May 30, 1933. A. G. DECKER 1,911,813

PORTABLE POWER HAMMER

Filed Sept. 28, 1927 2 Sheets-Sheet 1

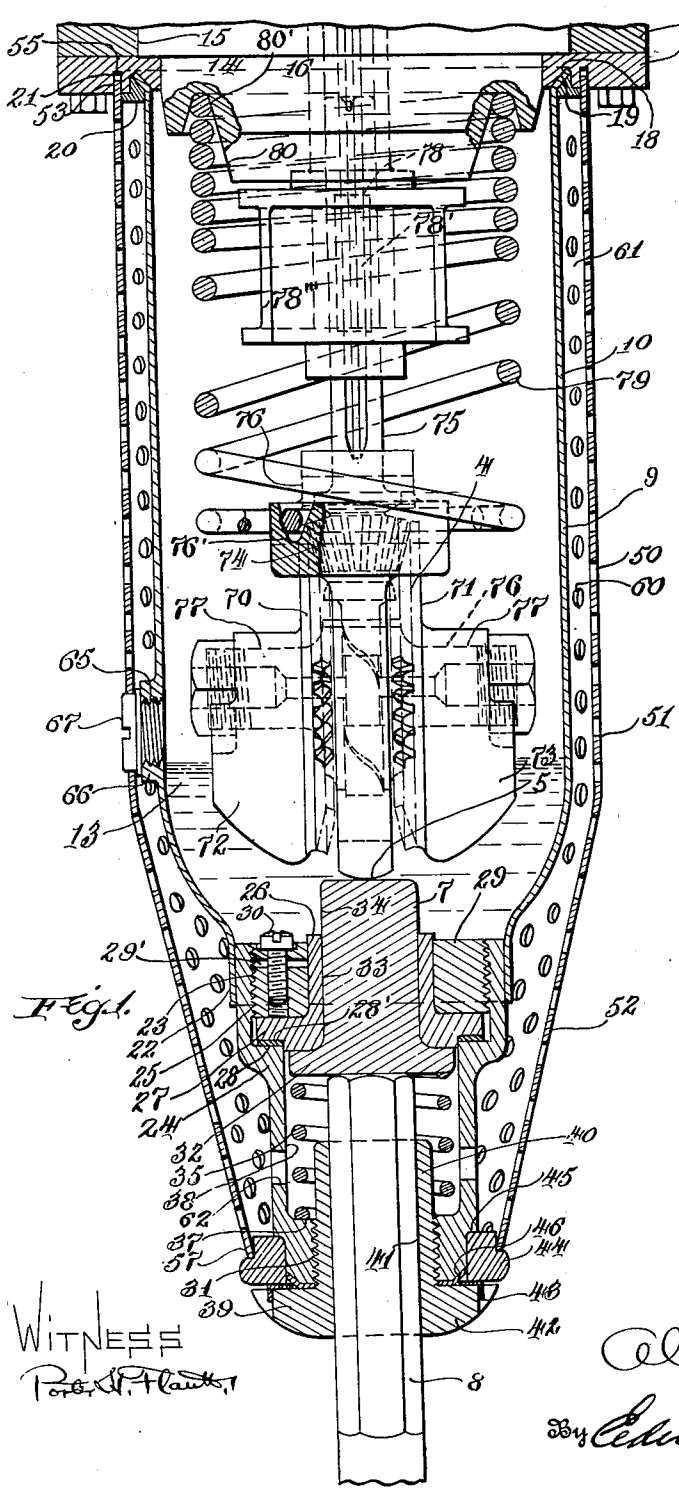


Fig. 1.

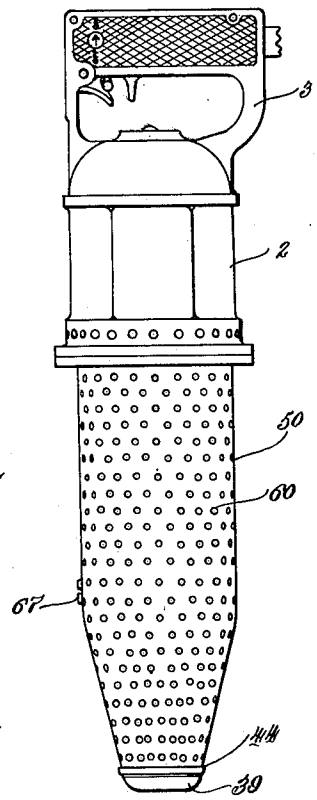


Fig. 3.

WITNESS

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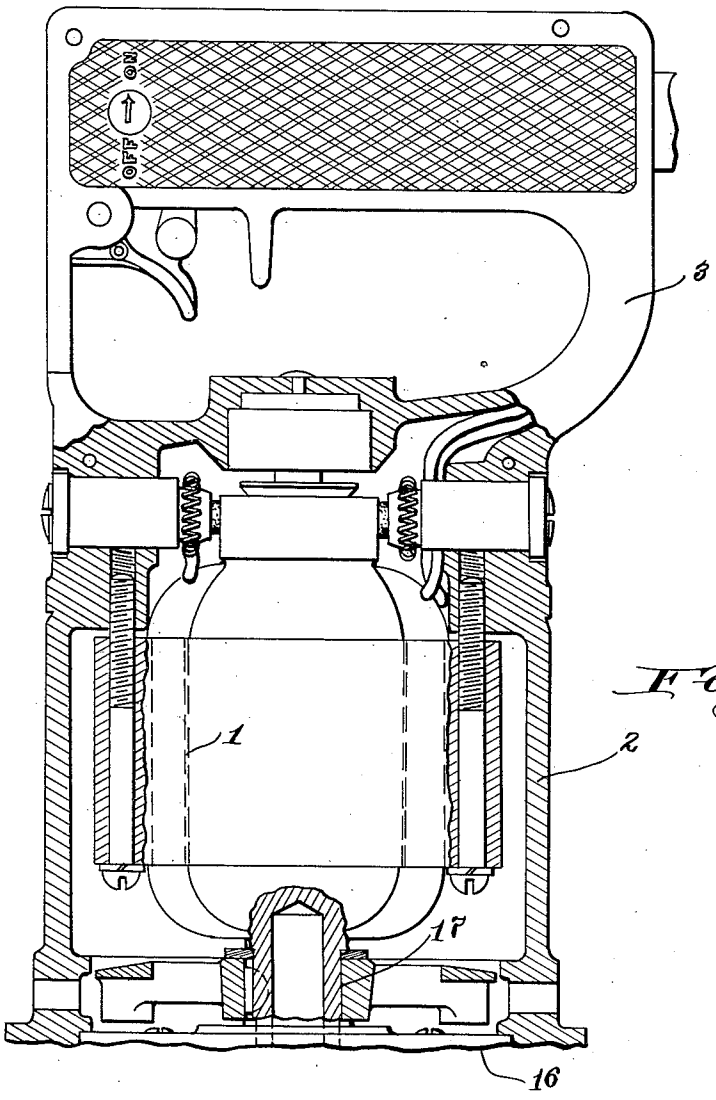


Fig. 2.

Witness
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UNITED STATES PATENT OFFICE

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PORTABLE POWER HAMMER

Application filed September 28, 1927. Serial No. 222,573.

The invention relates to a percussive hand tool or power driven manually portable and directed hammer, the machine shown being of the type in which a reciprocating ram or tup transmits its impact to an anvil which, in turn, engages the bit or bit holder. The hammer parts thus described are enclosed within a casing or barrel.

In connection with the invention it is of interest to note that the operation of the hammer within the casing, particularly the continual beating of the ram or tup against the anvil generates heat which is communicated to the barrel, causing difficulty in directing the tool, as it is generally desirable for this purpose for the operator to grasp the barrel. To overcome this difficulty the machine of the invention is provided with means protecting the hands of the operator from the heat and tending to cool the barrel.

The invention also includes a removable tool bushing by which the bit operated by the hammer is held and guided in the path of the anvil, and an oil tight mounting for the anvil with means for returning the anvil following the stroke of the tup, said means being in the form of a spring which also takes up the impact of the ram or tup and preserves the structure from the shock of the strokes of the ram when the tool is not in position for operation.

In the accompanying drawings I have illustrated in detail a hammer of the type described, the barrel structure of which embodies the features of the invention in the preferred form.

In the drawings:

Figure 1 is an axial section through the barrel portion of the tool.

Figure 2 is a corresponding section through the upper portion of the tool showing the motor, hand grip, switch, etc., in elevation, the view being continuous with Figure 1 or slightly overlapping.

Figure 3 is a side elevation in the form of an external view of the entire tool on a reduced scale.

Referring to the drawings by numerals, each of which is used to indicate the same or similar parts in the different figures, the machine, as shown, comprises a motor 1 enclosed within a motor casing or motor housing 2 having a suitable grip or handle 3 by which it is held, supported and directed. The motor 1 has a driving connection to the hammer mechanism 4, shown in elevation in Figure 1, the hammer mechanism being of any suitable and preferred type, as shown in prior United States Patents Nos. 1,489,319, 1,484,490 and 1,620,201 whereby a reciprocating motion or pulsation is imparted to a weight which on its downward stroke creates an impact which is imparted to the tool 8. In the construction shown, the hammer stroke is produced by means of eccentrically weighted bevel gears 70 and 71, the weighted portions being indicated by reference characters 72 and 73. These gears are driven in opposite rotation, the weights being so placed as to move downwardly in unison, by bevel pinion 74 on pinion shaft 75 which is extended downwardly below the pinion carrying rotatively mounted thereon a cross bearing member 76, the bevel gear bearings being on the horizontal or transverse arms 77. The cross bearing member 76 carries at its lower end, opposite pinion 74, tup 5. The pinion shaft 75 is mounted to slide in the motor shaft 17, which is hollow and provided at its lower end with coupling member 17''' secured to the said shaft 17. The coupling member 78''' is formed with a spline 78 sliding in the groove 78' pinion shaft 75. The spring 79 tends to hold the members 70, 71, 76, etc., in the lowermost position with the tup in contact with the anvil 7. The spring 79 also prevents rotation of the bearing member 76 and parts covered thereby about the motor shaft, being

wound at its upper end about stationary cone 80 having a groove 80′ at its base in which the end of the spring is seated, and at its lower end the spring is frictionally or otherwise engaged with the upper portion of bearing member 76 where it is seated in groove 76′. The eccentricity of the weights 72 and 73 sets up a series of vertical pulsations of the ram composed of the parts carried by bearing member 76 which are communicated to the anvil 34 in the form of a succession of impacts of the tup 5 against the anvil.

In accordance with the preferred practice, the hammer parts below the motor are submerged in oil 13 to a level approximately as shown and enclosed within a barrel 9 which holds the supply of oil within which the parts operate, as aforesaid. This barrel 9, as shown, comprises a cylindrical portion 10 of sheet metal secured at its upper end to a top plate or ring 11 in any suitable manner, as by welding. In the form shown, its edge 18 is forced into seating groove 19, shown as of V section concentric with the motor axle in which it is secured by brazing or welding. The metal deposited by the brazing or welding process produces a shoulder 20, and a circular groove 21 concentric with the axis is formed at the edge of the shoulder. The exact details of this arrangement are, however, not essential to the main features of the invention. The plate or ring 11, is, in turn, secured to a corresponding flange 12 at the bottom of the motor housing preferably by holding. The opening 14 in the ring 11 registers with an opening 15 in the bottom of the motor housing, but these openings are closed by the bearing and supporting structure 16 surrounding the motor shaft.

The barrel 9 is shown as reduced at 22 at its lower end, the upper portion 10 being cylindrical, and into this lower end is inserted the nose-piece 24 to which the barrel is secured in any suitable manner, as by welding. The nose-piece 24 is formed as to its upper portion with an opening 25 concentric with the axis. The upper portion of this opening is threaded at 23. In the lower portion of this opening below the thread is seated the anvil guide bushing 26 flanged as to its lower end at 27 to engage a shoulder 28 in the opening 25 below the threaded portion 23. In the form shown, there is a gasket 28′ between the shoulder and the flange to effect a tight fit and prevent leakage of oil. The guide 26 is held in position by a split threaded ring or nut, referred to as a retaining screw 29 slotted at 29′, which is locked by means of pinch screw 30, the operation of which will be easily understood.

The anvil 7 is so fitted to the guide 26 that freedom of longitudinal movement is obtained without permitting oil leakage. This anvil is of suitable wear-resisting material and provided at its bottom edge with a flange 32 which normally, i. e., between strokes of the hammer, bears against the bottom surface of the guide 26 around the opening 33 therein and in which the shank 34 of the anvil 7 is fitted, as aforesaid.

The anvil is held normally in retracted, i. e., uppermost position by the unloading spring 35, the flange 32 being thereby pressed against the corresponding surface of the guide 26, thus determining the retracted position of the anvil.

Below the shoulder 28 the cavity 25 in the nose-piece 24 is reduced in diameter forming spring cavity 38. The unloading spring 35 is shown in the form of a helical coil bearing at its lower end against an annular shoulder 37 inside the nose-piece at the bottom of the spring cavity 38 and at its upper end the spring bears against the bottom surface of the anvil 7. At its lower end, leading downwardly from the bottom of the spring cavity, the nose-piece 24 is provided with a threaded axial opening 31 which carries the tool bushing 39, the same having an upwardly disposed shank 40 which is correspondingly threaded to engage the opening 31 and the bushing 39 is also formed with a central axial opening 41 for the tool or tool bit, the same being shown as of hexagonal cross section and in which, as illustrated, the tool or tool shank 8 is inserted.

The tool bushing 39 has at its lower end a thickened flange 42 which projects outwardly over the end of the nose piece, the said flange being preferably curved as to its lower or outside surface to give the tool a smooth and pleasing outline, and it may be provided to advantage with two or more flattened surfaces 43 for engagement by means of a wrench whereby the tool bushing may be instantaneously removed and replaced when worn, this part of the tool being in ordinary use subjected to excessive wear.

The nose-piece 24 further carries at its lower end just above the flange 42 a heat insulating ring 44 for protection of the hands of the operator and for insulating the outer casing 50, as hereinafter described. This ring is shown as seated in an annular recess 45 formed in the outer surface of the nose-piece 24. To prevent rotation of the tool bushing 39 a lock washer 46 is placed between the end of the nose piece, the ring 44 and the flange 42 of the tool bushing 39.

An important feature of the invention resides in the means for protecting the hands of the operator from the heat generated by the hammer, as aforesaid, and transmitted to the oil within the barrel 9 and hence to the surface of the barrel, and for disposing of the heat thus generated. This protecting

and cooling means consists of a perforated outer casing or grip 50 completely enclosing the barrel, spaced away from it and insulated therefrom. This outer casing 50 is formed of perforated sheet metal, as shown, and as to its upper portion 51 is of cylindrical outline, the lower portion 52 being, in the form shown, frusto conical, the reducing taper at 52 providing a convenient grip and corresponding in a general way to the outline of the lower end of the barrel 9 and nose 24.

The word perforated as used in this paragraph in connection with the casing 50 refers to material having numerous perforations, so that the word foraminated may be considered a more acurate descriptive term.

In the form of the invention shown, in order to secure the outer casing 50 in position the upper edge 53 of the same is seated in a groove 21 in the ring of plate 11, and to insure that the outer casing is tight and prevent vibration the construction is shown as including a spring ring 55 deflected in the direction of its axis from the flat plane of the circle. The ring 55 being first placed in the groove 21, the edge 53 of the cylinder is forced into the groove against the ring tending to flatten it, taking up any tendency to play between the parts. This casing 50 is supported at its lower edge on an annular shoulder 57 formed on the insulating ring 44, which ring, being seated after the casing is placed in position, is forced upwardly, the tool bushing being then inserted and engaged. The outer casing is then tightened by turning up the tool bushing 39 causing it to take up by means of the threads.

The outer casing or cylinder 50 is shown as provided with perforation 60 throughout its area. There is a certain change of atmosphere or circulation in and through the inter-wall space 61 between the barrel 9 and the outer casing 50, due to the heat of the barrel and motion of the tool. This circulation is improved and made positive by the motion of the anvil 7 or, more particularly, the flanged end 32 thereof moving up and down in the spring chamber 38, which acts as a cylinder and is provided with a series of lateral perforations 62 arranged about its periphery. The flange 32 serves as a piston forming an effective circulating pump, air being alternately drawn in and expelled.

As a means for supplying oil to the barrel and changing the same, the latter is provided with a tapped hole 54 formed in a boss 66 thereon, the hole being closed by a screw plug 67, for the admission of which a suitable opening is provided in the outer casing 50.

The manner of operating and directing the tool, holding the same by the handle 3 with one hand and directing it with the other hand grasping the outer casing 50 will be easily understood. The difficulty previously encountered in this connection, whereby the heat transmitted to the barrel made the tools difficult to control, is completely overcome by means of the ventilated and insulated outer casing 50. In the form of the invention shown, the insulating ring 44 is caused to project outwardly beyond the surface of the casing, calling attention as the hand moved downwardly, to the fact that it is approaching a heated portion of the tool, i. e., the bit bushing 39.

In the operation of the tool, as aforesaid, the anvil 7 is engaged by the ram 5 and forced downwardly into contact with the bit 8 and tool or bit bushing 39 at each stroke, the anvil being returned by the spring 35.

In case the hammer is set in motion when the tool is not in operative position the impact received by the anvil from the ram is taken up by the spring 35, tending to absorb the shock and prevent destruction of the barrel and parts supported thereby. The removable function of the bit or tool bushing has already been referred to, as have also the oil tight properties of the anvil mounting and other features and details of the structure.

The operation of the novel features of the hammer and the advantages of the same has been fully brought out in the preamble and in connection with the description of the structure.

I have thus described specifically and in detail a hand controlled power operated percussive tool or hammer embodying the features of my invention in the preferred form in order that the nature and operation and manner of applying the same may be clearly understood, however, the specific terms herein are used descriptively, rather than in a limiting sense, the scope of the invention being defined in the claims.

What I claim as new and desire to secure by Letters Patent is:

1. An electrically driven percussive tool having mechanical impact generating and delivery means which means in its operation produces a considerable amount of heat due to friction and impact, a barrel enclosing the same and a hand grip encircling the barrel with means securing the same to the barrel and solid heat insulating means supporting it and insulating it from the barrel the grip having means providing for the circulation of a cooling agent therethrough.

2. In a power driven percussive tool, impact generating and delivery means including an anvil having a shank and an upwardly disposed shoulder, a guiding bushing for the anvil engaging the shank, a nosepiece in which the anvil is mounted the same being chambered and shouldered to admit

and support the bushing which is flanged at its lower end, a collar encircling the bushing and seated in the nose-piece about the bushing, a spring in the chamber below the anvil and supporting the same, a barrel enclosing said generating means and a perforated casing for the barrel spaced outwardly from the barrel, the chambered portion having an air passage connecting it to the inside of the casing whereby the reciprocation of the anvil in the chamber causes the anvil and chamber to serve the purpose of a piston and cylinder to pump air through the casing.

3. In a power driven percussive tool, mechanical impact generating and delivery means including an anvil a chambered portion within which the anvil reciprocates, the same having inlet and delivery passages for air, a spring returning the anvil after each impact the operation of which produces a considerable amount of heat due to friction and impact, a barrel and a perforated casing forming an air chamber around the barrel, the anvil and chamber by virtue of said passages and the reciprocation of the anvil as a piston serving as a pump to circulate air through the casing.

4. A power driven percussive tool having mechanical impact generating and delivery means, a barrel enclosing the same, a nose-piece secured in the end of the barrel, the impact delivering means including an anvil mounted to slide in the nose-piece the operation of which parts produces a considerable amount of heat due to impact and friction, a bit holding bushing with means removably securing the same in the lower end of the nose-piece, a heat insulating ring encircling the lower end of the nose-piece and having an upwardly disposed seat, a foraminated casing for the barrel bearing on said seat, the bushing serving as a support for the ring.

5. A portable power driven percussive tool having mechanical impact generating and delivery means which means produce in their operation a considerable amount of heat, a barrel enclosing the same, a foraminated casing enclosing the barrel, means for seating the casing at the upper end of the barrel, heat insulating means adapted to engage and support the casing at the lower end and means for forcing said insulating means upwardly against the casing, tightening the casing and holding it in position.

6. A portable power driven percussive tool having impact generating and delivery means said means in their operation producing a considerable amount of heat, a barrel enclosing the same, a foraminated casing enclosing the barrel, means for seating the casing at the upper end of the barrel, heat insulating means adapted to engage and support the casing at the lower end and means for forcing said insulating means upwardly against the casing holding it in position, and spring means at the upper end for taking up play of the casing.

7. A portable power driven percussive tool having mechanical impact generating and delivery means said means in their operation producing a considerable amount of heat, a barrel enclosing the same, a foraminated casing enclosing the barrel, means for seating the casing at the upper end of the barrel, heat insulating means adapted to engage and support the casing at the lower end and means for forcing said insulating means upwardly against the casing, tightening the casing and holding it in position, the insulating means being formed to project beyond the casing to attract the attention of the operator when the hand approaches the exposed heated portions of the tool.

8. In a portable power driven hammer having impact generating and delivery means, said means producing in their operation a considerable amount of heat, a nose piece, an anvil having a reduced upwardly projecting shank with a shoulder at its lower end, a flanged bushing surrounding the shank and engaging the shoulder in the normal position of the anvil, the flange of the bushing projecting beyond the anvil and resting on the nose piece, a threaded locking ring seated in the upper end of the nose piece surrounding and holding the bushing, a barrel enclosing the impact generating means, a flanged bushing for the tool threaded into the lower end of the nose piece, a perforated casing surrounding the nose piece and barrel, and a heat insulating member supporting the casing and supported by the flange on the tool bushing and other means engaging said casing oppositely to said insulating member.

9. A manually portable power driven percussive tool having an electric motor, a longitudinal support to which the motor is secured at one end, an anvil secured to the said support at the other end, impact generating means connected to the motor secured to the support and transmitting its impacts to the anvil a tool bushing in operative relation to the anvil, a perforated casing surrounding the anvil and the tool bushing, the heat generated by the operation of the hammer being dispensed by the circulation of air through the casing and around the anvil and bushing, which circulation is facilitated by the perforations.

10. A manually portable power driven percussive tool having a barrel, an electric motor secured to the barrel near one end and impact generating means within the barrel and connected to the motor to be operated thereby, an anvil secured to the barrel at the end opposite the motor and a tool bushing also secured to the barrel in operative relation to the anvil, a perforated casing substantially enclosing the anvil and

the tool bushing, and means for supporting the casing and spacing it outwardly to provide an air chamber surrounding the anvil and tool bushing, the heat generated by the operation of the hammer being dispersed by the circulation of air through the casing and around the anvil and bushing which is facilitated by the perforations.

Signed by me at Towson, Maryland, this 19th day of September, 1927.

ALONZO G. DECKER.