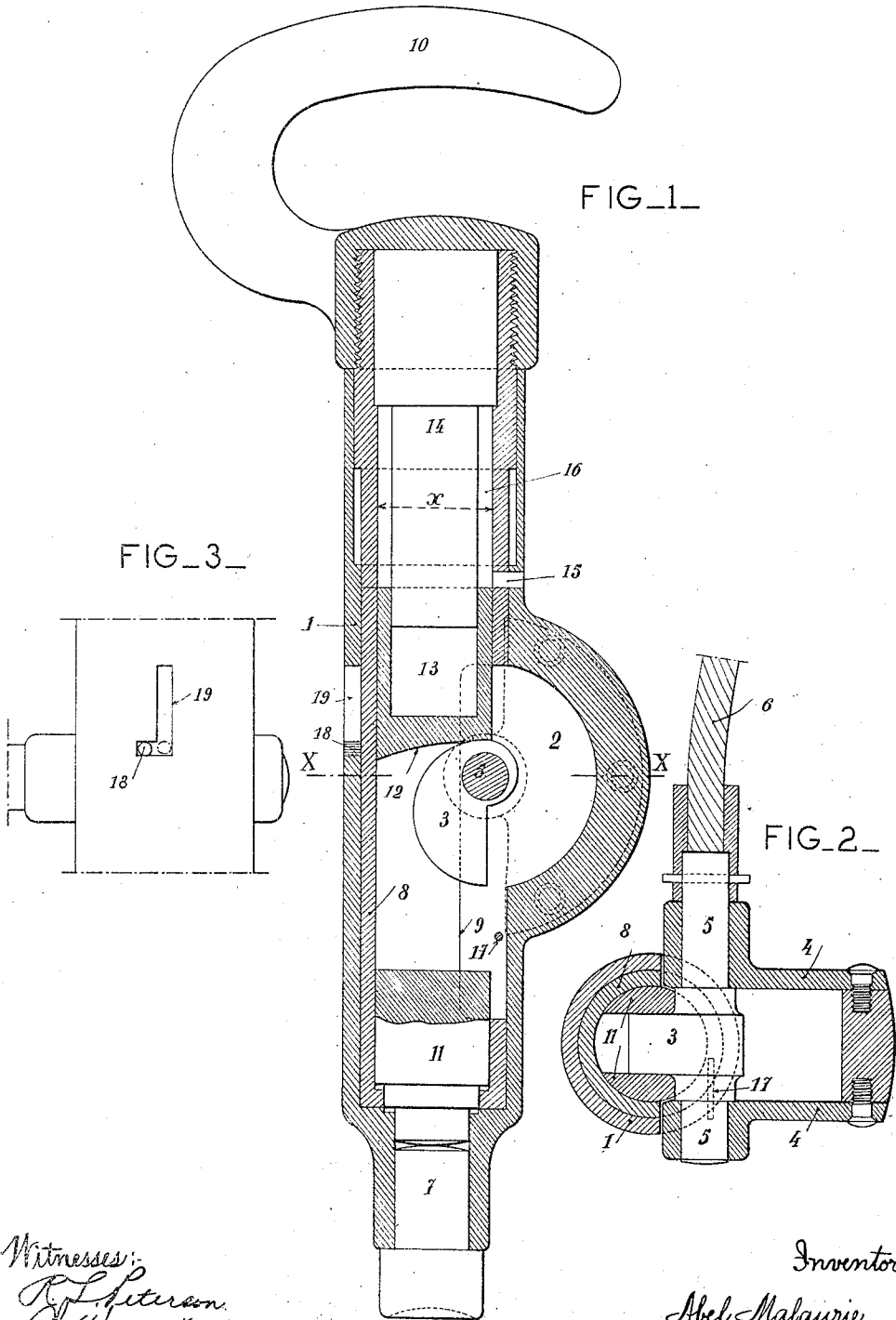


A. MALAURIE.  
POWER HAMMER.

APPLICATION FILED MAR. 23, 1910.

979,522.

Patented Dec. 27, 1910.



Witnesses:  
*R. L. Peterson*  
*L. Weintz*

Inventor  
*Abel Malaurie*  
by *Otto Munn*  
his Attorneys

# UNITED STATES PATENT OFFICE.

ABEL MALAURIE, OF PARIS, FRANCE.

## POWER-HAMMER.

979,522.

Specification of Letters Patent.

Patented Dec. 27, 1910.

Application filed March 23, 1910. Serial No. 551,150.

*To all whom it may concern:*

Be it known that I, ABEL MALAURIE, a citizen of France, residing at 78 Rue de Dunkerque, Paris, in the Republic of France, have invented new and useful Improvements in Power-Hammers, of which the following is a specification.

My invention relates to a power hammer adapted to be used by hand which presents over other power hammers already known and particularly fluid operated hammers the advantage of being very easily movable from one point to another more or less distant from the power plant without necessitating the installation of compressors or additional piping as in the case of pneumatic hammers.

My invention consists in the use for actuating the hammer, of a flexible transmission connected to a cam which is disposed so as to lift a percussion piston or body against the action of resilient means such, for example, as compressed air, the cam after leaving said piston permits the latter to fall suddenly against the tool under the expansion of the resilient means. In its preferred form, my power hammer is constructed so that the piston may be gradually removed from the action of the cam for the purpose of regulating the force of the blows and finally stopping the hammer at will.

In the annexed drawing: Figure 1 is a longitudinal section through a power hammer according to my invention. Fig. 2 is a cross section thereof along the line X—X Fig. 1. Fig. 3 is a part elevation of the same.

Referring to the drawing, 1 represents the casing or body of the hammer which is provided with a recess 2 for receiving the cam 3 and has two side plates 4 secured thereon, said side plates having lateral hubs in which the shaft 5 of the cam rotates. The shaft 5 is directly actuated from the power plant through the flexible connection 6 which may be of any desirable length. In the lower part of the casing 1, is inserted the tool 7. A tube or sleeve 8 which is adapted to slide in the casing has a longitudinal recess 9 for the passage of the cam and the handle 10 is secured to the upper end thereof, said handle serving to hold and guide the hammer. In the sleeve 8 is placed the piston 11 which is provided with a recess 12 for the working of the cam, the upper operating wall of said recess having any convenient shape for co-operating with the cam. The piston 11 has

at one end a longitudinal bore 13 forming an air cylinder whereby it can slide over a stationary piston 14 secured in the sleeve 8 and leaving an annular chamber 16 between it and the inner wall of the sleeve.

15 represents an opening through the walls of the casing 1 and sleeve 8.

When the piston 11 is lifted by the cam rotating in the direction of the arrow, the air is compressed in the bore 13 and in the annular chamber 16 which forms a second cylinder, so that the entire surface exposed thereafter to the expansion of the compressed air corresponds to the cross section of a piston having a diameter of the length indicated at  $x$ . When the cam leaves the piston, the latter is thrown back by the compressed air and a strong blow is given thereby upon the head of the tool 7. Upon the piston 11 reaching the end of its downward stroke, the opening 15 is exposed so that the outer air may enter the annular chamber 16 for compensating any leakage in the compression. The arrangement of parts is such that the pressure in bore 13 is always lower than in the annular chamber 16 so that no leakage can occur from the bore, the admittance of outer air to the same being therefore unnecessary.

The hammer may be thrown out of action and the force of the blows may be regulated by the following means. The recess 12 in the piston 11 is of a length equal or superior to twice the greatest radius of the cam so that if a pull is exerted on the handle 10 for moving the sleeve 8 and the piston 11 contained therein in the casing 1 and bringing the upper edge of the recess 12 in said piston in front of the upper edge of the recess 2 in the casing 1, the cam will be free to rotate without actuating the hammer. For throwing the hammer into action it will be sufficient to depress the handle and to force the sleeve 8 together with the piston 11 into the casing so as to bring the latter gradually under the action of the cam. Air is then compressed again in the bore 13 and the annular chamber 16 and the percussion strokes of the piston increase gradually, the force of the blows being at its maximum when the sleeve 8 is entirely forced into the casing 1 as shown in the drawing. A stop 17 prevents the sleeve 8 from being drawn out of the casing 1 beyond the desired limit. A pin 18 extending from the sleeve 8 engages a longitudinal slot 19 in the casing 1, said

slot having one end extending at right angle as shown in Fig. 3. This arrangement is such that the sleeve 8 and handle 10 may be secured in their lowest position by simply turning the handle with regard to the casing for engaging the pin into the end of the slot, which is of advantage when heavy blows are to be delivered for a long period.

My power hammer is adapted to work in any position and the flexible connection permits the same to be used very easily and in any desired place. The flexible transmission may be connected for instance to a small electric motor located in the vicinity of the place where the power hammer is used.

The hammer may be used with advantage for riveting, cutting, chiseling, perforating, etc.

Having now described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a device of the character described, the combination with a casing, of a piston reciprocable therein and being adapted to compress a resilient medium when the piston is retracted in the casing, means for retracting the piston in the casing, and means to vary the position of the piston in relation to the retracting means, whereby the force of the piston stroke, due to the expansion of said resilient medium, may be varied.

2. In a device of the character described, the combination with a casing, of a piston reciprocable therein, a stationary piston between which and the reciprocable piston a resilient medium is adapted to be compressed when the reciprocable piston is retracted in the casing, means for retracting the reciprocable piston in the casing, and means to vary the position of said last named piston in relation to the retracting means, whereby the force of the piston stroke, due to the expansion of said resilient medium, may be varied.

3. In a device of the character described, the combination with a casing, of a sleeve therein, a piston reciprocable in said sleeve, a stationary piston carried by said sleeve, means for retracting the reciprocable piston in the sleeve, and means for moving the

sleeve whereby the position of the reciprocable piston in relation to said retracting means may be varied.

4. In a device of the character described, the combination with a casing, of a sleeve longitudinally adjustable therein, a piston reciprocable in said sleeve and having a recess formed therein, a cam adapted to work in said recess and retract the piston in said sleeve, means for actuating said cam, and means for moving said sleeve in the casing to vary the position of the piston relatively to the cam.

5. In a device of the character described, the combination with a casing, of a sleeve longitudinally adjustable therein, a stationary piston integral with the sleeve, a reciprocable piston in the sleeve, there being a bore between one face of the stationary piston and one face of the reciprocable piston wherein a resilient medium may be compressed when the reciprocable piston is retracted in the sleeve, means for retracting the reciprocable piston, and means for adjusting the sleeve in the casing to vary the position of the reciprocable piston in relation to the retracting means.

6. In a device of the character described, the combination with a casing having an air admission opening therein, of a sleeve having an air admission opening and being movable in the casing relatively to the latter, a cam mounted in said casing, means for operating said cam, a stationary piston in the sleeve and integral therewith, there being an annular chamber between said piston and sleeve, and a piston reciprocable in said sleeve and having a recess for receiving the cam and having also a bore for receiving the end of the stationary piston, said bore and said annular chamber being adapted to receive air through the air admission openings in the sleeve and casing.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ABEL MALAURIE.

Witnesses:

LOUIS MOSES,  
H. C. COXE.