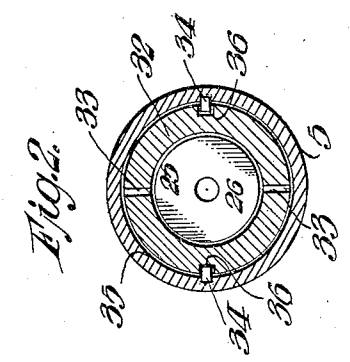
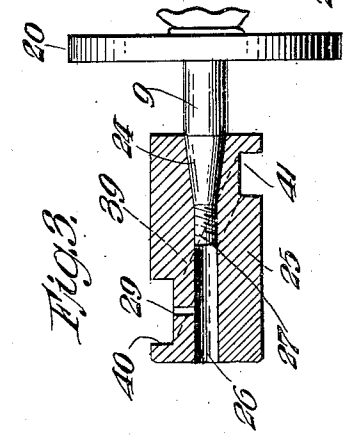
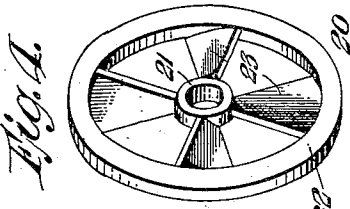
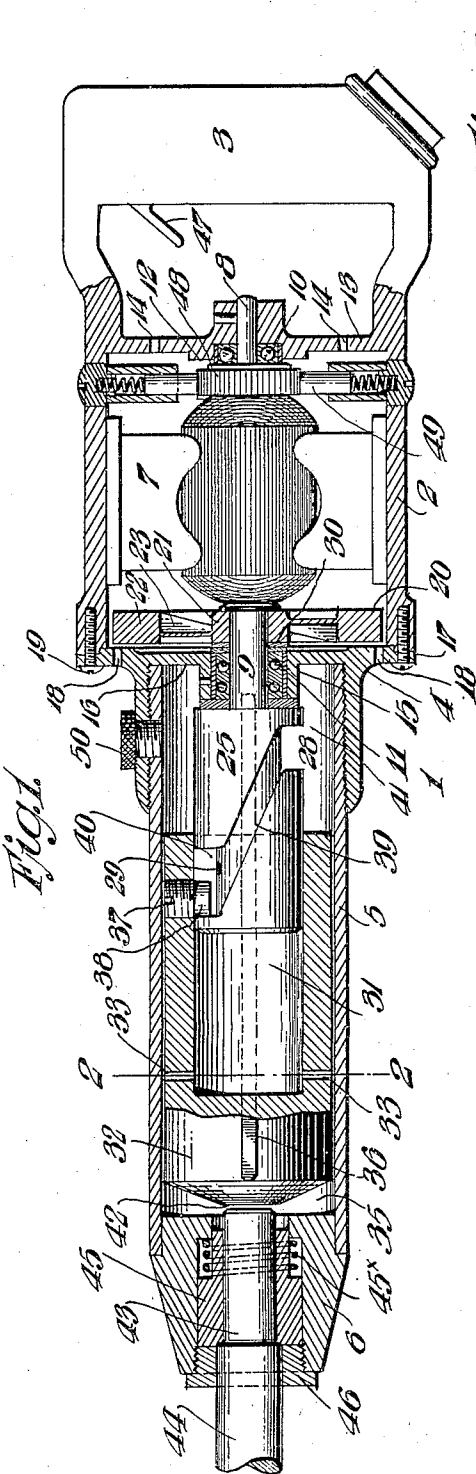


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H. B. GRINER
ELECTRIC HAMMER

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UNITED STATES PATENT OFFICE.

HARRY B. GRINER, OF OAKLYN, NEW JERSEY.

ELECTRIC HAMMER.

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To all whom it may concern:

Be it known that I, HARRY B. GRINER, a citizen of the United States, residing in Oaklyn, in the county of Camden, State of New Jersey, have invented a new and useful Electric Hammer, of which the following is a specification.

My invention consists of a novel construction of an electrically operated hammer, wherein the power taken from an electric motor is transmitted from the motor shaft directly to a rotor having a cam slot therein, whose walls engage a pin of a reciprocating hammering piston, whereby the rotary movement of the rotor is transformed into the reciprocatory movement of the piston.

It further consists of a novel construction of an electric hammer, wherein a balance wheel applied to the motor shaft has the dual function of cooling the motor, and of imparting a regular and uniform movement to all the rotary and reciprocating parts.

It further consists of novel means for ventilating the motor casing and of novel means for lubricating the revolving rotor and the reciprocating piston.

It further consists of novel means for assembling the motor casing, cylinder and the coupling common to said casing and cylinder, and the nose piece and its adjuncts for the forward end of said cylinder.

It further consists of other novel features of construction and advantage all as will be hereinafter pointed out in the claims.

For the purpose of illustrating my invention, I have in the accompanying drawings forms thereof which are at present preferred by me, since they will give in practice satisfactory and reliable results, although it is to be understood that the various instrumentalities of which my invention consists can be variously arranged and organized and that my invention is not limited to the precise arrangement and organization of these instrumentalities as herein shown and described.

Figure 1 represents a longitudinal sectional view partly in elevation of an electric hammer, embodying my invention.

Figure 2 represents a section on line 2—2 Fig. 1.

Figure 3 represents a longitudinal sectional view on the forward end of the motor shaft showing its connection to the rotor.

Figure 4 represents a perspective view of the balance wheel employed in detached position.

Similar numerals of reference indicate corresponding parts.

Referring to the drawings:—

In carrying out my invention, I construct the exterior of my novel electric hammer 1, of the following principal elements, the motor casing 2, which has the grasping handle 3 preferably integral therewith, the coupling member 4, common to the forward end of the motor casing and the rear end of the cylinder 5, whose forward end has the nose piece 6 secured thereto.

The electric motor 7 may be of any standard or conventional type and is mounted on the shafts 8 and 9, which rotate in the ball bearings 10 and 11 respectively. The rear bearing 10 is mounted in the hub or boss 12 of the partition 13, which is provided with the ventilation ports 14, while the forward bearing 11, is mounted in the hub 15 of the partition 16 of the coupling member 4, the outer flange 17 of which has ventilation ports 18 therein and is secured to the forward end of the motor casing 2 by the bolts 19 or the like. 20 designates a combined fly wheel and fan, which is secured fast to the shaft 9, in the rear of the partition 16, and within the forward end of the motor casing 2. The wheel 20 is composed of the hub 21 and the outer solid peripheral rim 22, between which are the radial vanes or blades 23, whereby a suction is created through the holes 18, for the purpose of cooling the motor, said fan being also so proportioned as to serve as a fly wheel or balance wheel, whereby a steady and uniform speed is imparted to the rotary and reciprocating elements to be hereafter referred to.

The forward portion of the front motor shaft 9, is tapered as indicated at 24, (Fig. 3) and engages a tapered seat in the rotor 25, which has the longitudinal passage 26 therethrough. The forward terminal of the tapered portion 24, is in engagement with the contiguous wall of the bore or passage 26 by means of a left hand thread, as indicated at 27. The rotor 25 rotates in the lubricant chamber 28 at the rear of the cylinder 5, and the lubricant has access to the bore 26 of the rotor, through the port 29, the lubricant being prevented from entering the motor chamber, by the packing or

washers 30. The forward end of the rotor 25 is nicely fitted within the rear end of the chamber 31 of the reciprocating piston 32, which is provided with the oil ports 33. 34 designates longitudinally extending keys, secured in the walls of the piston chamber 35, and engaging the longitudinal aligning grooves 36, whereby the piston 32 is prevented from rotating and always reciprocates in the same rectilinear path. The rear end of the piston 32 has the threaded plug 37, secured therein, whose inner terminal 38, projects into and engages the walls of the cam like or inclined continuous slot 39, it being noted that said slots are provided with the widened portions or dwell at the opposite points 40 and 41, whereby the hammering piston is enabled more efficiently to perform its hammering function.

I preferably form a striker 42 on the forward end of the piston 32, which is adapted to impact upon the shank 43 of the working tool 44. The shank 43 is contained in the sliding bushing 45, which is cushioned by the spring 45*, said bushing being held in the nose piece 6 by the nut or closure 46. I have deemed it unnecessary to show in detail the electrical connections to the motor 7, or the switch therefor, which can be manually opened or closed by the finger piece 47. The commutator and brushes 48 and 49 are of the usual construction.

The lubricant is introduced into the lubricant chamber 28 through the plug or closure 50, said chamber 28 forming a continuation of the piston chamber 35, as is evident.

The working tool or implement 44 may be a chisel, or similar implement adapted for chipping stone, metal or other materials or for ramming sand or any other similar purpose, or a rivet set of the usual character may be substituted therefor when it is desired to use the device as a riveter. Instead of the closed handle 3, an open or pistol grip handle may be employed if desired.

The operation is as follows:

The power or rotation of the motor shaft 9 is imparted directly to the rotor 25, which revolves as a unit therewith, and through the medium of the continuous cam slot 39 and pin 38 the rotation of the rotor is transformed to the reciprocatory movement of the piston 32, the latter being prevented from turning by the guides 34, engaging the walls of the longitudinal grooves 36 in the piston. By the provision of the dwell at the points 40 and 41 a slight rebound of the piston is permitted, at the impact of its forward end with the shank 43 of the working tool, so that there is no undue shock or loss of power at any stage of the cycle of operation.

The balance wheel 20 causes the rotary

and reciprocatory movements of the various parts to be steady and uniform, and in addition the motor is kept cool and at the proper temperature at all times.

The moving parts are properly lubricated at all times by the provision of the ports and passages 29, 26 and 33, as is evident.

It will be understood that the bushing 45, the shank 43 of the working tool and their adjuncts are proportioned substantially as seen in Figure 1, so that the striker 42 of the piston will not impact against the shank 43 until the working tool 44 is pressed against the work. When said working tool is pressed against the work, the shank 43 will be pushed inwardly, the spring 45* will be compressed, and the striker 42 will then impact upon the end of the shank 43 as is evident.

It will further be understood that the parts are so proportioned that when the piston 32 is in its extreme forward position the parts will appear substantially as seen in Figure 1 and the striker 42 will be normally out of contact with the shank 43 until the latter is pressed inwardly by the application of the working tool to the work.

It will now be apparent that I have devised a novel and useful electric hammer which embodies the features of advantage enumerated as desirable in the statement of the invention and the above description, and while I have, in the present instance, shown and described a preferred embodiment thereof which will give in practice satisfactory and reliable results, it is to be understood that such embodiment is susceptible of modification in various particulars without departing from the spirit or scope of the invention or sacrificing any of its advantages.

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

1. In an electric hammer, an electric motor, a motor casing therefor, a motor shaft having its bearings in said motor casing, a rotor connected to said motor shaft and revolving in unison therewith and provided with a cam groove, a cylinder, a reciprocating piston therein having a chamber for the reception of said rotor and a pin carried by said piston and engaging said cam groove, and a working tool normally out of contact with said piston.

2. In an electric hammer, an electric motor, a motor casing, a cylinder attached to said casing, a motor shaft mounted in said casing, apertured partitions at each end of said motor casing, a balance wheel carried by said motor shaft and provided with blades for creating air circulation in said motor casing, a revoluble rotor attached to said motor shaft, a reciprocating piston in said cylinder and connections common to

said piston and rotor, whereby the rotary movement of the latter is transformed into the reciprocatory movement of the piston.

3. In an electric hammer, an electric motor, a motor casing, a cylinder attached to said casing, a motor shaft mounted in said casing, apertured partitions at each end of said motor casing, a balance wheel carried by said motor shaft and provided with blades for creating air circulation in said motor casing, a revolving rotor attached to said motor shaft, a reciprocating piston and connections common to said piston and rotor, whereby the rotary movement of the latter is transformed into the reciprocatory movement of the piston, and means for preventing rotation of said piston.

4. In an electric hammer, a motor shaft, a rotor secured thereto, and provided with a cam groove having a dwell at its opposite ends, to compensate for the rebound of the piston after impact, a piston having a chamber therein, for the reception of said rotor and a pin carried by said piston and engaging said cam groove, whereby said piston is reciprocated.

5. In an electric hammer, an electric motor, a shaft therefor, a rotor mounted on said shaft and having a left hand threaded connection therewith, a cam groove on said rotor, a piston having a chamber therein, for the reception of said rotor, a pin common to said cam groove and said piston, means for preventing said piston from rotating and a balance wheel mounted on said motor shaft and contained within said motor casing.

6. In an electric hammer, an electric motor, a shaft therefor, a rotor mounted on said shaft and having a left hand threaded connection therewith, a cam groove on said rotor, a piston having a chamber therein,

for the reception of said rotor, a pin common to said cam groove and said piston, means for preventing said piston from rotating and a balance wheel mounted on said motor shaft and contained within said motor casing, said balance wheel comprising a solid hub and rim and radial blades common thereto.

7. In an electric hammer, a motor casing having a grasping handle integral therewith, an electric motor in said casing, partitions in said casing, a motor shaft having bearings in said partitions, a balance wheel on said motor shaft, within said casing, said wheel being provided with blades for circulating air in said casing, a rotor having a tapered joint connection with said motor shaft, an inclined cam groove on said rotor provided with dwells at its opposite ends, a reciprocating piston having a chamber therein for the reception of said rotor, a pin carried by said piston and projecting inwardly to engage said cam groove, and means for preventing rotation of said piston.

8. A device of the character stated comprising a cylinder provided with a lubricant chamber, a hollow piston mounted in said cylinder, a rotor located within and operative to impart reciprocating movement to said piston, a motor housing carried by the cylinder, a motor in said housing operatively connected to said rotor, the connecting part therebetween being lubricated from said chamber, and means for preventing escape of lubricant to the motor housing.

HARRY B. GRINER.

Witnesses:

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EMILY I. VODGES.