

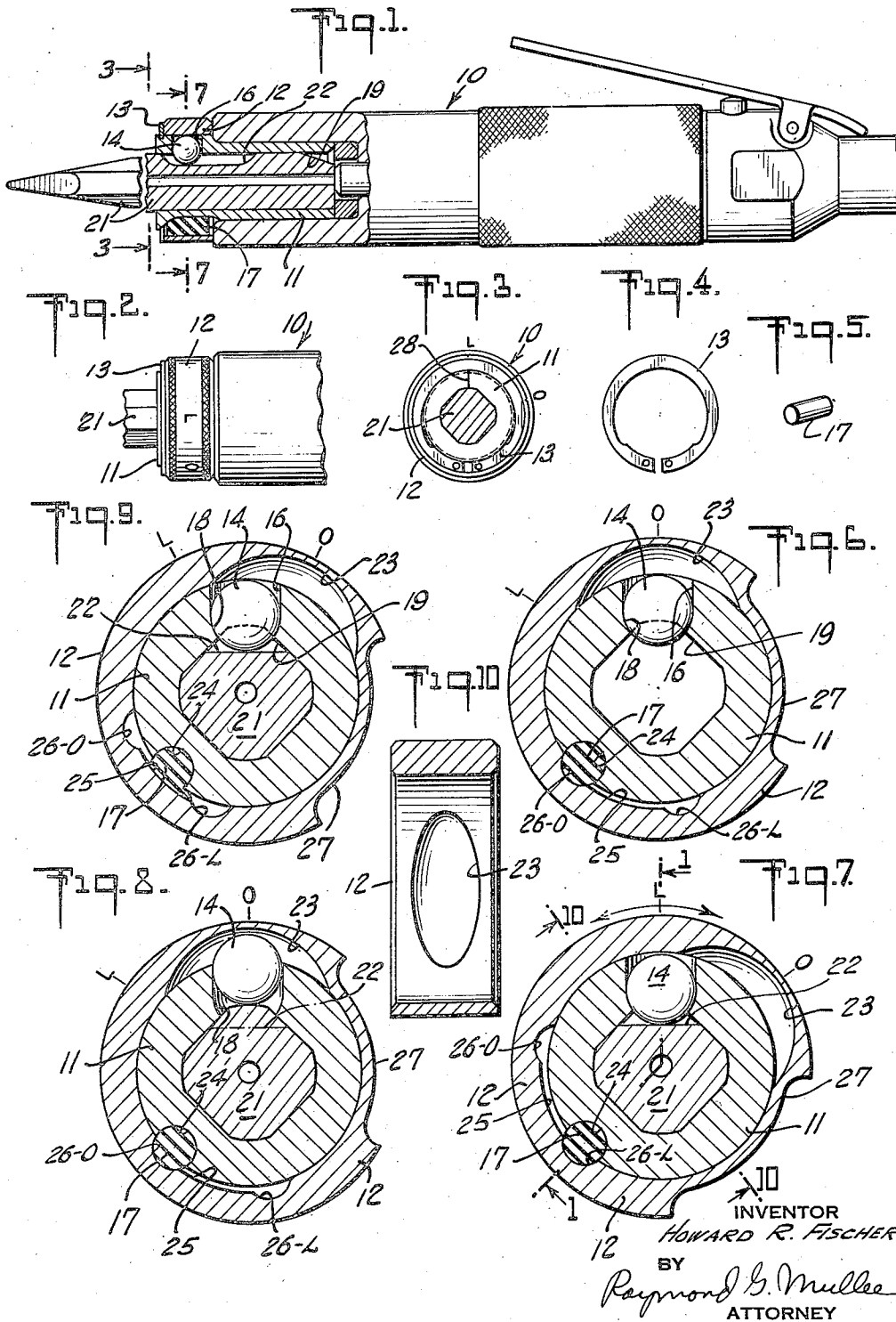
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TOOL RETAINER FOR PNEUMATIC HAMMER

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TOOL RETAINER FOR PNEUMATIC HAMMER

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This invention relates to a retainer for maintaining a working implement or tool in a power-operated hammer. It may be applied, for example, to a pneumatic chipping hammer to provide for quick insertion and removal of chisels.

The main object of this invention is to provide in a pneumatic hammer, a tool retainer that is simple in structure, and which is effective and reliable in use.

A further object of the invention is to provide in a pneumatic hammer, a tool retainer in which its tool holding position is readily observable.

Another object of the invention is to provide a tool retainer which may be adapted for use on a conventional pneumatic hammer with little alteration of structure of the latter.

These and further objects and features of the invention will become more apparent from the following description when considered with the accompanying drawing in which:

Fig. 1 is a side elevational view of a pneumatic hammer having a tool retainer according to the invention, and showing the latter partly in longitudinal section along the irregular line 1-1 in Fig. 7;

Fig. 2 is a fragmentary plan view of the tool and hammer of Fig. 1;

Fig. 3 is a view as seen from line 3-3 in Fig. 1;

Fig. 4 is a front view of a retaining ring used in the tool retainer of the invention;

Fig. 5 is a perspective view of a resilient holding element used in the tool retainer of the invention;

Fig. 6 is a cross-section view through the tool retainer of the invention showing the position of the various elements prior to insertion of a tool in the pneumatic hammer;

Fig. 7 is a cross-section view as seen from line 7-7 in Fig. 1, and illustrating the tool holding position of elements of the invention;

Fig. 8 is a cross-section view similar to Fig. 7 but illustrating a non-holding position of the elements of the invention;

Fig. 9 is a cross-section view similar to Fig. 8, but illustrating the position of certain elements between non-holding and holding positions.

Fig. 10 is a cross-section view, as seen from line 10-10 in Fig. 7, of a lock ring used in the invention.

Figs. 6-10 are drawn to a larger scale than Figs. 1-5.

Referring now to the drawing, a pneumatic hammer 10 is shown, having a tool retainer of the invention positioned in the front end, which includes a sleeve 11, a lock ring 12 supported for rotary movement upon the exterior end of the sleeve, a retaining ring 13 for holding the lock ring in position against the end of the pneumatic tool 10, a ball 14 positioned for radial movement in a hole 16 formed in the sleeve, and a holding cylinder 17, which is preferably formed of rubber and which is compressively arranged between the sleeve and the lock ring. The inner end of the hole 16 is beveled over at 18, to keep the ball

14 in the hole, but to allow it to project from the end thereof a slight distance as shown.

The sleeve 11 has a bore 19, which is of rectangular cross-section, to slidably receive the shank of a tool 21, the latter having a longitudinal groove 22 extending a short distance on the surface, which is arranged for reception of the projecting part of the ball 14, to thus retain the tool in position within the hammer. The lock ring 12 has a first recess 23 into which the ball 14 may be moved (Fig. 8), when the tool is being inserted, or removed, from the sleeve. Rotation of the sleeve to the Fig. 7 position, results in the ball being maintained, at its inner zone, in the groove 22.

When set in the position of Fig. 7 or Fig. 8, the ring 12 is secured against accidental displacement. For this purpose, the holding cylinder 17 is positioned in a groove 24 formed on the outer diameter of the sleeve, and is arranged for compressive engagement against a second recess 25 formed upon and about the inner diameter of the lock ring. The recess 25 is slightly enlarged at each end to provide pockets 26-O and 26-L in which the holding cylinder may expand to retain the lock ring 12 in either "open" or "lock" position. In its normal or unassembled condition, the rubber cylinder has a diameter which exceeds the combined depth of groove 24 and recess 25, and which may slightly exceed the combined depth of groove 24 or pocket 26-O and 26-L. As a result, the rubber is placed under compression, or under increased compression, when it is carried out of the pocket and along the recess 25, for example, in moving the ring 12 from the Fig. 7 position to the intermediate position of Fig. 9. The rubber cylinder 17, therefore, provides a frictional or yielding lock resisting such movement.

A circumferential recess 27 is formed on the exterior of the ring 12, to provide clearance for air exhaust holes (not shown) located in the front end of the hammer.

With the lock ring 12 in the Fig. 7 position, a letter "L" on the exterior of the ring will be in alignment with a mark 28 (Fig. 3) located on the forward surface of the sleeve 11; when the lock ring is in the Fig. 8 position, a letter "O" on the exterior of the ring will be in alignment with the mark 28. In such manner the tool operator may know whether the tool retainer is in locked (L) or open (O) condition.

It will be seen that the tool retainer of the invention forms a simple and reliable arrangement for maintaining a tool in operative position at the end of a pneumatic hammer. With the tool retainer in locked condition, the tool 21 is securely held in the hammer as it is reciprocally driven against a work surface by action of the hammer piston; by a simple twist of the lock ring 12 to open condition, the tool may be removed from the pneumatic hammer.

While the invention has been described as applied to a pneumatic hammer, it should be obvious that it may be used in many types of machines wherein a work bit is reciprocally driven against a work surface.

What is claimed is:

1. A tool retainer comprising in combination a sleeve having a bore for reception of the shank of a tool and a radially disposed hole which is of reduced cross section at its inner end, a ball arranged for movement in said hole and projectable from the inner end of the hole, a lock ring mounted for rotary movement upon the sleeve and having an inner recess which may be brought into alignment with said ball, and a resilient means arranged between the sleeve and the lock ring which is adapted to maintain the lock ring in set rotary position upon the sleeve.

2. In a pneumatic hammer, a tool retainer for main-

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taining a reciprocable tool in operative position in the end of the hammer, including a sleeve having a bore for reception of the shank of the tool and a radially disposed hole intersecting said bore, said hole being of reduced cross section at its inner end, a ball arranged for movement in said hole and projectable into the bore, a lock ring mounted for rotary movement upon the sleeve and having a first inner recess and a second inner recess, said lock ring adapted in a first position to maintain said ball projecting into the bore and in a second position to allow the ball to move into said first inner recess so that it does not project into the bore, and a rubber-like cylinder positionally maintained in the sleeve and projecting into said second recess and being adapted to hold the lock ring in set rotary position upon the sleeve.

3. In a pneumatic hammer, a tool retainer according to claim 2, in which a pocket is arranged at each end of the second inner recess to receive the rubber-like cylinder in either extreme rotary position of the lock ring.

4. In a pneumatic hammer, a sleeve having a bore for receiving the shank of a tool and having a radial hole containing a ball projectible in part into the bore, a lock ring rotatable on the sleeve, a resilient member retained in part in an outer pocket of the sleeve, the lock ring having a rotated position on the sleeve wherein an inner cavity thereof is in alignment with the ball so as to allow the lat-

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ter to move upwardly out of the bore and wherein a projecting part of the resilient member engages in a complementary inner pocket formed in the lock ring, and the lock ring having an inner shallow recess in continuation of the upper portion of the inner pocket thereof against the bottom face of which recess the projecting part of the resilient member is adapted to yieldingly compress after it is caused to be dislodged from the said inner pocket upon rotation of the lock ring from its first mentioned position.

5. In a pneumatic hammer as defined in claim 4, wherein the lock ring has a second rotated position in which the inner cavity thereof is clear of the ball and the projecting part of resilient member is engaged in a second complementary inner pocket formed at the opposite end of the inner shallow recess.

6. In a pneumatic hammer as defined in claim 5, wherein the resilient member is a solid rubber cylinder.

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