Oct. 13, 1931. J. E. BRYAN 1,827,611

ELECTRIC HAMMER

Filed March 12, 1928

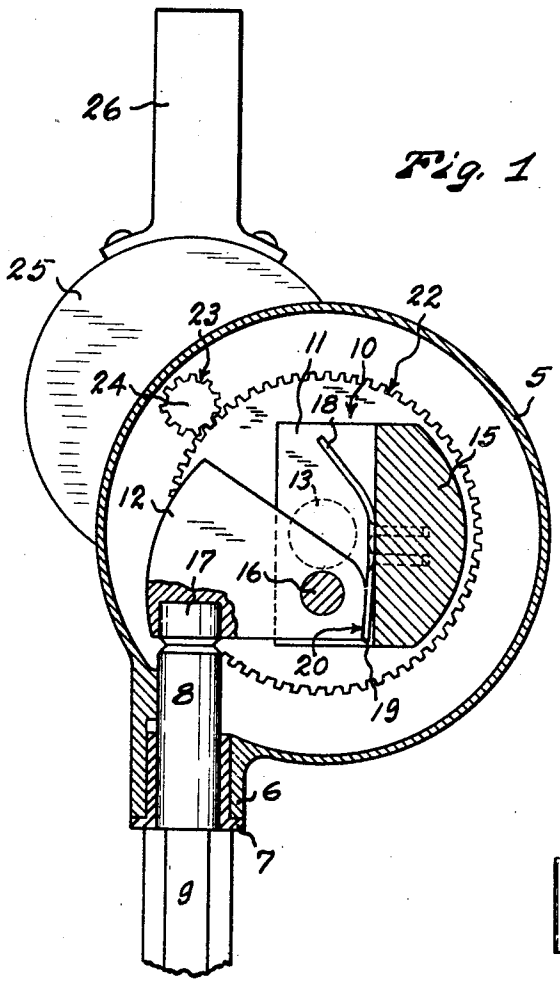


Fig. 1

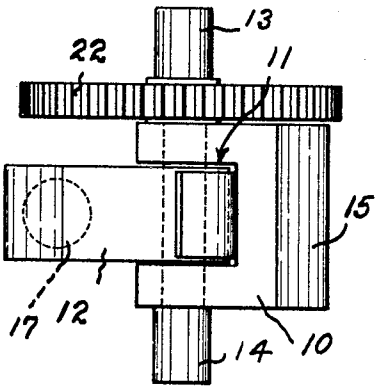


Fig. 3

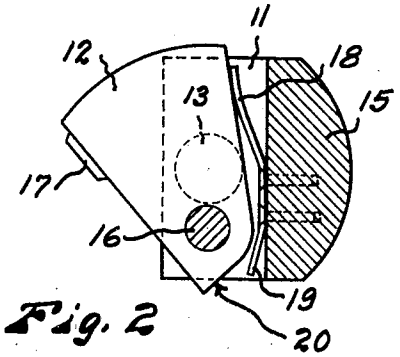


Fig. 2

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ELECTRIC HAMMER

Application filed March 12, 1928. Serial No. 261,104.

My invention relates to improvements in centrifugal rotary hammers and the general object of my invention is to simplify and increase the efficiency of hammers of this nature.

A more specific object is to provide a centrifugal rotary hammer employing a relatively heavy hammer element which is kept near to the axis about which it is rotated thereby utilizing to the greatest possible extent the limited amount of power available for operating said hammer.

A further object is to provide efficient spring shock absorbing means for arresting the swinging movement of the hammer at the limit of its movement in both directions.

Other and more specific objects and advantages relative to vibration elimination and rapid withdrawal of the hammer from the point of striking contact after successive impacts, will be apparent from the following description taken in connection with the accompanying drawings.

In the drawings, Figure 1 is a view partly in elevation of a centrifugal rotary hammer constructed in accordance with my invention.

Fig. 2 is a detached view partly in elevation of the hammer element and mounting for the same showing the hammer in a retracted position.

Fig. 3 is a detached top edge view of the hammer assembly.

Referring to the drawings, throughout which like reference numerals designate like parts, 5 is a cylindrical hammer housing having at one side a substantially tangential guide bar 6 provided with a bushing 7 within which the cylindrical end 8 of a tool 9 is slidably disposed, the said cylindrical end 8 projecting into the housing 5 as shown in Fig. 1.

A centrifugal hammer and mounting for the same are disposed within the housing 5. The hammer mounting comprises a block 10 recessed on one side as at 11 for the reception of a hammer element 12 and having two bearing pins or studs 13 and 14 that project in opposite directions therefrom and are journaled in the housing 5. A portion 15 of solid metal extends across back of the recess 11 serving the double purpose of a counterweight and a means of uniting the two sides of said mounting as hereinafter explained. The hammer element is fulcrumed on a pivot pin 16 whose center is offset a short distance relative to the common center or axis of the studs 13 and 14, and in a manner such that, at the revoluble point of contact of the hammer to the tool 9, the plane of the hammer striking face will be in approximate right or acute angular relationship to a plane taken through both the axis of the base and hammer, the said pivot 16 constituting, in effect, a crank pin on which the hammer element is mounted. An anvil piece 17 of suitable steel is inserted in the hammer element 12 for striking the blows on the end 8 of the tool.

For absorbing the shock of the hammer as it rebounds from the tool, I provide a spring element 18 which may be located in the bottom of the recess 11, and I also provide another spring element 19 with which a shouldered projection 20 of the hammer may engage for absorbing the shock of the hammer as it swings outwardly after passing the striking position. The movement of the spring element 19 is limited by the back wall of the recess 11 so that the hammer element will be positively stopped and can not swing further than the position shown in Fig. 1, under the influence of centrifugal force.

The hammer assembly is driven by a gearwheel 22 which is rigidly secured to the bearing stud 13 and meshes with a pinion 23 on a shaft 24 that may be directly connected with an electric motor in a housing 25 that is rigidly secured to the housing 5. One or more handles 26 may be provided on the housings 25 and 5.

In the operation of this hammer, when the gearwheel 22, together with the block 10 and hammer element 12 are rotated rapidly in the direction indicated by the arrow A the hammer element will be urged outwardly by centrifugal force into the position shown in Fig. 1, the portion 20 coming in contact with the spring 19 which serves as a cushion, first to absorb the shock and then to positively limit the swinging movement of the hammer element as the spring is forced against the

back wall of the recess 11. When hammer element reaches the position shown in Fig. 1 it will strike a blow on the end 8 of the tool, then, as the pivot 16 moves on around its crank circle, the hammer element will be withdrawn from contact, partly by rebound and partly by the effective arcuate travel of crank pivot 16, being positioned as described in such relationship, at point of contact, with respect to the base rotation, as to afford the maximum movement per degree of travel in a rapid clearing of the anvil piece 17 from tool 8, prior to the subsequent and necessarily rapid centrifugal force reaction of the hammer. More particularly, as the hammer element passes the end of the tool centrifugal force is rapidly reasserted to return the hammer element into successive striking relationship with respect to the tool, a blow upon each complete revolution of the hammer assembly. The spring 18 absorbs all shock of the rebound and helps to throw the hammer element out quickly after it has passed the tool. The hammer, being mounted close to the base axis on a relatively short crank arm and imparting at the position described, eliminates vibrational torque, allowing a most effective operation with a minimum amount of power, being driven at relatively high speed to afford heavy and effective striking blows in rapid succession. This makes a particularly desirable hammer for use with electrical power where the available voltage is limited and where a small motor must be used in order to keep down the weight of the tool.

The foregoing description and accompanying drawings clearly disclose a preferred embodiment of my invention, but it will be understood that this disclosure is merely illustrative and that such changes in the invention may be made as are fairly within the scope and spirit of the following claims.

What I claim is:—

1. A power hammer having a rotatable hammer block bifurcated deeper than its axis of rotation to provide a rear wall and an integral counter-balancing portion rearwardly of said wall, and a hammer member pivotally supported between said bifurcations in offset disposition of the block axis to accommodate a retractive movement of a portion of said hammer member past the axis of said block, said hammer member being conformed, cooperatively with the rear wall of said block, so as to normally position the plane of the striking face in approximate right angular disposition to a plane taken through the block and the hammer axes.

2. A power hammer as defined in claim 1, wherein said rear wall affords a cushion to both the retractive and extended movements of the hammer member.

3. A power hammer having a rotatable hammer block bifurcated deeper than its axis of rotation to present an uninterrupted channel projecting through and beyond the axis of rotation of said block, and a hammer member pivotally supported between said bifurcations, said pivot being eccentrically of the block axis so as to normally position the plane of the hammer striking face in approximate right angular disposition to a plane taken through the block and the hammer axes, and affording retractive movement of a portion of said hammer member past the axis of said block, and said block having an integral rearwardly extending portion beyond the rear wall of said channel for counter-balancing the pivotal activity of the hammer member, and means interposed between said rear wall and the hammer member for cushioning said hammer member in both the retractive and extended cycles of operation.

4. In a power hammer, a rotatable block, said block being bifurcated to provide an uninterrupted channel projecting through and beyond the axis of rotation of said block, a hammer member pivotally received in said channel to allow swing activity of a portion thereof beyond said block axis, the portion of said block rearwardly of the channel affording a counterbalance to the hammer activity, said hammer member being eccentrically pivoted in said channel in relative adjacency to said block axis, means provided by said hammer member and the rear wall of said channel to normally position the plane of the striking surface of said hammer member in approximate right angular disposition to a plane passing through said block and hammer axes, and means to rotatively drive said block.

In witness whereof, I hereunto subscribe my name this 25th day of February, A. D. 1928.

JAMES E. BRYAN.