

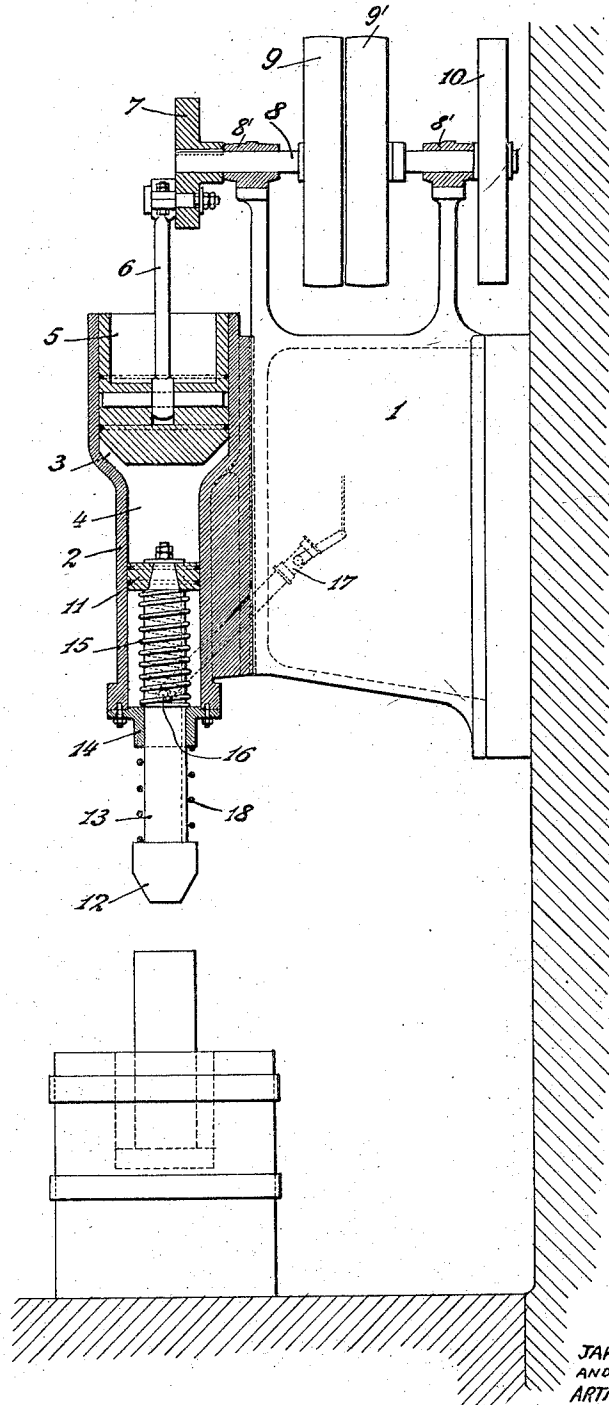
J. BERNHARD AND A. MEISTER.

PNEUMATIC HAMMER.

APPLICATION FILED DEC. 9, 1919.

1,346,166.

Patented July 13, 1920.



INVENTORS
JAKOB BERNHARD
AND
ARTHUR MEISTER
BY *Arthur Meister*
THEIR ATTORNEY

UNITED STATES PATENT OFFICE.

JAKOB BERNHARD, OF HASLE, NEAR RUEGSAU, AND ARTHUR MEISTER, OF RUEGSAU, SWITZERLAND.

PNEUMATIC HAMMER.

1,346,166.

Specification of Letters Patent.

Patented July 13, 1920.

Application filed December 9, 1919. Serial No. 343,567.

To all whom it may concern:

Be it known that we, JAKOB BERNHARD, of Hasle, near Ruegsau, Switzerland, and ARTHUR MEISTER, of Ruegsau, Switzerland, both citizens of the Swiss Confederation, and residents of Hasle, near Ruegsau, and Ruegsau, respectively, Switzerland, have invented certain new and useful Improvements in Pneumatic Hammers, of which the following is a specification.

The present invention has reference to certain new and useful improvements in power-driven hammers and relates more particularly to a power hammer, in which the hammer member proper is operated by an elastic fluid, preferably air, which is alternately compressed and rarefied by a power-driven air pump plunger member, and the specific inventive feature is the provision of a working cylinder the upper portion of which, housing the plunger member, is shorter and wider than the lower portion in which the hammer member proper reciprocates, for the purpose of obtaining for the hammer member an operative lift of relatively larger extent than that of the plunger member.

Our invention will best be understood when described in connection with the accompanying drawing which shows a vertical section through our improved pneumatic percussive hammer.

To the wall bracket 1 is secured a perpendicular cylinder 2, formed of a wider upper bore portion 3 and a narrower lower bore portion 4, both cylinder portions being superposed in coaxial alinement and the upper wider portion being shorter in extent than the lower narrower portion. In the bore 3 operates the air pump plunger head 5 to which is imparted a relatively short reciprocatory movement in the usual manner by means of the crank gear 6, 7 of the shaft 8, which latter is journaled in the wall bracket bearings 8' and is provided with the fixed pulley 9 and the idle pulley 9' and with the fly wheel 10. In the lower cylinder bore 4, closed below by the removable, flanged closure 14, operates the hammer member proper, which comprises the piston head 11, the body member 13 guided in the closure 14, and the hammer head 12. A helical rebound spring 15 is interposed around the body member 13 between the piston head 11 and the cylinder closure 14. This spring

15 serves to lift the hammer member proper immediately after the blow has been struck, aiding thereby the suction action of the plunger member, and it is so adjusted that it will normally support the hammer member in its inoperative position about midway of its lift.

The plunger member in its reciprocatory operation alternately compresses and rarefies the air within the cylinder above the hammer piston, causing the hammer member to correspondingly reciprocate in an up and down direction, and, the operative diameters of the two cylinder bore portions being different as stated above, obviously the extent of the lift of the hammer member will be the larger the greater the relative ratio of the two cylinder portions.

Near its lower end the cylinder bore 4 is provided with an air port 16 which is controlled by a valve 17, whereby the cylinder interior below the hammer piston can be brought into or out of communication with the outside air. By adjusting this air valve, which is preferably done before the hammer is started, the power effect of the hammer head can effectively be controlled by more or less throttling down the air in its exhaust from the lower cylinder space on descent of the hammer piston 11. A buffer-spring 18 is interposed between the hammer-head 12 and the cylinder closure 14.

It is clear that in the described hammer construction with a short lift of the air pump plunger a relatively long lift and thus a correspondingly large power effect of the hammer head will be obtained. The whole construction of the device is simple and not easily subject to repairs, since there is no mechanically operated governor for the hammer member proper and both piston members operate within a single-piece cylinder whose two differently dimensioned bore portions are coaxially alined. Obviously, the cylinder could also be formed of two or more sections if desired.

What we claim is:—

1. In a pneumatic hammer of the character set forth, a cylinder having two coaxial portions differing in length and width of bore and in unobstructed direct communication with each other, a plunger making an air-tight fit with the wider shorter portion of the cylinder, means for reciprocating the plunger in the cylinder, and a ham-

mer member including a piston making an air-tight fit with the narrower longer portion of the cylinder and being reciprocable therein by the movement of the plunger.

- 5 2. In a pneumatic hammer of the character set forth, in combination, a cylinder comprising an upper, short and wide portion and a lower, relatively longer and narrower portion, with both portions in coaxial
10 alinement, a plunger member airtightly fitting said upper cylinder portion, and means for reciprocating said plunger member, a hammer member proper, comprising a piston head, a body part and a hammer head,
15 said piston head airtightly operating in said lower cylinder portion, means for cushioning said hammer member in the last stage of its upward stroke, and means for normally returning said hammer member into
20 its inoperative, half-raised position.

3. In a pneumatic hammer of the character set forth, in combination, a cylinder comprising an upper, short and wide por-

tion and a lower, relatively longer and narrower portion, with both portions in coaxial alinement, a plunger member airtightly fitting said upper cylinder portion, and means for reciprocating said plunger member, a hammer member proper, comprising a piston head, a body part and a hammer head, said piston head airtightly
25 operating in said lower cylinder portion, means for cushioning said hammer in its upward stroke, means for normally returning said hammer member into its inoperative position, and means for controlling the
30 power effect of the hammer member proper, comprising an air valve near the bottom edge of said lower cylinder portion and operating mechanism therefor, for adjustably throttling the exhaust air issuing from out of the
35 cylinder interior below said hammer member piston.
40

JAKOB BERNHARD.
ARTHUR MEISTER.