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E. W. STEVENS

RETAINER FOR RIVET CUTTING TOOLS

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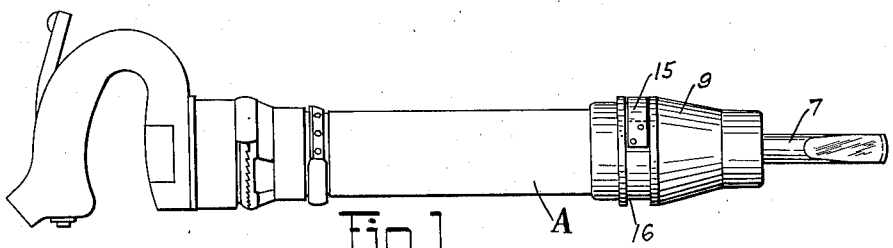


Fig. 1

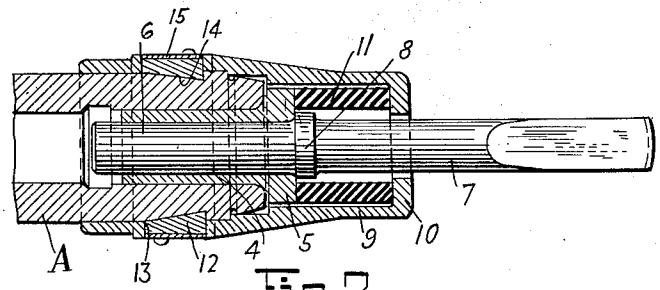


Fig. 2

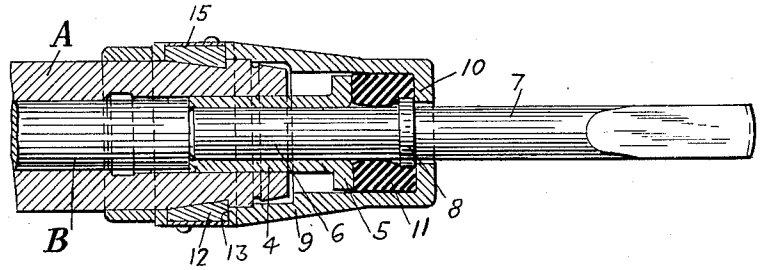


Fig. 3

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UNITED STATES PATENT OFFICE.

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RETAINER FOR RIVET-CUTTING TOOLS.

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This invention relates to tool retainers for use with percussive tools such as pneumatic hammers. In particular it concerns retaining devices designed specifically for use with rivet cutting tools but the scope of their utility is by no means confined thereto.

In practice riveting hammers are frequently used for cutting off and driving out rivets. For this purpose the chisels and punches used must be very light in order not to absorb the force of the blow delivered by the hammer piston. The common practice is to insert in the front end of the riveting hammer an adapter bushing having a tapered bore to accommodate the shank of the working tool which is also tapered and of such diameter as to extend through the bushing a sufficient distance to receive the blow of the piston. Without the use of some form of retainer there is great danger of injury to workmen due to the tendency of the piston, bushing and chisel or other working tool to shoot out of the hammer when the rivet is cut off.

Many attempts have been made to develop a successful retainer for such tools but heretofore they have failed on account of delicate construction. Failure has usually resulted from securing the chisel or other working tool to the adapter bushing with a connection permitting limited relative movement as by milling flats or grooves in the tool shank and inserting pins or blocks through the bushing to engage these grooves or flats with an elastic buffer interposed between the bushing and the retainer. When the chisel is not applied to the work and is struck by the piston. the shock and force of the blow is transmitted through the pins or blocks to the adapter bushing. Breakage accordingly occurs at the base of the grooves or flats on the chisel, or through the holes in the bushing, and the pins or blocks are often damaged or broken.

One object of the invention is to provide a simple, strong and easily applied retainer which has no delicate parts susceptible of breakage, which does not require a tapered opening in the bushing and a tapered shank to fit it, and which will give effective protection to workmen against flying parts. Other objects will be apparent from the detailed description which follows.

In order to make clear the nature of the invention and its use, the same are shown in the accompanying drawings, in which:

Fig. 1 is a side elevational view of a riveting hammer equipped with the invention;

Fig. 2 is a vertical sectional view of the outer end of the hammer shown in Fig. 1; and

Fig. 3 is a view similar to Fig. 2 showing the working tool at the outer limit of its movement and the piston striking the adapter bushing.

The embodiment of the invention is illustrated as applied to a riveting hammer A which has an adapter bushing 4 inserted in the outer end of its cylinder. The bushing has a radial flange 5 at its outer end which forms a stop to engage the end of the hammer cylinder and limit the movement of the bushing therewithin. Slidably fitting the bore of the bushing 4 is the shank 6 of the working tool 7 which is provided with a collar 8, the shank 6 being of a length to project inwardly beyond bushing 4 (Fig. 2) when the collar 8 engages the stop flange 5 of the bushing. The working tool 7 and the bushing 4 are maintained in assembled relation by a retainer 9 which may take the form of a barrel nut secured to the hammer cylinder in any suitable manner and having an inturned outer end 10 providing an abutment or retaining wall both for flange 5 of the bushing and collar 8 of the working tool, the shaft of the latter passing through the opening in the outer end of retainer 9. Bushing 4 is normally held with its stop flange 5 in engagement with the end of the hammer cylinder by the yielding pressure of a suitable elastic buffer 11 of rubber or similar material interposed between flange 5 and the inturned end 10 of retainer 9. As shown, buffer 11 is cylindrical in form and loosely receives collar 8 of tool 7 for sliding movement therewithin.

Means for maintaining retainer 9 in place on the cylinder of the hammer A may comprise opposed latch blocks 12 extending

through openings 13 in the retainer and having their inner faces rearwardly bevelled to engage complementary grooves 14 in the hammer cylinder, the blocks being yieldably held in latching position by an arcuate spring 15 secured thereto and disposed in a circumferential groove 16 on the exterior of the retainer 9.

Fig. 2 discloses the position of the parts when the tool 7 is pressed to the work, the shank 6 of the tool then projecting inwardly beyond the bushing 4 and receiving the full force of the blow of the hammer piston. When the working tool 7 is withdrawn from the work, it will move by gravity until the collar 8 contacts with its abutment 10 on retainer 9 (Fig. 3), provided the hammer is held in a depending position. In this case, if the hammer is inadvertently operated, the piston B thereof will strike the end of the bushing 6 and the buffer 11 will absorb the blow. If the working tool 7 is disposed in the position shown in Fig. 2 but not pressed to the work or if the tool slips beyond the work as when a rivet is sheared off, the piston B will drive the working tool 7 outwardly until the collar 8 contacts abutment 10 and will then spend its force against the bushing 4 which may move outwardly to a slight extent as the buffer 11 is compressed (Fig. 3).

While a working tool having a tapered shank and a bushing having a complementary tapered bore may be used, if desired, such a construction is unnecessary and the straight tool shank and straight bushing bore shown in the drawings are preferred. Similarly it has been found unnecessary to use a yielding buffer between the collar 8 of the working tool and abutment 10 but such a buffer may be provided, if desired. It is to be understood that the invention is not confined to use with a riveting hammer but may be adapted for use with any type of percussive machine. Moreover, the invention is not limited to the specific form and construction herein shown but covers all changes, modifications and adaptations within the scope of the appended claims.

From the above it will be apparent that the invention provides structure characterized by few parts which are of simple and rugged construction and readily assembled, that the absence of any mechanical connection between the bushing and the working tool eliminates breakage of these parts, that the force of the blow when the percussive machine is inadvertently operated is absorbed by the bushing and its yielding buffer, and that the invention contemplates quick attachment to and detachment of the retainer nut to permit convenient changing of working tools.

I claim as my invention:

1. The combination with a pneumatic hammer, of a bushing to fit the cylinder of the hammer, a working tool having a shank slidable within said bushing into position to receive the blow of the hammer piston, said tool having a collar arranged to engage said bushing to limit the movement of the tool shank therewithin, a tool retainer arranged for quick attachment to and detachment from the hammer cylinder and forming an abutment for said bushing and for the collar of said tool, and an elastic buffer for said bushing within said retainer engaging the retainer abutment, said buffer having a bore receiving the collar of the tool whereby the latter when not pressed to the work may move beyond the reach of the hammer piston whereby the force of the latter is absorbed by said bushing and its buffer.

2. In combination with a pneumatic hammer, a bushing slidably fitting the outer end of the hammer and having an enlarged outer end forming a stop, a working tool having a shank slidably fitting said bushing and arranged to have its end extend inwardly beyond the bushing to receive the blow of the hammer piston, a stop collar on said tool for engagement with said bushing, a tool retainer arranged for quick attachment to and detachment from said hammer, said retainer having an inturned open end receiving the tool therethrough and forming an abutment for both said tool collar and said bushing, a cylindrical rubber buffer for said bushing within said retainer, the collar of said tool being loosely received in said retainer and permitted axial movement in excess of the projection of the tool shank beyond the bushing when in working position whereby the tool when not pressed to the work may move to a position beyond the range of movement of said hammer piston.

3. In combination with a pneumatic hammer a bushing slidably fitting within the hammer and having a flanged portion arranged to engage the end of the hammer as a stop, a cylindrical tool retainer arranged for instant attachment to and detachment from the hammer and providing a chamber beyond said hammer, means within said chamber engaging said retainer and yieldingly maintaining said bushing in place with its stop against the end of the hammer, and a working tool having its shank slidably received in said bushing so as to receive the blows of the hammer piston, said tool being arranged for limited free longitudinal movement within said retainer.

4. In combination with a pneumatic hammer a bushing slidably fitting within the hammer and having a flanged portion arranged to engage the end of the hammer as a stop, a cylindrical tool retainer arranged for instant attachment to and detachment from the hammer and providing a chamber

beyond said hammer, said retainer having an inturned open end, a buffer within said chamber between said retainer end and said bushing for yieldingly maintaining the latter in place with its stop against the end of the hammer, and a collared working tool having its shank slidably receivable within said bushing and its collar slidable within said buffer between said bushing and said retainer end to permit limited free longitudinal movement of said tool.

Signed by me at Detroit, Michigan, this 4th day of June, 1924.

EDWARD W. STEVENS.