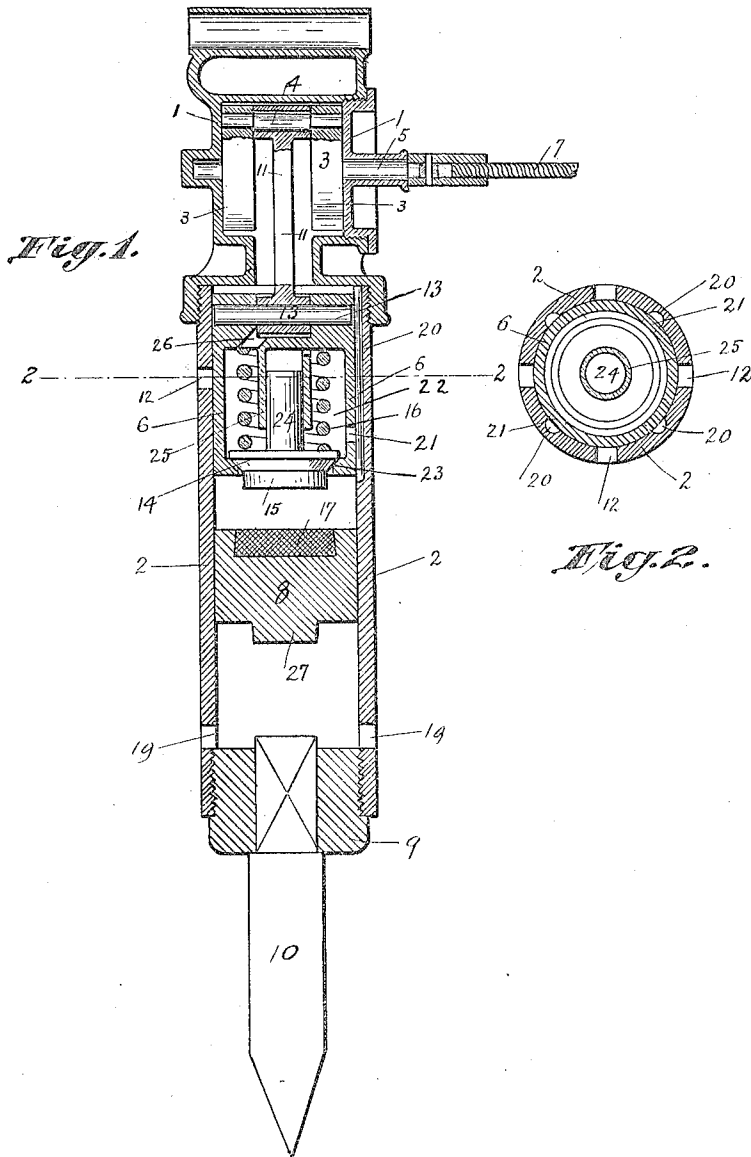


K. KUTSCHKA.
MECHANICAL HAMMER.
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1,207,417.

Patented Dec. 5, 1916.



WITNESSES:

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KARL KUTSCHKA, OF YOUNGSTOWN, OHIO.

MECHANICAL HAMMER.

1,207,417.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, KARL KUTSCHKA, a citizen of the United States, residing at Youngstown, in the county of Mahoning and State of Ohio, have invented certain new and useful Improvements in Mechanical Hammers, of which the following is a specification.

My invention pertains to mechanical or power-driven hammers for operating drilling, chiseling, riveting and similar reciprocating tools, the object being to produce a device of this character in which the maximum of efficiency may be developed with the minimum strain and wear upon the different parts.

With these and other objects in view which will be readily apparent as the nature of the invention is understood, the same consists of the novel construction, combination and arrangement of parts hereinafter illustrated, described and claimed.

Figure 1 is a vertical section view through the hammer, and Fig. 2 is a cross section view on line 2—2 Fig. 1.

Similar reference characters designate the different parts throughout the various figures of the drawings.

In the construction of my device I employ a crank-shaft 5 mounted in a suitable housing 1 and driven by any convenient or desired means, the drawings showing a flexible shaft 7 used for that purpose. This crank-shaft carries the crank disks 3—3—or arms if desired—which are joined by the crank-pin 4.

Connected to the inner open end of the housing 1 is the cylinder 2, within which are mounted the piston 6 and the plunger or hammer head 8, and carrying at its outer end the head block 9 to which the operating tool 10 is secured by any suitable means. The piston 6 is connected with the crank-pin 4 by means of the connecting rod 11 and the wrist pin 13. It is obvious, of course, that various other methods of reciprocating the piston within the cylinder might be adopted without departing from the spirit of the invention. The opposite end of the piston is counter-bored, as at 22, and is provided at the open end of the counter-bore with the valve-seat 23 in which is seated the valve 14 carried by the valve-stem 24, which in turn is slidably mounted in the sleeve 25 formed integrally with the bottom of the counter-bore 22. The valve head

14 may be provided with the projection or striking head 15 for engagement with the plunger 8. Loosely surrounding the sleeve 25 is the coil spring 16 with its opposite ends opposed, respectively, against the bottom of the counter-bore 22 and the valve head 14.

The cylinder is provided with air holes or ports 12 near its inner end and similar air holes 19 at its outer end adjacent the head block 9, all of which communicate with the atmosphere, and with the longitudinal air ports 20 at its inner end. The piston is also provided with air ports 26 through its head and 21 through the shell or wall surrounding the counter-bore. Ports 21 are so disposed as to communicate with longitudinal ports 20. If desired, a suitable cushioning substance may be applied to the inner face of the plunger 8, as at 17, and the outer face may be provided with the striking head 27.

In the operation of my device, as the crank-shaft 5 is rotated the piston 6 will first be forced outwardly in the cylinder, causing the head 15 to come in contact with the plunger 8 and driving it out against the tool 10. When ports 12 are uncovered by the outward movement of the piston, air will rush in behind it and will be compressed in the inner end of the cylinder by the piston on its return or inward movement. As soon as ports 20 are uncovered by the inward movement of the piston, this compressed air will escape through ports 20 to the space between the piston 6 and the plunger 8 until the pressure is equalized. This process of equalization will also be facilitated by passage of air through ports 26 and 21 into ports 20. As soon as the piston, on its second outward movement, covers ports 20, it will commence to compress the air in the space between it and the plunger 8, which will gradually start the latter on its working movement before the striking head 15 comes in contact with it, thus materially relieving the device of the strain and jar ordinarily resulting from the sudden, violent contact of the two elements. When the striking head 15 comes in contact with the plunger 8 the valve 14 will open and the compressed air will pass into the counter-bore 22 and up through ports 26 until the pressure equalizes. As the piston travels inwardly again, the valve will close and a partial vacuum will be created be-

tween the piston and the plunger 8, which will permit the atmospheric pressure through ports 19 to drive the plunger 8 back into position to receive its next working impulse on the return movement of the piston.

It is thought that from the foregoing the construction, operation and advantages of my improved hammer will be apparent without further comment.

10 I claim:

1. In a mechanical hammer, a cylinder having air ports communicating with the atmosphere, and also internal air ports formed in the wall thereof; a piston mounted within said cylinder, said piston having a counter-bore, and a valve seat at the open end of said counter-bore; a valve seated upon said valve seat; a ram mounted within said cylinder; and means for reciprocating said piston.

2. In a mechanical hammer, a cylinder having air ports communicating with the atmosphere, and also internal air ports formed in the wall thereof; a piston mounted within said cylinder, said piston having a counter-bore, and a valve seat at the open end of said counter-bore, and also internal air ports; a valve seated upon said valve seat; a ram mounted within said cylinder; and means for reciprocating said piston.

3. In a mechanical hammer, a cylinder having air ports communicating with the atmosphere, and also internal air ports formed in the wall thereof; a piston mounted within said cylinder, said piston having a counter-bore, and a valve seat at the open end of said counter-bore, and also internal air ports; a valve seated upon said valve seat and provided with a projection or striking head; a ram mounted within said cylinder; and means for reciprocating said piston.

4. In a mechanical hammer, a cylinder having air ports communicating with the atmosphere, and also air ports establishing communication between points, respectively, above and below the piston at its most inner point of travel; a piston mounted within said cylinder, said piston having a counter-bore, and a valve seat at the open end of said counter-bore; a valve seated upon said valve seat; a ram mounted within said cylinder; and means for reciprocating said piston.

5. In a mechanical hammer, a cylinder having air ports communicating with the atmosphere, and also air ports establishing communication between points, respectively, above and below the piston at its most inner point of travel; a piston mounted within said cylinder, said piston having a counter-bore, and a valve seat at the open end of said counter-bore, and also internal air ports; a valve seated upon said valve seat; a ram mounted within said cylinder; and means for reciprocating said piston.

6. In a mechanical hammer, a cylinder having air ports communicating with the atmosphere, and also air ports establishing communication between points, respectively, above and below the piston at its most inner point of travel; a piston mounted within said cylinder, said piston having a counter-bore, and a valve seat at the open end of said counter-bore, and also internal air ports; a valve seated upon said valve seat and provided with a projection or striking head; a ram mounted within said cylinder; and means for reciprocating said piston.

In testimony whereof I hereunto affix my signature in the presence of two witnesses.

KARL KUTSCHKA.

Witnesses:

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HARRY G. EWING.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."