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R. GOLDSCHMIDT

MECHANICAL HAMMER

Filed May 27, 1921

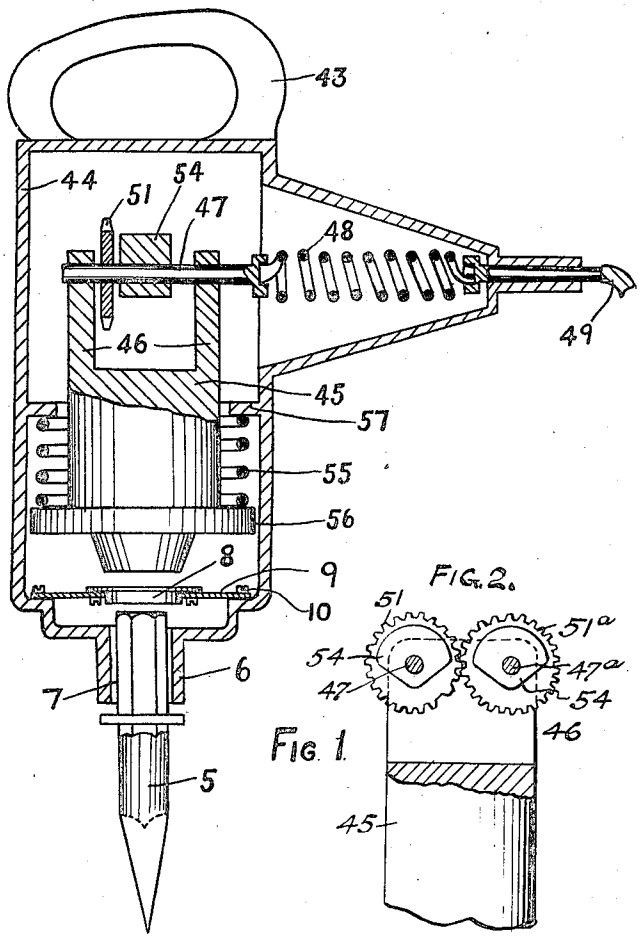



FIG. 1.




FIG. 2.

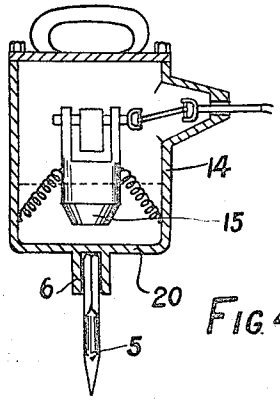



FIG. 4.

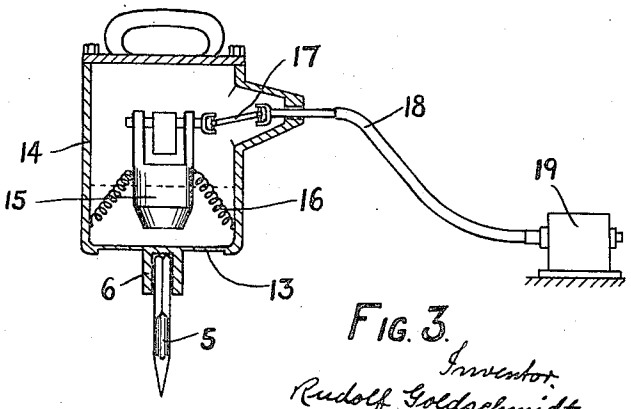



FIG. 3.

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# UNITED STATES PATENT OFFICE.

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## MECHANICAL HAMMER.

Application filed May 27, 1921. Serial No. 473,032.

*To all whom it may concern:*

Be it known that I, RUDOLF GOLDSCHMIDT, a German citizen, residing at 45 Linden Allee, West End, Berlin, Germany, have invented new and useful Improvements in Mechanical Hammers, of which the following is a specification.

This invention relates to mechanical hammers and has for its object to provide means for preventing the escape of lubricant from and the entry of impurities into the casing.

According to the present invention the apparatus comprises the combination of a reciprocated hammer and a closed casing enclosing the hammer so that the hammer strikes the tool through the wall of said casing.

In carrying out this invention the wall of the casing struck by the hammer may be sufficiently thin to be flexible or it may be in the form of a flexible diaphragm.

In order that the invention may be more clearly understood, reference will be hereinafter made to the accompanying diagrammatic drawings, whereon:—

Fig. 1 is a sectional elevation of a mechanical hammer illustrating one form of the present invention.

Fig. 2 is a detail view at right angles to Fig. 1.

Figs. 3 and 4 are sectional elevations on a smaller scale illustrating a form of mechanical hammer and showing two further modifications of the invention.

Referring to Fig. 1, which represents a mechanical hammer or percussive tool of the type described in my co-pending patent application, Serial No. 436,206 filed 10th January 1921, the tool comprises a casing 44 adapted to be supported by a handle 43. A tup 45 is adapted to reciprocate within the casing 44, for which purpose it is formed with lugs 46 supporting a driving spindle 47 driven by a coil spring 48 from a flexible shaft 49 connected to any suitable form of prime mover or motor. The spindle 47 carries a spur wheel 51 driving a spur wheel $51^a$ (Fig. 2) on a parallel spindle $47^a$ as described in my aforesaid patent application. The spindles 47 and $47^a$ are each fitted with an excentric weight 54, the centrifugal action of which causes reciprocation of the tup 45. A spring 55 is fitted between a collar 56 on the tup 45 and a collar 57 on the casing 44.

It will be seen that the tool comprises essentially four parts, namely, a tool 5 (such as a chisel, rivet head sinker or the like), a casing 44 having a guide 6 for the tool shank 5, a tup 45 which reciprocates within the casing 44 and imparts its stored energy by impact to the tool 5, and the driving mechanism 47, 48, 49, 51, 54, which however varies according to the power available, which may be either centrifugal action as illustrated or it may be compressed air, electrical energy or the like.

Dust, chippings or destructive fluids may obtain access to the interior of the casing 44 through the space 7 between the guide 6 and tool 5 and thus damage the driving mechanism or interfere with the lubrication. The lubricant could also escape through the space 7. This is a particular drawback if the tup and driving mechanism is flooded with lubricant, that is to say, if the interior of the casing 44 is wholly or partly filled with lubricant. Experience has shown that, in the usual constructions, even with a relatively good joint between the tool 5 and the guide 6, the lubricant is ejected by the blows imparted to the tool.

In order to overcome these drawbacks, the casing according to the present invention is enclosed in such a manner that the energy is nevertheless transmitted by the tup to the tool. For this purpose the tup does not act directly upon the tool, but through the medium of one wall of the casing which is interposed between the tool and its driving tup.

In Fig. 1 a bolster 8 in the form of a plug is secured to a transverse flexible diaphragm 9 which is secured by screws, bolts or the like 10 to the casing 44 so as to form one wall thereof. The diaphragm 9 is sufficiently flexible to enable the plug 8 to transmit the blow from the tup 45 to the tool 5. The flexible diaphragm 9 may be made of any suitable material, such as thin metal, rubber, leather or the like.

It is not essential that a flexible diaphragm 9 should be provided. The casing 44 may itself be so constructed that its lower wall is sufficiently thin to act in the manner of a flexible diaphragm.

Fig. 3 illustrates a percussive hand tool in which the tool 5 is supported in a guide 6 depending from the thin lower wall 13 of a casing 14 enclosing the tup 15, which in this case is illustrated as controlled by springs 16 and driven by a universally jointed shaft 17 and flexible shaft 18 from a motor 19.

It will be seen that in this case the lower wall 13 of the casing is of reduced thickness as compared with the walls of the casing 14 so that the lower wall 13 forms a flexible diaphragm to transmit the blow from the tup 15 to the tool 5.

In the further embodiment of my invention illustrated in Fig. 4, the casing 14 is formed with a lower non-flexible wall 20 which carries the guide 6 and transmits the blow from the tup 15 to the tool 5.

Claims—

1. A reciprocatory tool comprising a casing having an elastic end wall, a tup guided within the casing, mechanism for reciprocating the tup to cause it to strike the central portion only of said end wall and a tool support on the end of the casing for supporting the tool in proximity to said end wall.

2. A reciprocatory tool comprising a casing, a tup guided within the casing, mechanism for reciprocating the tup, an extension on said casing forming a support for the tool in alinement with the tup, and a transverse elastic diaphragm between the tool and tup for closing said casing.

3. A reciprocatory tool comprising a casing, a tup therein, mechanism for reciprocating the tup, a tool guide for permitting movement of the tool in the direction of movement of the tup and a fluid-tight elastic closure for the casing between said tup and tool guide.

RUDOLF GOLDSCHMIDT.