

Fig. 1

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1,316,236.

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2 SHEETS—SHEET 2.

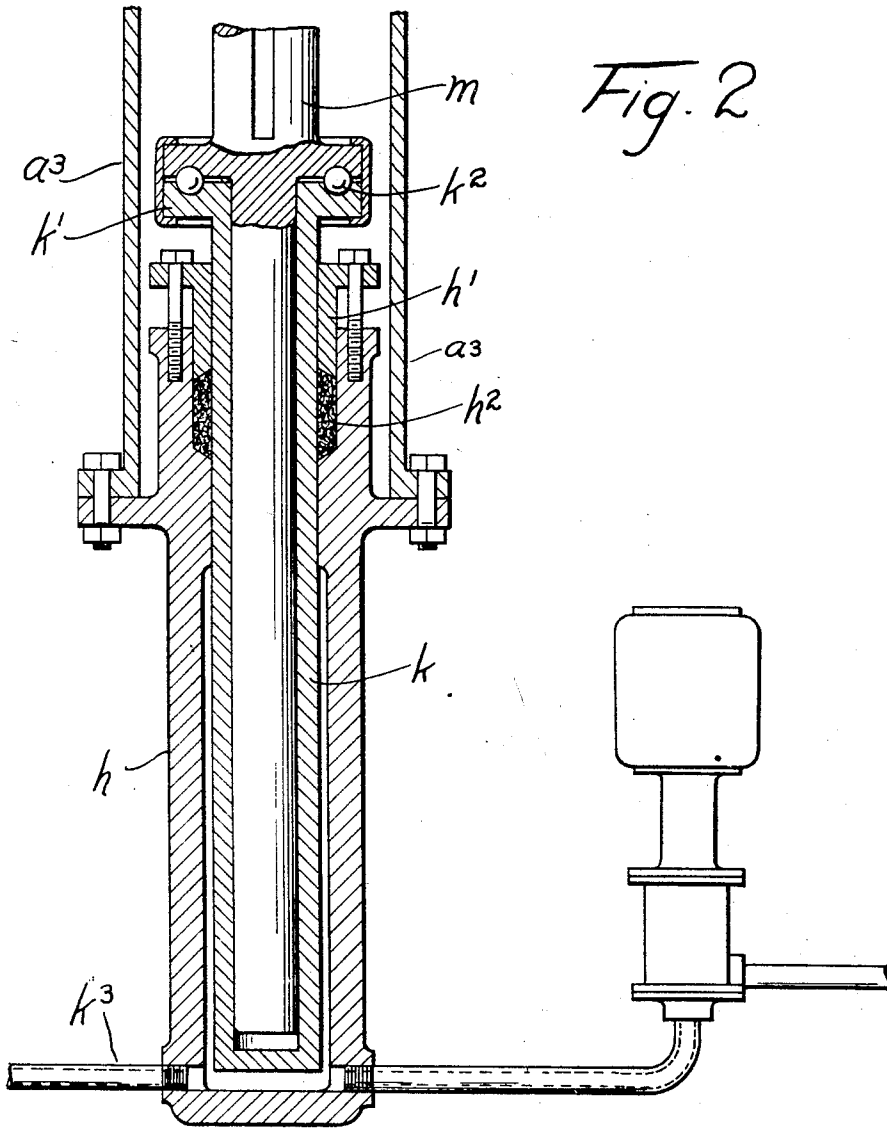


Fig. 2

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WILLIAM M. HOFFMAN, OF TORONTO, ONTARIO, CANADA.

BORING-MACHINE.

1,316,236.

Specification of Letters Patent. Patented Sept. 16, 1919.

Application filed October 21, 1916. Serial No. 126,838.

To all whom it may concern:

Be it known that I, WILLIAM M. HOFFMAN, citizen of the United States, residing at Toronto, county of York, Province of Ontario, Dominion of Canada, have invented a certain new and useful Improvement in Boring-Machines, and declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to devices for boring and truing up the interior of explosive shells used for military purposes, or other analogous structures, and consists in the various combinations hereinafter described and pointed out in the claim.

In the drawings—

Figure 1, is a detailed vertical sectional view of the upper portion of such a boring machine.

Fig. 2, is a detailed sectional view of the lower portion of my machine, it being understood that the lower and upper portions fit together to make one common machine, it being broken away at the point of joining.

In the drawings, similar letters refer to similar parts. a , represents a framework of proportionate size and strength to hold the article b which is to be bored out as hereinafter described. In the framework a is a socket a' within which the article b to be bored may be held by set screws c , c , or other convenient means. d is a water pipe leading from any convenient source of water supply and which passes through the upper end of the article b to be bored, which in the case shown is a shell having an orifice e . By thus impinging upon the boring tool the water keeps the tool and article to be bored comparatively cool. In the arrangement made it also has a further function, that is of carrying the boring chips directly away from the surface upon which the boring is performed and out through the bottom of the shell in the direction shown at e' .

The framework a is of course adequately supported, but as the support forms no part of the device it is not shown. In the lower part a^2 of the framework a there is journaled a beveled gear wheel f driven by a pinion f' on the shaft f^2 which, in turn, is driven by any appropriate means, as a band

wheel f^3 . Of course, the shaft runs in appropriate bearing f^4 and is appropriately supported and driven in any convenient way and by any convenient means—which means is no part of my invention and which is familiar to every mechanic. On the hub of the gear wheel f is a ring g somewhat larger in diameter than the bearing and held at the hub of the wheel by set screw g' . This ring serves the purpose of keeping the gear-wheel in its bearing. Attached to the framework a , a' a^2 is a subframe a^3 composed of strong bars at the lower end of which is carried a strong tube h . This tube h forms the barrel of a hydraulic ram, the upper end of which carries a stuffing box h' stuffed with materials h^2 to make the device watertight around a plunger k . This ram may be hollow with a solid lower head for the purpose of saving weight. At the upper end of the ram is a flange k' upon which is attached a ball bearing k^2 . This ram operates a pressure bar or plunger m having a spline n thereon which engages a corresponding groove in the gearwheel f whereby the gearwheel compels the bar m to rotate upon the bearing k^2 . Upon the upper end of the boring bar is a rose-cutter p which, having cutting surfaces thereon and grooves therefor, trims out the end of a shell or other hollow material to be operated upon, even to the forward end thereof, with any suitable form that is chosen to be adopted. It is obvious that the boring bar m being slidably, but not rotatably attached to the gear wheel f must revolve with the gear-wheel but may be pushed or fed into the interior of the article to be operated upon by means of the hydraulic ram or plunger k . There is nothing new in the principle of operating this ram, which is by means of a liquid force pump; therefore I do not show it. An outlet k^3 may be furnished which, when the tool is desired to descend, is opened and the tool descends by its own weight upon the outflow of the water at k^3 .

One of the chief advantages of this form of boring bar is the fact that heretofore in boring bars and machines the boring bar has been horizontal and the chips would be in the way of the cutter. Inasmuch as most of the material to be operated upon is of high carbon steel and the chips, when cut, become very hot, and when suddenly cooled by the introduction of water, are apt to be tempered more or less hard and thus not only

interfere with the cutter but are apt to dig into the inner surface of the article to be operated upon and thus produce irregularities therein as well as springing the bar over and making the interior surface eccentric with the exterior surface. By arranging the mechanism as I have described the device is very simple, very certain to work, and the chips are carried immediately away from the boring tool so that they do not interfere with it.

I preferably use a form of cutter with a pilot nose r on which is adapted to enter the cored-out end into the perforation in the end thereof and although grooved for the purpose of the admission of water, yet acts as a pilot guide for the cutter to prevent any accidental swerving of the cutter from the true line by reason of one side of the article being operated on being harder than the opposite side. This pilot is shown at r . I prefer to mount the cutting tool upon the boring bar by a concentric screwthread which is, of course, opposed to the direction of the rotation of the bar, but other means may be used without departing from the principle of my invention.

The mode of operation of this device is clearly apparent from the foregoing description, it being obvious that the article to be bored out is properly fastened in its receptacle at the upper end of the frame a and formed in the upper part of the frame

a at a' and the proper or appropriate cutter being placed upon the boring bar, the forcing of the bar upward, at the same time rotating it by means of the gears, enables the inside of the rough article to be trimmed out and trued up with great facility and with the introduction of water, as stated, at the upper part, the chips are all carried away without interfering with the work, so that the article is certainly, expeditiously and accurately finished.

I have not shown supports or holding means, as those may be adapted to the situation in which it is placed and inasmuch as they form no part of my invention I have not deemed it necessary to describe them.

Having thus described my invention, what I claim is—

In a boring machine, the combination of a vertical boring bar, a frame supporting the same and adapted to support the article to be operated upon, a gear non-rotatably but slidably mounted upon said boring bar and forming a bearing therefor, a bearing in said frame for said gearwheel, means for operating the gearwheel, a hydraulic ram for forcing the boring bar vertically upward, and means for introducing water at the upper end of the article to be operated on, substantially as described.

In testimony whereof I sign this specification.

WILLIAM M. HOFFMAN.