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BUSHING FOR PNEUMATIC HAMMERS

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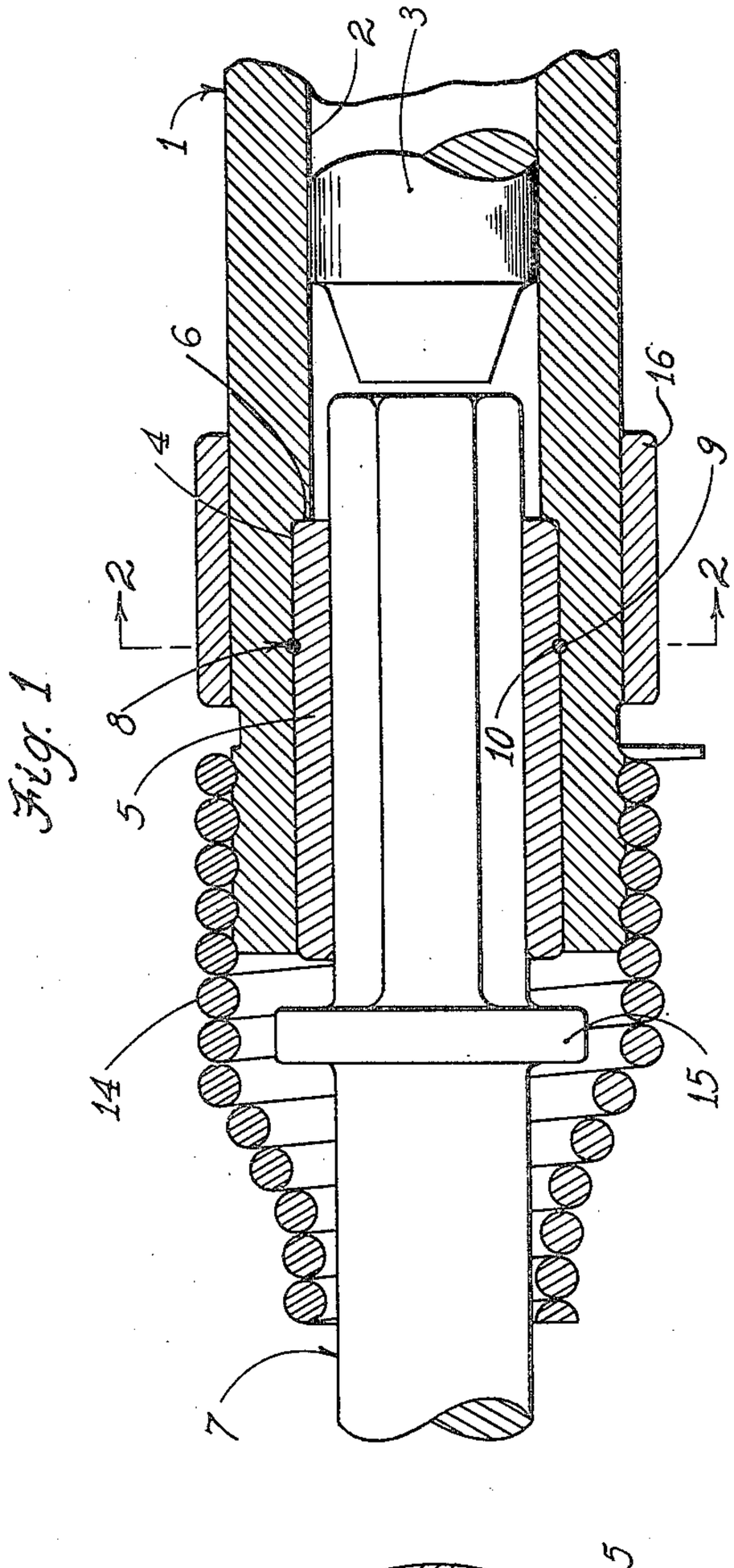

Fig. 1

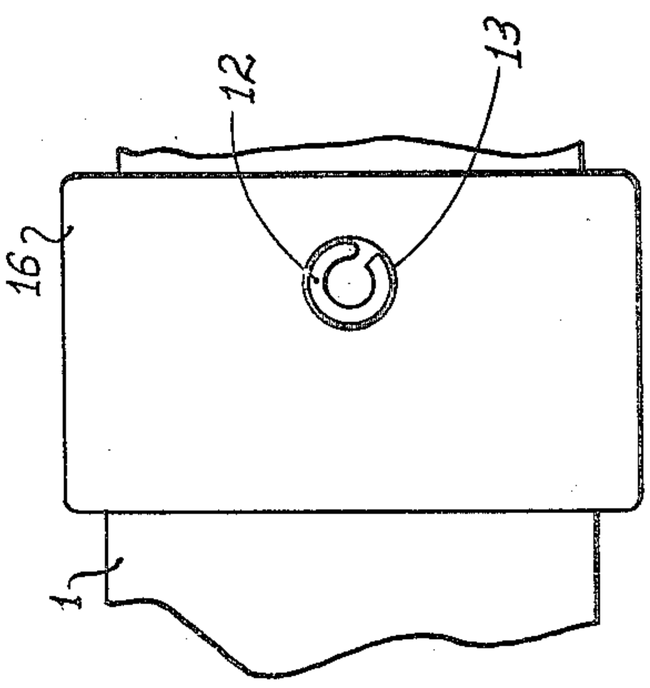

Fig. 3

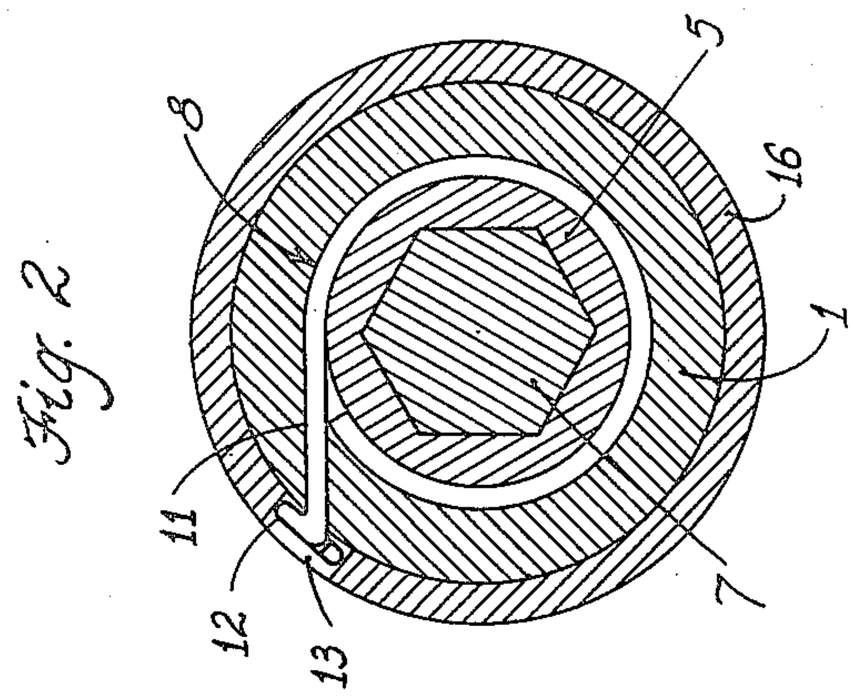

Fig. 2

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BUSHING FOR PNEUMATIC HAMMERS

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1 Claim. (Cl. 121—31)

1

This invention relates to improvements in portable pneumatic hammers and like tools.

These tools comprise a barrel having a bore providing a cylinder in which is reciprocated by compressed air a hammering piston for delivering rapid and repeated hammer blows on a chisel or other working tool inserted into the forward or outer end of the barrel. The latter is provided with air flow passages and mounts an automatically acting distributing valve at its rear or handle receiving end to control the admission of live air to the opposite ends of the barrel to reciprocate the hammering piston therein. The tool may have a piston controlled exhaust.

According to the practice heretofore employed, the barrel of the tool has been provided in association with the bore adjacent its outer or front end with an integral bridge projecting into the path of the reciprocable movement of the piston to provide a stop therefor should the tool be operated without the chisel in place or should the chisel glance off the work in the operation of the tool. In tools of this design, the bridge is provided with a passage extending therethrough in line with the axis of the cylindrical bore to receive the reduced guide extension on the piston in striking the bridge to prevent the piston from dropping or being shot out of the barrel. Fitted in a recess in the nose or forward end of the barrel directly in advance of the bridge is a guide bushing to receive and support the chisel with its inner end extending into the bore of the barrel to receive the hammer blows of the piston. The bushing is usually of hard steel and seats against a shoulder on the front side of the bridge, that is, the side of the bridge facing the outer or open end of the barrel. The surface of the bore throughout its length is ground smooth with a high finish as required in these tools and to permit this grinding at the corners where the bore meets the bridge and where the bridge meets the recess for the bushing, fillets are made in the body of the barrel. The above construction adds to the cost and complexity of these barrels and requires careful and skillful grinding operations due to the fact that the integral bridge projects into the path of the grinding operations.

In accordance with my instant invention, I improve the construction of the barrel at the bridge whereby the bore may be ground straight through without interference by the bridge or providing fillets as heretofore.

In carrying out the objects of my invention, I provide the bridge in the form of a steel bushing made separate from the barrel and inserted into

2

the front end thereof immediately in advance of the bore whereby the bore may be ground straight through before the bushing is inserted with a close or pressed fit into the barrel.

A further object of my invention is to utilize said bushing to support and guide the chisel inserted into the barrel.

A further object of my invention is to lock the bushing in the barrel to hold it against displacement by the hammer blows of the piston thereon, said locking means, in the embodiment shown, being in the form of a wire element fitting in registering grooves in the bushing and the barrel, respectively.

The invention consists further in the features of construction and combination of parts hereinafter described and claimed.

In the accompanying drawing—

Fig. 1 is a fragmentary longitudinal sectional view through the front end of a barrel of a pneumatic hammer or like tool embodying the features of my invention and shown equipped with a chisel and a retainer therefor;

Fig. 2 is a transverse sectional view taken on line 2—2 of Fig. 1; and

Fig. 3 is a top plan view of the barrel at the region of the fastener opening to show the recess provided in the barrel to seat the outer enlarged end of the fastener.

As shown in the drawing, 1 indicates the barrel of a pneumatic hammer having a bore 2 providing a cylinder for a reciprocating hammering piston 3. The barrel 1 is provided with air flow passages (not shown) to convey compressed air to the opposite ends of the cylinder 2 or on opposite sides of the piston 3 to reciprocate the same within the barrel as well understood in tools of this kind. The barrel mounts at its rear or handle receiving end an automatically acting distributing valve (not shown) to control the flow of live air to the opposite ends of the barrel to reciprocate the piston. The air supply for the tool is through the handle member (not shown) and said handle member is provided with the usual throttle valve whereby the tool is started and stopped.

The front or nose end of the barrel 1 has a recess 4 somewhat larger in diameter than the bore 2 and receiving a hard steel or equivalent bushing 5. This bushing, in accordance with my invention, has a close or pressed fit within the recess 4 and seats against a shoulder 6 provided in the barrel between the recess 4 and the bore 2. The depth of the recess 4 and the diameter of the bushing 5 are sufficient to project the bushing partially into the path of the piston in its reciproca-

tion within the bore 2. Hence, the bushing 5 serves as the bridge for the piston as well as a support and guide for the chisel or other working element 7 inserted into the barrel to receive the blows of the piston in the operation of the tool. As shown in Figs. 1 and 2 of the drawings, the bushing 5 and the upper end of the chisel 7 serve to close off the lower end of the barrel 1 so that upon the downstroke of the hammer 3, a cushion of air is formed in the well-known manner by compression of the air ahead of the lower end of the hammer as it approaches the upper ends of the chisel 7 and the bushing 5.

With the arrangement shown and above described, the barrel and the bridge or bushing 5 can be separately made and heat treated and the bore 2 within the barrel 1 may be ground straight through before the bushing 5 is pressed into place.

As a further aid in holding the bushing 5 within the barrel and against displacement by the blows of the piston thereon, I provide a fastener or anchor 8 in the form of flexible wire or equivalent member fitting in registering grooves 9, 10 in the barrel and the bushing 5, respectively, as shown in the drawings. The grooves are annular and the fastener 8 interlocks with them as shown.

To insert the fastener 8 in place and remove it, when desired from the tool, I provide the barrel with a passage 11 extending from the exterior of the barrel and connecting with said grooves 9, 10. The passage 11 is tangential to the grooves as shown, and hence, the wire 8 may be threaded into locking position. The outer end of the wire 8 has an enlargement 12 which fits within a receiving recess 13 made in a ring 16 and seating the enlargement flush or just inside the outer surface of the ring. The enlargement 13 may be in the form of an eye or loop so that the wire can be engaged for manipulation in inserting and removing it with respect to the barrel.

The retainer for the chisel 7 comprises in the embodiment shown a coil of relatively stout wire 14 threaded on the front end of the barrel 1. The chisel member has a flange 15 to be engaged within the retainer 14 as shown.

The barrel 1 is provided about the bushing 5, with a reinforcing ring 16. The combination nozzle and bridge 5 is believed to be novel and results in numerous advantages which reduce the expense of grinding the barrel and gives longer life and better service for hammers so constructed. For example, since the constriction in the hammer bore known as the bridge need not be present at the time this longer and delicate bore is ground to exacting limits, it is possible to much more accurately and thoroughly finish the internal bore of the hammer resulting in a smoother, more uniform performance and greatly increased life.

It is also possible to employ different types of steel in the nozzle-bridge and in the hammer barrel together with separate heat treatments as heretofore mentioned in order to secure the ultimate and physical properties in desired performance, impossible when the barrel and the bridge are made in one piece as heretofore. The outside of the barrel may have a spiral groove to receive the retainer.

The details of construction and arrangement of parts shown and described may be variously changed and modified without departing from the spirit and scope of my invention, except as pointed out in the annexed claim.

I claim as my invention:

In a pneumatic hammer, a barrel having a uniform bore providing a cylinder portion free of internal obstructions and a counter bore at the outer end of said cylinder portion of greater diameter than said uniform bore, a piston reciprocable within said cylinder portion, an annular bushing fitted telescopically into said counter bore and having a sufficient wall thickness so that the bushing extends radially at its inner end into the path of reciprocating movement of said piston, said bushing and said counter bore being provided with complementary peripheral grooved portions, a reciprocable tool member extending through and guided by said bushing for actuation by said piston, said piston being reciprocably movable into striking impact with the tool member and with the inner end of said bushing whereby the latter serves as a bridge to prevent ejection of the piston from the cylinder portion, and flexible retaining means disposed in said grooved portions and coacting with said barrel and said bushing for securing the latter in place against the force of impact of said piston.

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