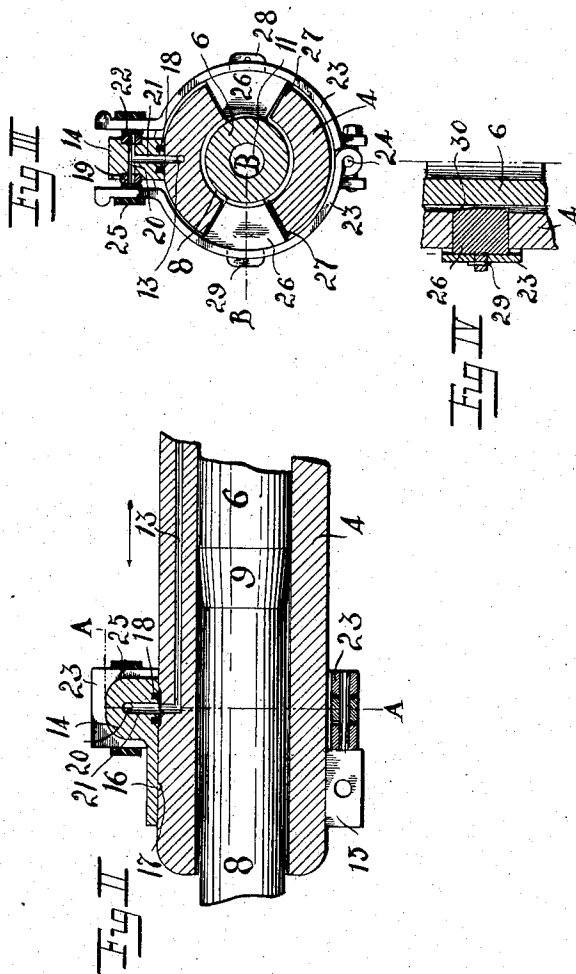
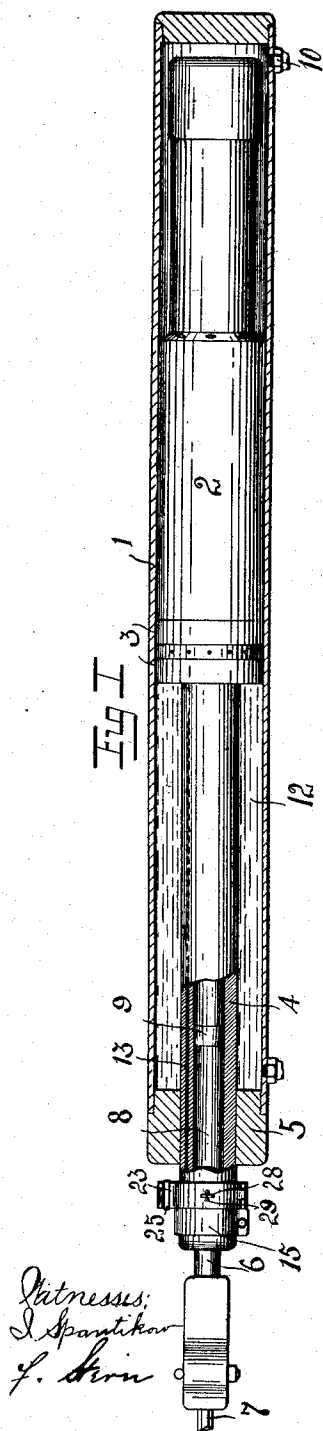


VALVE DEVICE FOR HYDRAULICALLY CONTROLLED SELF FEEDING PERCUSSIVE APPARATUS.

Patented Jan. 23, 1912.

1,015,449.



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VALVE DEVICE FOR HYDRAULICALLY-CONTROLLED SELF-FEEDING PERCUSSIVE APPARATUS.

1,015,449.

Specification of Letters Patent.

Patented Jan. 23, 1912.

Application filed May 5, 1909. Serial No. 494,100.

To all whom it may concern:

Be it known that I, WILHELM MAUSS, engineer, a subject of the King of Great Britain, residing at Consolidated Buildings, Johannesburg, Transvaal, have invented new and useful Improvements in Valve Devices for Hydraulically-Controlled Self-Feeding Percussive Apparatus, of which the following is a specification.

In application No. 465616 there is described percussive apparatus in which the engine being pressed forward in an outside shell, is checked and retained in its momentarily correct position for striking its blow, by a body of liquid contained in the front part of the shell. The requisite forward movement of the machine, after each effective blow, is permitted by escape of the liquid through a valve which is opened by a cam surface upon the piston rod whenever the tool cuts into the rock or other material being operated upon.

The purpose of the present invention is to provide a valve device for controlling the escape of the aforesaid checking liquid, the operation of which is unaffected by lateral vibration of the piston and piston rod with respect to the cylinder.

In the accompanying drawing Figure I is a longitudinal section of the complete percussive apparatus showing the arrangement of the novel device, Fig. II an enlarged view of the valve device; Fig. III a section thereof taken on A. A., and from the direction of the arrow; and Fig. IV is a section on B. B., Fig. III.

1 represents the external shell in which the percussive machine 2 is free to slide. The head of the machine is extended as a neck 4 which projects through the front cap 5 of the shell. Through said neck works the piston rod 6 carrying the tool 7. The front portion 8 of the piston rod is reduced in diameter and joined to the unreduced part by a cone 9. Compressed air or other actuating fluid to operate the percussive machine and to force it forward in the shell is supplied to the rear end of shell 1 at 10; exhaust from the machine may be taken through an axial hole 11 in the piston rod.

The front end 12 of the shell contains the checking liquid, and the eduction port 13 for said liquid is carried up the neck 4.

14 indicates a valve seating mounted upon

the part of the neck which is external of the shell. As shown, the valve seating is detachably secured to the neck by means of a clip 15, in order that the neck may be passed through cap 5. The seating is positioned by means of a key 16 on the inside of the clip 15 engaging a keyway 17 in the neck; and a watertight connection between the seating and the neck is made by the packing 18. Renewable valve seats 19, having rounded surfaces, are fitted in the opposite faces of the valve seating; a port 20 passes through said seats and the seating and is connected to port 13 by the port 21. The two rubber or like valves 22 cooperating with said valve seats are carried by a stirrup formed of the two arcuate arms 23 hinged together by a pin 24 and of such diameter when assembled as well to clear the neck 4.

The valves are held to the seats by a rubber band 25 passed around the free ends of the arms 23. Each such arm carries a block 26 which extends through an aperture 27 in the neck 4 in close proximity to the reduced portion 8 of the piston rod. As shown, the blocks are held to the arms by lugs 28 which pass through slots in the arms and are secured by split pins 29. Said blocks fit the apertures 27 nicely in the direction of the axis of the machine, but otherwise loosely. Their edges are beveled off, as indicated by 30, at the angle of the cone 9.

The device operates in the following manner. Actuating fluid admitted through cock 10 urges the percussive machine forward in the shell and puts the liquid in chamber 12 under pressure, escape of the liquid being prevented by the valves 22 closing port 20. As the piston reciprocates and the tool cuts into the rock sufficiently far to enable the cone 9 to force apart the blocks 26 the valves 22 are lifted off their seats 19 and a certain amount of liquid thereby escaping, the machine is enabled to move forward in the shell.

It will be understood from the foregoing that the valves are never moved from their seats until the cone 9 comes between the blocks 26. Any play or vibration of the piston rod relatively to the neck, although it may force out either one block, also permits the second block to follow inwardly to a corresponding extent thus causing merely

a movement of the stirrup as a whole about the valve seating 14 but leaving the valves 22 in full contact therewith.

The feeding point may be readily corrected or adjusted by varying the position of the bevels 30. Thus, should the piston rod cam surface become worn and should it be desired to vary the feeding point in order to correspond with the class of rock being drilled, the blocks 26 may be taken out and replaced by others having the bevel advanced toward the cone 9, or cut back as the case may be.

What I claim and desire to secure by Letters Patent is:

1. In combination, a percussive mechanism including a shell for pressure and checking fluids, a longitudinally reciprocating member dividing said shell into pressure and checking fluid chambers and arranged to be acted upon by said fluids and provided with a cam, means for admitting pressure fluid to operate said member, means for controlling the checking fluid for said member actuated by longitudinal movement of said cam, said last mentioned means including a device for preventing operative movement thereof upon lateral movement of said reciprocating member.

2. In combination, a shell for containing pressure and checking fluids, a reciprocal member dividing the shell into pressure and checking chambers and arranged to be acted upon by said fluids and including a rod provided with a cam surface, means for admitting pressure fluid for driving said member forwardly, valve mechanism for controlling the checking fluid arranged to be operated by longitudinal movement of the cam, said valve mechanism including means for preventing operative movement of said valve mechanism upon lateral or vibratory movement of said rod.

3. In combination, a shell for containing pressure and checking fluids, a reciprocable member dividing the shell into pressure and checking fluid chambers and including a rod for said member provided with a cam, means admitting pressure fluid to drive said member forwardly, valve mechanism for controlling the checking fluid including a valve seating, an expansible stirrup, and valve means carried by said stirrup and bearing upon said seating, said stirrup being free to oscillate about said valve seating, said mechanism being actuated by said cam.

4. In combination, a percussive mechanism a shell for pressure and checking

fluids, a reciprocating member interposed between said fluids in said shell and dividing the same into pressure and checking fluid chambers, said member including a rod having a cam thereon, means admitting pressure fluid to drive said member and means actuated by said cam for controlling the checking fluid.

5. In combination, a percussive mechanism a shell for pressure and checking fluids, a reciprocable member in said shell and dividing the shell into pressure and checking fluid chambers and projecting therethrough said member having mechanism for controlling egress of the checking fluid, and a piston in said member provided with a rod having a cam for actuating said mechanism, and means for admitting fluid to said pressure chamber.

6. In combination, a percussive mechanism comprising a shell for the checking and pressure fluids, a reciprocable member dividing the shell into pressure and checking fluid chambers; and having a reduced neck projecting through said shell, means carried by said member outside of said shell for controlling egress of the checking fluid, a reciprocating piston in said member provided with a rod having a cam slidable in said neck for actuating said means, and means for admitting fluid to said pressure chamber.

7. A percussive mechanism comprising in combination, a shell for pressure and checking fluids, a percussive machine dividing said shell into checking and pressure fluid chambers and having an outlet for the checking fluid, radially movable actuating means for normally preventing egress of the checking fluid from said outlet, a piston for actuating said radial means to permit egress, and means admitting fluid to said pressure chamber, substantially as described.

8. A percussive mechanism comprising in combination, a shell for the pressure and checking fluids, a member dividing said shell into checking and pressure chambers and having an outlet for the checking fluid, valves controlling egress through said outlet, pivotally mounted mechanism including yielding means for supporting and holding said valves seated, and a piston rod for actuating said mechanism to open said valves.

In testimony whereof I affix my signature in presence of two witnesses.

WILHELM MAUSS.

Witnesses:

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ALFRED L. SPOOR.