive shaft to said cam, a yoke for moving the said clutch member, a lever for moving the said yoke, and means for pivotally mounting the said lever, said means including a band encircling the said drive shaft casing and a connection between the free ends of the said band for clamping the said band to the drive shaft casing and forming a pivot pin for the said lever.

6. The combination in a power hammer, of a plunger, a cam for moving the said plunger, a drive shaft, a casing enclosing the said drive shaft, a movable clutch member on the said drive shaft for coupling the drive shaft to the said cam, a yoke for actuating said

clutch, member, a spring engageable with the said yoke for urging the clutch to releasing position, a bolt carried by the drive shaft casing and projecting through the furcations of the said yoke, the said belt forming an abutment for the said spring, a cover plate, forming with the furcations of the yoke, a housing for the said spring, and means for maintaining the said cover plate in engagement with the said yoke, said means including a threaded member engageable with the free end of the said bolt.

7. In a power hammer, a plunger casing having an elongated slot therein, a plunger within said casing, a spring normally urging the plunger in one direction, a pin carried by the plunger and projecting through the elongated slot in the plunger casing, a cam arranged exteriorly of the plunger casing and engageable with said pin, means for actuating the cam including, a drive shaft, having a gear freely rotatably mounted thereon, a second gear secured to said cam and adapted to mesh with the gear aforesaid, and a clutch for securing said first mentioned gear to the drive shaft.

In testimony whereof I affix my signature.

LEO F. KOTT.