

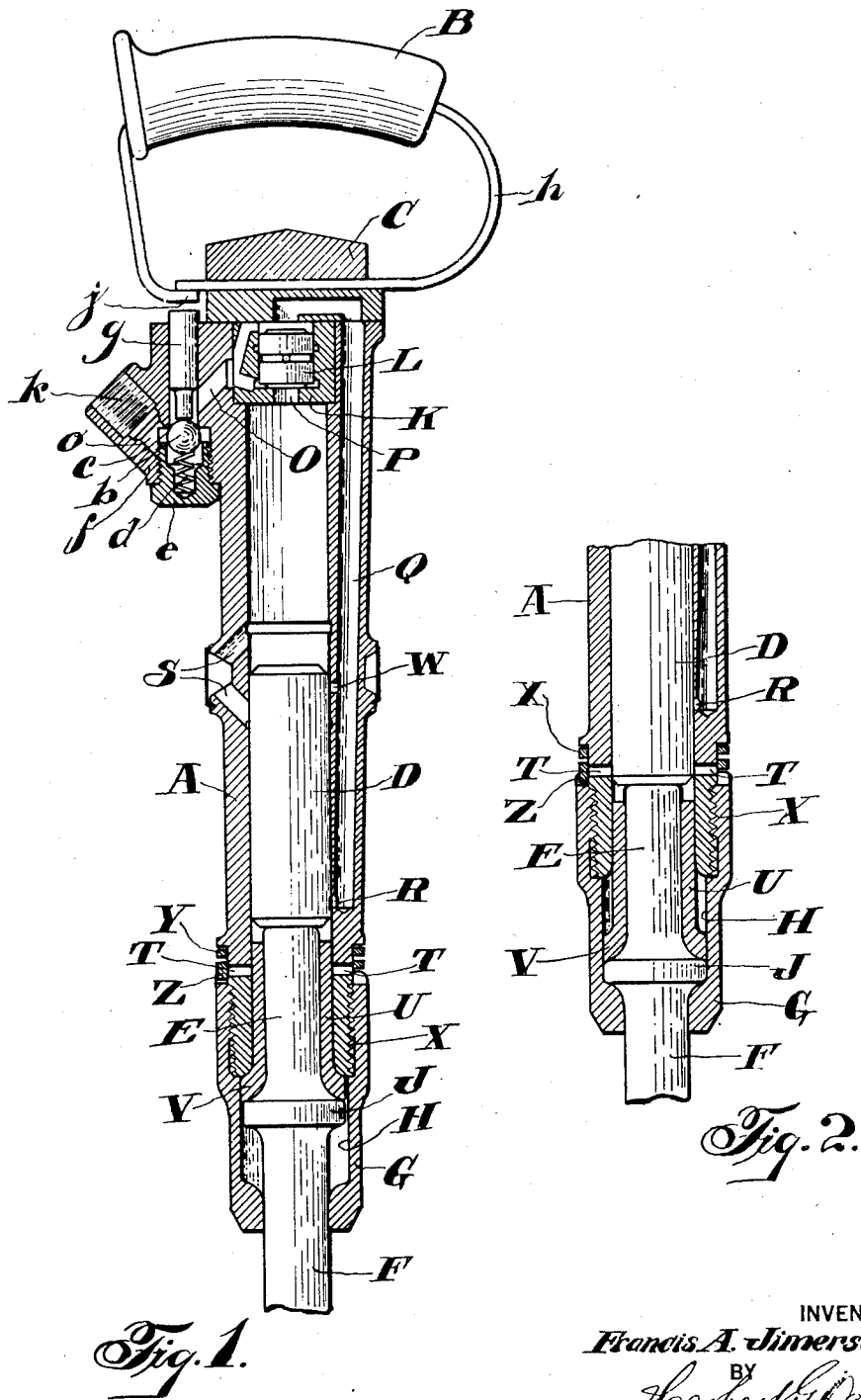
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PERCUSSIVE TOOL

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PERCUSSIVE TOOL.

Application filed August 26, 1926. Serial No. 131,651.

This invention relates to pneumatic percussive tools and more particularly to that type of hammer tool in which the power is provided by means of a percussive hammer piston striking against the shank of a tool.

An object of this invention is to automatically stop the reciprocation of the hammer piston when the operator fails to bear against the tool.

Other objects of the invention will be in part obvious and in part pointed out hereinafter.

In the drawing in which similar reference characters refer to similar parts,

Figure 1 is a longitudinal section through a percussive tool constructed in accordance with the practice of the invention, and

Figure 2 is a longitudinal section through the front portion of the tool showing the manner in which the operation of the reciprocation of the hammer piston is automatically stopped when pressure on the handle of the tool is released by the operator.

Referring to the drawing, the invention is shown embodied in a tool preferably of the type known as coal picks, which are adapted to be used as a substitute for hand picks in breaking up masses of coal and similar material.

The tool comprises a cylinder A to which a suitable handle B is bolted as by means of a back head C. Within the cylinder a piston D is adapted to reciprocate for striking against the shank end E of a tool F inserted in the front head G suitably attached to the end of the cylinder A. The front head G is provided with a bore H, preferably larger than the bore of the cylinder A, into which the collar J of the shank E is inserted so as to permit limited longitudinal movement of the tool F with respect to the cylinder A.

The cylinder A is provided with a valve box K having a reciprocating spool valve L for distributing motive fluid from the supply passage O to suitable supply passages P and Q leading to the rear and front ends respectively of the cylinder A. The motive fluid supply passage Q terminates near the front end of the cylinder in a port R adapted to be overrun slightly by the front end of the reciprocating piston D. The exhaust of motive fluid from the cylinder A is controlled by the piston D, the spent motive

fluid being adapted to pass to atmosphere through centrally located exhaust ports S in the cylinder A. The operation of the valve L to control the distribution of motive fluid to the cylinder A is substantially as described in Patent No. 1,589,295, granted June 15, 1926, to Francis A. Jimerson.

It is desirable in operating a tool of this character to hold the tool with force against the work. The tendency is for the shank E to be driven forward out of the path of the piston D in which position no work is done and the front head may be damaged due to the repeated blows of the piston D. This invention provides means for stopping the reciprocation of the piston D when pressure against the handle B is relaxed.

To this end there is provided a plurality of atmospheric exhaust ports T near the end of the cylinder A and adapted to be controlled by a bushing U slidably fitting in the bore of the cylinder A and fitting snugly around the shank E of the tool F. The shank E is slightly longer than the bushing U in order that the shank E only may be struck by the piston D under normal operating conditions. The bushing U is provided with a flanged end V adapted to bear against the collar J by which the bushing is forced in a direction into the cylinder A to cover the ports T. The diameter of the flange V is such that it fits substantially the bore H of the front head G.

During normal operating conditions, the hammer D will strike against the shank E but, due to the pressure against the handle, the tool F and bushing U remain in the position substantially as shown in Fig. 1, wherein the atmospheric ports T are closed by the bushing U. However, if the pressure against the handle B be relaxed by the operator, or when for any reason the resistance to the tool is removed as when a coal pick enters a pocket, the piston D will hammer the bushing U and the shank E forward to the position substantially as shown in Fig. 2. The piston D in this position closes the port R through which motive fluid is normally supplied for returning the piston. Leakage around the piston into the forward space is permitted to pass to atmosphere through the ports T.

Means is provided to indicate to the operator that the trouble is not due to a defect in the tool but that he is not providing

sufficient pressure against the handle B. A port W communicating with the bore of the cylinder A from the supply passage Q and substantially midway in the path of the piston D is adapted to be uncovered by the piston when the latter is allowed to pass to the position shown in Figure 2. In the latter position, the port W is uncovered permitting motive fluid to escape through the bore of the cylinder A and out from the exhaust port S. A slight back pressure is produced back of the piston to counteract the tendency of the piston to rebound from the striking face of the shank E. The noise caused by the escape of motive fluid in this manner is sufficient to attract the attention of the operator and to indicate that the trouble is lack of pressure at the handle B permitting the piston D to advance too far forward.

The front head G may be attached to the cylinder A in any suitable manner. In this instance it is internally threaded and is adapted to be secured to the threaded end X of the cylinder A, there being a coil spring Y interposed between the cylinder and front head and attached at either end to both said members as shown at the bent-over end Z. The tension in the spring Y is sufficient to cause the cylinder and front head to tend to screw together, rather than to unscrew, while it is subjected to the vibration of the tool.

The throttle valve is of the ball type comprising a ball *b* adapted to seat in a passage *c* communicating with the supply passage O. Normally the ball *b* is held seated by a coil spring *a* held in position by means of a plug *e* into the boss *f*. The throttle valve is opened by means of a plunger *g* adapted to bear against the ball *b* to unseat the latter. The plunger *g* is operated by means of pressure against the handle B which is

mounted on a flexible spring-like member *h* having a free end *j* which may be pressed against the protruding end of the plunger *g*. A suitable air hose (not shown) may be coupled to the pneumatic tool at the threaded opening *k* leading to the supply passage *o* to the space around the ball valve *b*.

I claim:

1. A pneumatic percussive tool comprising a cylinder having motive fluid supply ports communicating with the front and rear ends of said cylinder and centrally disposed exhaust ports, a hammer piston adapted to reciprocate in said cylinder, a front head to receive the shank of a tool to be struck by said hammer piston, means controlled by the shank of said tool to permit escape of motive fluid from the end of said cylinder and a centrally disposed port in said cylinder communicating with one of said supply ports and controlled by said piston to permit the escape of motive fluid back of said piston from one of said ports and to said exhaust port.

2. A pneumatic percussive tool comprising a cylinder having supply passages and ports communicating with both ends of said cylinder, and centrally disposed exhaust ports, a hammer piston adapted to reciprocate in said cylinder, a front head for said cylinder, a bushing in said front head slidable in said cylinder and adapted to receive the shank of a tool to be struck by said piston, atmospheric exhaust ports in said cylinder controlled by said bushing, and a port in said cylinder communicating with one of said supply passages and uncovered by said piston when moved forwardly beyond its normal stroke.

In testimony whereof I have signed this specification.

FRANCIS A. JIMERSON.