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G. L. KOLLOCK

ELECTRIC HAMMER

Filed July 12, 1923

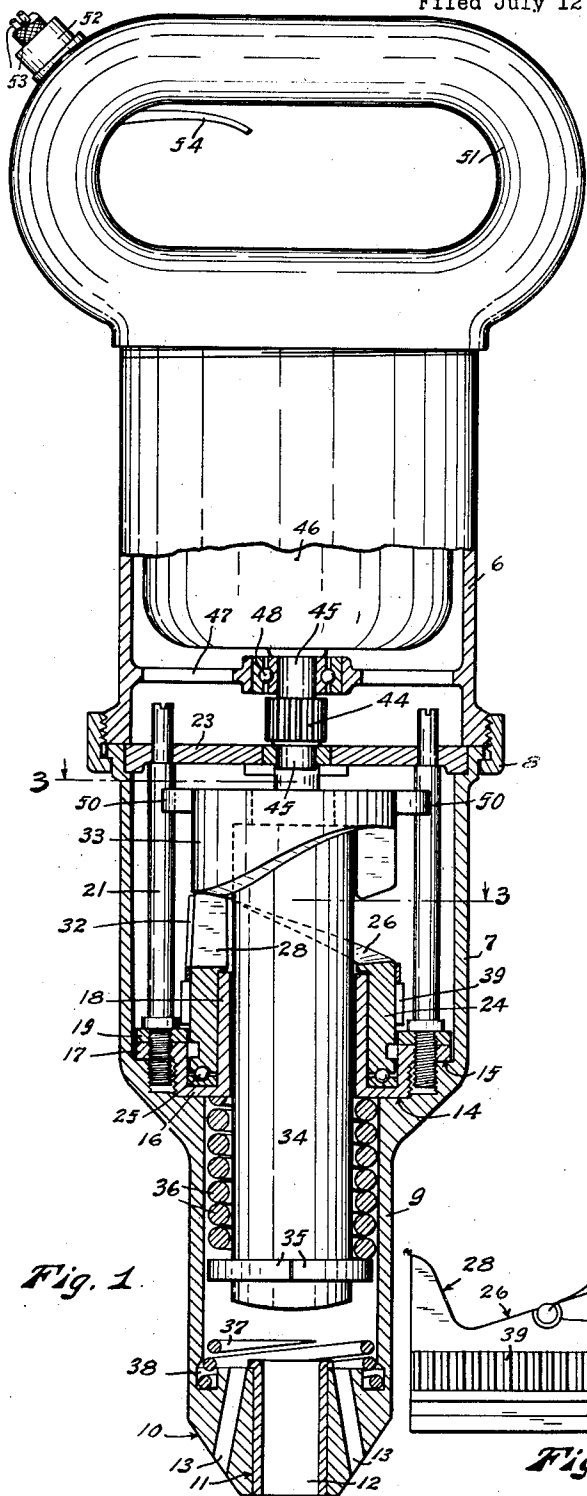


Fig. 1

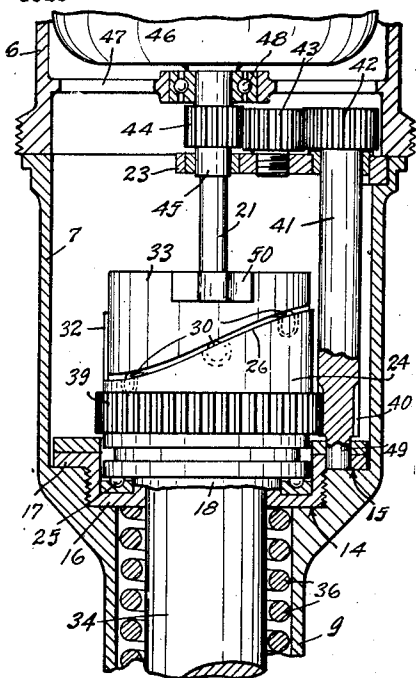


Fig. 2

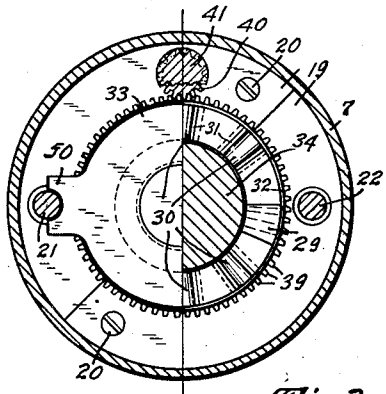


Fig. 3

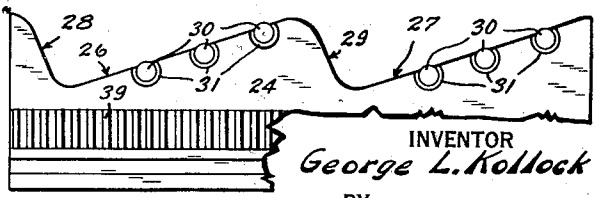


Fig. 4

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ELECTRIC HAMMER.

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To all whom it may concern:

Be it known that I, GEORGE L. KOLLOCK, a citizen of the United States, residing at Seattle, in the county of King and State of Washington, have invented a certain new and useful Improvement in Electric Hammers, of which the following is a specification.

My invention relates to improvements in electric hammers and an object of my invention is to provide an electrically operated hammer that embodies a striking member actuated by a compression spring that is alternately compressed and released by a cam driven by an electric motor.

Another object resides in the novel construction of a double or duplex cam mechanism for operating the striking member, said mechanism embodying one cam member having a plurality of roller bearings embedded in the bearing surface thereof and another cam member movable on said roller bearings.

Another object is to provide novel and efficient means for guiding the reciprocating striking element of the hammer said guiding means being arranged to absorb the torque that is transmitted by the cams to striking member without causing undue wear and without causing said striking member to bind and thereby become less efficient in operation.

With the above and other objects in view the invention consists in the novel features of construction and combination of parts, the essential elements whereof are recited in the appended claim and a preferred form of embodiment of which is hereinafter described and fully illustrated.

I accomplish these objects by devices illustrated in the accompanying drawings, wherein—

Figure 1 is a view in longitudinal mid-section of a tool constructed in accordance with my invention parts being shown in elevation and the striking member being shown elevated;

Fig. 2 is a fragmentary longitudinal sectional view in a plane at substantially right angles to the plane of the section of Fig. 1;

Fig. 3 is a view in cross-section on two different planes substantially on line 3, 3 of Fig. 1; and

Fig. 4 is a view of one of the cam members showing the same as it may appear if laid out on a flat plain.

Referring to the drawings throughout

which like reference numerals indicate like parts, I have shown a housing comprising an upper cylindrical housing member 6 and a lower cylindrical housing member 7 that are detachably joined by a fitting ring 8. The lower housing member 7 is provided at the outer end with a tubular shank 9 of a smaller diameter which terminates in a convergent end 10 provided with an axial opening 11 herein is fitted a bushing 12 through which the end of a tool, not shown, may be inserted. Perforations 13, to permit a free inlet and outlet of air, are provided in the end 10 around the opening 11.

The bottom end of the housing member 7 is internally counterbored where it joins the smaller shank 9 to form two shoulders 14 and 15 whereon a base 16 and a peripheral flange 17 of a suitable bearing plate may rest, the base portion 16 being threaded into the counterbore, as more clearly shown in Fig. 2, said bearing plate is provided with an upwardly protruding centrally arranged tubular bearing member 18.

An annular plate 19 is secured by screws 20 to the top of the flange 17 to form a more substantial support through which two diametrically opposite guide posts 21 and 22 that are parallel with the axis of the hammer may be threaded. The guide posts 21 and 22 are supported at their upper ends in a bracket 23 that is secured within the upper end of the housing 7.

A lower driven cam member 24 is mounted on the tubular member 18 and is supported on a ball thrust bearing 25 that rests on the base plate 16. The lower cam member 24 is provided on its upper end with two relatively long cam surfaces 26 and 27 that are inclined at a lesser angle and with two diametrically opposite abrupt offsets 28 and 29. The cam surfaces 26 and 27 are provided at a plurality of points with radially arranged rollers 30 rotatably disposed in segments of bearing sleeves 31 that are embedded in the cam in a manner more clearly shown in Fig. 4 so that the peripheral portions of the rollers 30 will project a short distance above the plane of the surfaces 26 and 27. The rollers 30 and cam sleeves 31 are preferably tapered and are retained in place by a sleeve 32 that fits over the outside of the cam and is secured thereto.

A non-rotatable cam 33 shaped to fit the cam 24 is arranged to seat on the rollers 30 on the top of the same and is secured to a

cylindrical shank 34, herein termed a striking member, that extends downwardly through the tubular bearing member 18 into the housing shank 9. The lower end of the striking member 34 is provided with an annular groove, not shown, wherein is disposed a split ring 35 that forms an annular flange on which a compression spring 36 may rest. The upper end of the spring 36 abuts the plate 16.

A buffer spring 37 is disposed within an annular recess 38 in the bottom of the shank 9, the recess 38 preferably being undercut or of larger diameter than the interior of the shank 9, as shown, so that the buffer spring may be crowded down into said recess when compressed but will not snap entirely out of the recess when expanded. The buffer spring is arranged to catch the striking member just before it reaches the end of its stroke and thereby prevent damage being done to the several parts of the hammer.

The lower cam member 24 is externally provided with gear teeth 39 that meshes with internal pinion teeth 40 on the lower end of a jack shaft 41. The upper end of the jack shaft 41 is secured to a gear pinion 42 which meshes with an idler pinion 43 which, in turn, meshes with a pinion 44 on the driven shaft 45 of a motor 46 which is disposed within the upper housing member 6 and may be any desired style and type of electric motor capable of generating enough power to operate the hammer. A bracket 47 affording a bearing 48 for the motor shaft 45 between the motor 46 and gear pinion 44 is provided in the housing member 6. The upper end of the jack shaft 41 is journaled in the bracket 23 and the lower end of said jack shaft 41 terminates in a bearing stud 49 that is journaled in the plate 19 and flange 17.

The non-rotatable cam 33 is provided with semi-circular guide members 50 that fit over the guide posts 21 and 22 and prevent rotation of said cam 33 when the cam 24 is rotated. This particular mechanism for resisting the torque due to the rotation of cam 24 has been found to be exceptionally efficient and durable and to be free from any binding effect that might tend to lessen the efficiency of the hammer.

The upper housing member 6 is provided with a suitable handle 51 having an inlet 52 for electric circuit wires 53 by which electric current is supplied to the motor 46, and having suitable switch mechanism operated by a finger piece 54 for controlling the flow of such electric current.

The cam member 24 rotates at relatively high speed and the rollers 30 adjacent the abrupt shoulders 28 and 29 are near enough

to said shoulders so that there will be no sliding contact between the two cam members at the time the shoulder portions of the upper cam member drops from the corresponding shoulders 28 and 29 of the lower cam.

In operation, when the motor is rotated, rotary movement will be transmitted through gear pinions 44, 43, 42, jack shaft 41, and gears 40 and 39 to the lower cam to impart a rapid succession of upward movements to cam 33 and striking member 34 each of which movements will compress the spring 36 which will expand and drive the striking member outwardly to strike a blow each time the upper cam member 33 drops from the abrupt shoulders 28 and 29 of the lower cam member 24.

The foregoing description and accompanying drawings clearly disclose what I now consider to be a preferred embodiment of my invention but it will be understood that this disclosure is merely illustrative and that such changes may be made as are within the scope of the following claim:

What I claim is:

A tool of the class described embodying a cylindrical housing, an integral tubular shank of smaller diameter than said housing on the lower end thereof, a shoulder formed in the bottom of said housing at the junction of the housing and the shank, a fitting member rigidly secured to the housing and resting on said shoulder, an axially arranged tubular bearing member on said fitting, a cam rotatably mounted on said bearing member, a striking member reciprocable within said tubular member, another cam secured to the upper end of said striking member and arranged to engage with and be reciprocated by said first named cam, a collar forming an external flange at the lower end of said striking member, a compression spring arranged to bear against said collar, guide posts extending axially of said casing, means on said upper cam for slidably engaging said guide posts to prevent rotation of said upper cam, a gear on the periphery of said lower cam, a jack shaft mounted for rotation in said housing, a pinion on the lower end of said jack shaft meshing with said gear, a pinion on the upper end of said jack shaft; a motor mounted in said housing and having a driven shaft arranged axially of said housing, a pinion on said motor shaft, and an idler gear interconnecting the pinion on said motor shaft and the pinion on the upper end of the jack shaft.

In witness whereof, I hereunto subscribe my name this 5th day of July, A. D. 1923.

GEORGE L. KOLLOCK.