May 18, 1926. 1,584,799

R. F. PAGE

HANDLE FOR PERCUSSIVE RAMMING TOOLS

Filed Oct. 5, 1925 2 Sheets-Sheet 1

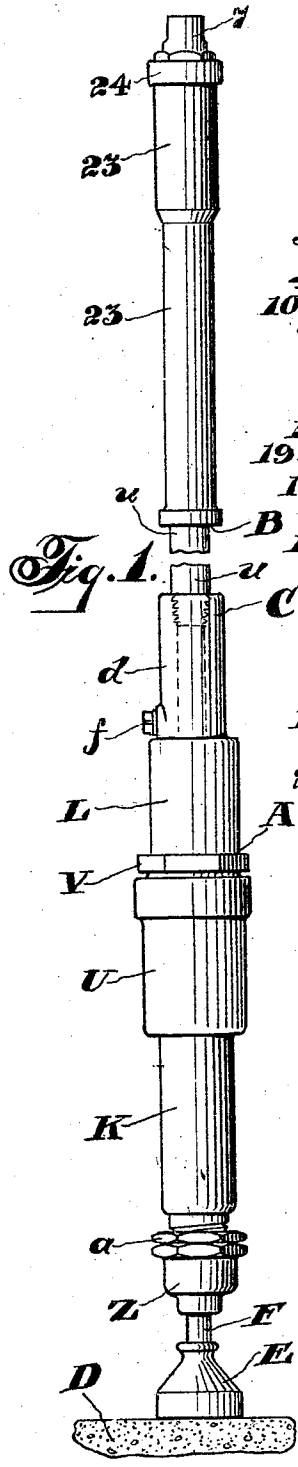


Fig. 1.

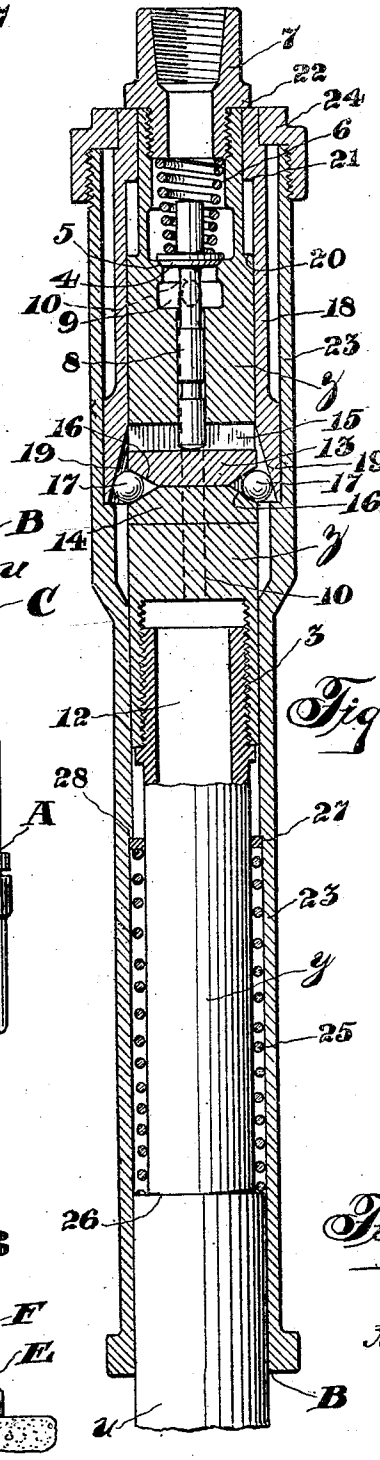


Fig. 2.

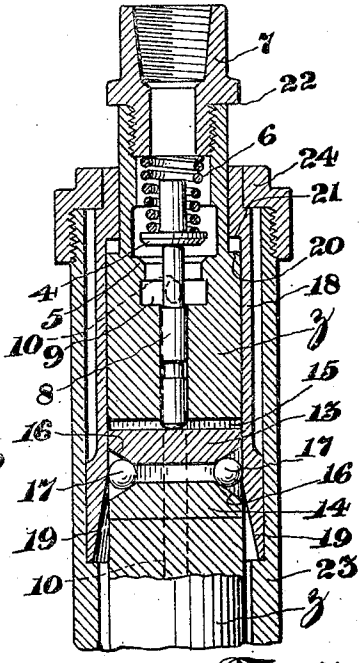


Fig. 3.

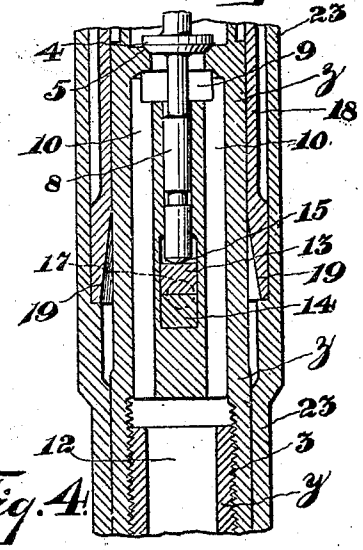


Fig. 4.

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HANDLE FOR PERCUSSIVE RAMMING TOOLS

Filed Oct. 5, 1925 2 Sheets-Sheet 2

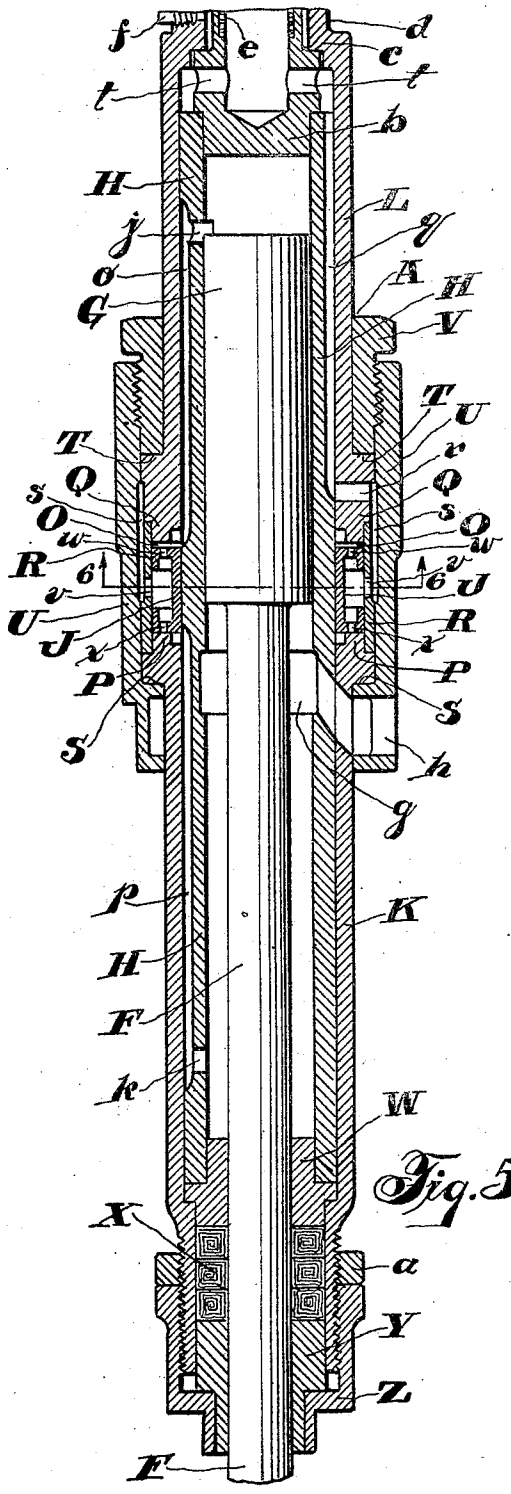


Fig. 5.

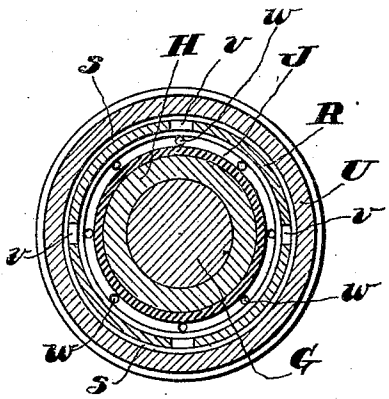


Fig. 6.

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Patented May 18, 1926. 1,584,799

UNITED STATES PATENT OFFICE.

ROBERT F. PAGE, DECEASED, LATE OF ATHENS, PENNSYLVANIA; BY JOHN M. FELT, ADMINISTRATOR, OF ATHENS, PENNSYLVANIA, ASSIGNOR TO INGERSOLL-RAND COMPANY, OF JERSEY CITY, NEW JERSEY, A CORPORATION OF NEW JERSEY.

HANDLE FOR PERCUSSIVE RAMMING TOOLS.

Application filed October 5, 1925. Serial No. 60,633.

This invention relates to percussive ramming tools such as pneumatics and rammers which may also be used for tamping concrete work of all kinds or for tamping earth around gas or water mains, or for back-filling other excavations in order to pack the dirt solidly and avoid any subsequent settlement.

The objects of the invention are to improve upon the handle construction of such machines, secure a simple and efficient throttle valve mechanism in the handle operated by movement of a handle sleeve and also construct the handle and handle sleeve in such a manner that the shock of impact of the reciprocating tamping tool and the vibration are largely absorbed in the handle which acts as a shock absorber.

Further objects of the invention will hereinafter appear and the invention is shown in one of its preferred forms in the accompanying drawings, in which—

Figure 1 is a side elevation of a pneumatic rammer known as a floor rammer or back-fill tamper having an extension handle, the handle itself being broken away indicating that the machine is proportionately longer than indicated in the confines of the drawing,

Figure 2 is an enlarged longitudinal sectional elevation of the handle portion of the machine partly broken away,

Figure 3 is an enlarged detail vertical sectional view of the upper portion of Figure 2 showing the throttle or supply valve in open position,

Figure 4 is a view similar to Figure 3 partly broken away taken at right angles to Figure 3 and showing the valve closed,

Figure 5 is an enlarged detail longitudinal sectional elevation of the percussive element of the machine partly broken away to which element the handle rod is adapted to be secured, and

Figure 6 is a transverse sectional view of Figure 5 on the line 6—6 looking in the direction of the arrows.

Referring to the drawings, the machine comprises a percussive element indicated generally by the reference character A in Figures 1 and 5 and a handle element indicated by the reference character B in Figures 1 and 2 which two elements are suitably secured together by any suitable connection at the point C in Figure 1, in this instance a screw threaded connection being indicated. Material to be tamped, such as sand D, is operated upon by the butt E or other suitable implement adapted to be connected to the piston rod F having the piston G reciprocated in the cylinder H and controlled by a distributing valve J.

In accordance with this improved construction the cylinder H is provided with front and back cylinder casings K and L and the valve J is located in a valve chamber O formed between the opposed ends P and Q of the cylinder casings. The valve is in the form of a sleeve surrounding the cylinder H and a spacing sleeve R between the ends of the cylinder casings conveniently forms one wall of the valve chamber. Suitable means are provided for holding the cylinder casings together and in this instance flanges S and T are provided on the casings and an outer casing U extends over said cylinder casings and bears against the flange S. A nut V is adapted to engage the opposite end of the outer casing U and bear against the flange T of the back cylinder casing firmly clamping the parts together.

The cylinder H is provided with a front cylinder packing washer W held in position by the front cylinder casing K and packing X for the piston rod F is held in the front portion of the front cylinder portion K by means of a packing bushing Y which is held in place by the screw threaded cap Z and lock nut *a*. The back head of the cylinder H is formed by the back head plug *b* which in this instance is held in position by the shoulder *c* of the back cylinder casing L. This back cylinder casing L has a reduced hollow extension *d* containing a strainer *e* suitably connected to the back cylinder plug *b* and an oil plug *f* is provided on this reduced extension *d*.

The cylinder H is provided with a piston controlled exhaust port *g* communicating through the front cylinder casing K with the exhaust port *h* in the outer casing U. Cylinder ports *j* and *k* communicate with the ends of the cylinder and passages *o* and *p* between the cylinder and casings and preferably formed on the outside of the cylinder connect these ports with the valve chamber. Another passage *q* connects the hollow back head plug *b* with the valve chamber

through the agency of the port *r* in the back cylinder casing and the passage *s* between the outer casing U and the spacing sleeve R. The back head plug *b* is formed, as shown, with the inlet ports *t* and pressure fluid is supplied through the hollow handle rod *u* and hollow reduced extension *d* of the back cylinder casing L to the port *t* and from thence through the passage *q*, port *r*, passage *s*, and through the ports *v* in the spacing sleeve R to the interior of the valve J. With the parts in the position shown in Figure 5, the forward end of the valve is opened to atmosphere through the passage *p* and through the interior of the cylinder to the exhaust port *h* so that live pressure fluid in the valve moves the valve to its forward position. Pressure fluid is permitted to pass through the rearward valve openings *w* to the passage *o* and thence through the port *j* to the rearward end of the cylinder to drive the piston forward. After the piston G has passed and uncovered the exhaust port *g* in its forward travel, the rearward end of the valve will be subject to atmospheric pressure and the valve will be thrown rearwardly so that pressure fluid will pass through the valve openings *x* and thence through the passage *p* and port *k* to the foward end of the cylinder to return the piston on its rearward stroke, after which the cycle is repeated. The valve J is light and simple in construction and has a short travel of sufficient length, however, to supply the full amount of pressure fluid needed for operating the tamper piston and tamper tool.

In the present instance, an extension handle is shown comprising the hollow handle rod *u* and the operative parts connected for controlling the supply of pressure fluid into the machine and for taking up the shock in the machine which would otherwise be transmitted to the hands and arms of the operator. In Figure 1 the extension handle rod is shown broken away and in Figure 2 the detail of the handle construction is illustrated. Upon the reduced portion *y* of the handle rod is suitably secured a handle head block *z* as by means of a screw threaded connection 3. A throttle valve 4 forming the supply valve is normally closed upon the seat 5 in the head block *z* and spring pressed by means of the spring 6 held in position by the retaining nut 7 which also forms a supply connection of pressure fluid to the machine. The stem 8 of the valve is guided in the head block and this valve controls the supply port 9 communicating with the passage 10 in the head block leading to the hollow bore 12 of the extension handle *u*.

The lower end of the valve stem 8, as shown, rests upon a movable valve block 13 normally resting upon the stationary valve block 14 both contained within a slot or opening 15 in the head block *z*. These two valve blocks are formed with bevelled or wedged shaped portions 16 with which wedges, operating devices or balls 17 cooperate adapted to force the upper block 13 away from the lower block as the balls are pressed inwardly. For this purpose a valve actuating sleeve 18 is slidably mounted outside the head block *z* and is provided with the bevelled portions 19 which force the balls 17 inwardly as the actuating sleeve 18 is forced forwardly as indicated in Figures 2 and 3. A shoulder 20 on the head block forms a stop cooperating with the shoulder 21 on the sleeve for limiting the movement of the sleeve in a forward direction. A flange 22 on the nut 7 limits the movement of the sleeve in a rearward direction.

The sleeve 18 is adapted to be actuated by means of a handle sleeve 23 extending over the head block *z* and partially over the hollow handle rod *u*. The handle sleeve 23 is connected to the valve actuating sleeve 18 as by means of the cap nut 24 into which the upper end of the valve actuating sleeve is suitably secured.

A spring 25 bears at its forward end upon a shoulder 26 of the hollow handle rod *u* and at its upper end bears against a washer 27 secured against the internal shoulder 28 of the handle sleeve so that when the handle sleeve is moved forward to open the supply valve 4, the spring 25 is placed under compression and upon releasing this compression, the handle sleeve is reduced to its rearmost position to permit the valve 4 to close upon its seat 5 under the influence of the spring 6.

In the operation of the device, the supply valve 4 is opened by sliding the handle sleeve 23 forwardly on the hollow handle rod *u* which carries the valve actuating sleeve 18 forwardly and the balls 17 are forced between the wedge shaped portions of the valve blocks to move the rearward valve block rearwardly and open the valve 4. Pressure fluid is then supplied down through the passages 10 in the head block *z* and through the hollow handle rod *u* to the back head block or plug *b* of the percussive element which starts the reciprocation of the piston G and tamper tool E for tamping purposes. The reciprocation of the piston is stopped by releasing or moving the slidable handle sleeve 23 rearwardly to permit the supply valve 4 to close.

I claim:

1. In a fluid actuated percussive ramming tool, the combination of a percussive element, a rearwardly extending handle rod, a handle head block, a normally closed spring pressed valve in said head block, a sliding valve actuating sleeve over said head block, an outer slidable handle sleeve engaging

said valve actuating sleeve and extending partially over the handle rod, and a spring between the handle rod and handle sleeve, whereby the valve may be actuated by movement of the handle sleeve and the shock of the percussive element is partially absorbed by said handle spring.

2. In a fluid actuated percussive ramming tool, the combination of a percussive element, a rearwardly extending handle rod, a handle head block, a normally closed spring pressed valve in said head block, a movable valve block forming an abutment for the valve, a sliding valve actuating sleeve over said head block, a movable member interposed between the valve block and sliding sleeve and cooperating with both, an outer slidable handle sleeve engaging said valve actuating sleeve and extending partially over the handle rod, and a spring between the handle rod and handle sleeve, whereby the valve may be actuated by movement of the handle sleeve and the shock of the percussive element is partially absorbed by said handle spring.

3. In a fluid actuated percussive ramming tool, the combination of a percussive element, a rearwardly extending handle rod, a handle head block, a normally closed spring pressed valve in said head block, two wedge shaped valve blocks, one being movable and forming an abutment for the valve, a sliding valve actuating sleeve over said head block, wedge separating members interposed between said valve blocks and the sliding sleeve and cooperating with said valve blocks and with the said sliding sleeve, an outer slidable handle sleeve engaging said valve actuating sleeve and extending partially over the handle rod, and a spring between the handle rod and handle sleeve, whereby the valve may be actuated by movement of the handle sleeve and the shock of the percussive element is partially absorbed by said handle spring.

4. In a fluid actuated percussive ramming tool, the combination of a percussive element, a rearwardly extending handle rod, a handle head block, a normally closed spring pressed valve in said head block, two opposed wedge shaped valve blocks, one being movable and forming an abutment for the valve, a sliding valve actuating sleeve over said head block having beveled portions, balls interposed between said valve blocks and the beveled portions of the said sliding sleeve whereby the balls are adapted to be forced inwardly by the sliding sleeve to separate the valve blocks, an outer slidable handle sleeve engaging said valve actuating sleeve and extending partially over the handle rod, and a spring between the handle rod and handle sleeve, whereby the valve may be actuated by movement of the handle sleeve and the shock of the percussive element is partially absorbed by said handle spring.

In testimony whereof I have signed this specification, as administrator.

JOHN M. FELT,
Sole Administrator of the Estate of Robert F. Page, Deceased.