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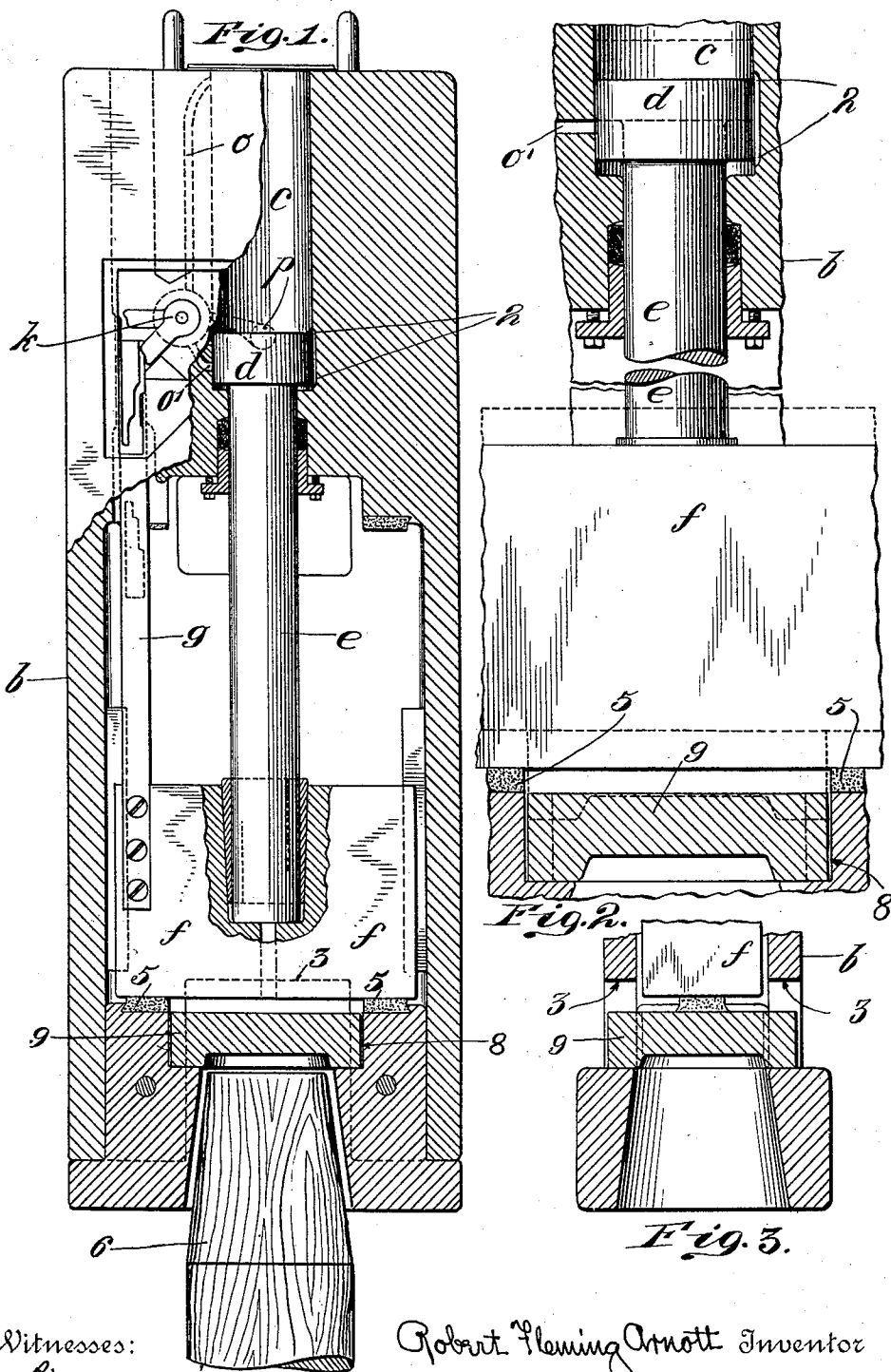
R. F. ARNOTT.

POWER OPERATED HAMMER.

APPLICATION FILED NOV 23, 1910. RENEWED JULY 31, 1912.

1,055,594.

Patented Mar. 11, 1913.



Witnesses:
 Richard A. Strong.
 M. Hamilton.

Robert Fleming Arnott Inventor
 By his Attorney
 James Hamilton

UNITED STATES PATENT OFFICE.

ROBERT FLEMING ARNOTT, OF NEW YORK, N. Y.

POWER-OPERATED HAMMER.

1,055,594.

Specification of Letters Patent.

Patented Mar. 11, 1913.

Application filed November 23, 1910, Serial No. 593,774. Renewed July 31, 1912. Serial No. 712,523.

To all whom it may concern:

Be it known that I, ROBERT FLEMING ARNOTT, a subject of the King of England, residing in the borough of Manhattan, in the city, county, and State of New York, have invented certain new and useful Improvements in Power-Operated Hammers, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to improvements in power-operated hammers of the character shown and described in the patent granted me June 14, 1910, No. 961,384, and an object of this invention is to provide a hammer of the type just referred to with means for preventing the premature operation of the ram-head and thereby avoiding the danger of wrecking the hammer consequent upon such premature operation of the ram-head. Where the operation of the ram-head is begun before the pile to be driven is in position to receive the full force of the blows of the ram-head, a part of this force is absorbed by the body of the hammer and its supports, from which it results that there is danger of the hammer being wrecked by a careless operator.

In the drawings illustrating the principle of this invention and the best mode now known to me of applying that principle, Figure 1 is a central vertical section through a hammer embodying my improvement, the rotative valve mechanism being shown in full; Fig. 2 is a detail which shows in section and on an enlarged scale the steam inlet passages, the piston and the ram-head; and Fig. 3 is a detail which shows the base of the hammer in section on a plane at right angles to the plane on which the sectional views of Figs. 1 and 2 are taken.

In the massive casting *b*, which forms the body or casing of the structure, is bored a cylinder *c* at its upper end in which is slidably fitted the piston *d* mounted on the upper end of the piston-rod *e* to the lower end of which is attached firmly the ram-head *f*. The inlet ports *o*, *o'* lead, respectively, to the upper and lower ends of the cylinder *c* and are controlled by the rotative valve *k*; but it is to be carefully observed that the inlet port *o'* enters the cylinder *c* at a short distance above the bottom of the latter. Further, the wall of the cylinder is formed with a by-pass 2 near its lower end, which by-pass extends upwardly and terminates

just above the upper face of the piston *d*, when the latter is in its lowermost position (that is, when the ram-head *f* rests upon the buffers 5). In this lowermost position of the piston *d*, the latter covers the cylinder end or opening of the passage or inlet port *o'*. However, the fit of the piston in the cylinder is not steam-tight but is the ordinary sliding fit of a piston in a steam cylinder. Hence, should steam leak past the valve *k*, while the ram-head *f* is in its lowermost position and not in action, this escaped steam will not accumulate below the piston *d* and tend by its pressure to raise the ram-head *f* from off its seat, the buffers 5, but will flow through the by-pass 2 and out through the exhaust port *p*. Again, should a careless operator open the valve *k* so as to admit full pressure of steam to the admission port *o'*, the portion of the steam which would leak between the piston *d* and the wall of the cylinder *c* to the space below the piston would likewise flow by the by-pass 2 to the exhaust port *p*.

The base portion of the casing *b* is formed with the usual opening 8 for the reception of the head of the pile 6 and in the walls of the opening 8 is fitted a pile-plate 9. As the top of the pile 6 enters the opening 8 in the bottom of the casing *b* during the lowering of the hammer on the pile, the latter contacts with and then carries the pile-plate 9 against the lower face of the ram-head *f*. Steam cannot, however, be admitted through the port *o'* to the cylinder, for the former is covered by the piston *d*. However, as the hammer is lowered still farther, the upper end of the by-pass 2 is covered by the piston *d* and, after there is a sufficient lap of the latter above this upper end, the admission port *o'* is uncovered. When the latter is fully uncovered, the pile-plate bears against the shoulders 3 formed on the base portion of the hammer (Fig. 3) and the hammer as a whole rests upon the pile 6. Hence, the operation of the ram-head may now be started with the certainty that the force of its blows will be used in driving the pile and will not be absorbed by the body of the hammer and its supports.

I claim:

1. A power-operated hammer having a ram-head; a piston which is connected with and drives the same; and a cylinder in which said piston reciprocates and which is formed with working-fluid passages; the po-

sition of said passages with respect to that of the piston at the end of its outward stroke being such that the piston controls the flow of the working fluid to and from the space between the piston and the adjacent end of the cylinder and thereby prevents the premature operation of the ram-head.

2. A power-operated hammer having a ram-head; a piston which is connected with and drives the same; and a cylinder in which said piston reciprocates and which is formed at one end with an inlet passage and a by-pass for the working-fluid; the position of said passages with respect to that of the piston at the end of its outward stroke being such that the piston controls the flow of the working fluid through said passages to and from the space between the piston and the adjacent end of the cylinder and thereby prevents the premature operation of the ram-head.

3. A power-operated hammer formed with an opening in its base and having a ram-head; a piston which is connected with and drives the same; a cylinder in which said piston reciprocates and which is formed with passages for the working fluid; and a pile-plate mounted in said opening; the position of said passages with respect to that of the piston at the end of its outward stroke being such that the piston controls the flow of the working fluid to and from the space between the piston and the adjacent end of the cylinder and thereby prevents the premature operation of the ram-head.

In witness whereof I hereunto set my hand at New York city, N. Y., this fourth day of October, 1910, in the presence of the two undersigned witnesses.

ROBERT FLEMING ARNOTT.

Witnesses:

HARRIETTE B. TURNER,

W. D. LEARFOTT.

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