

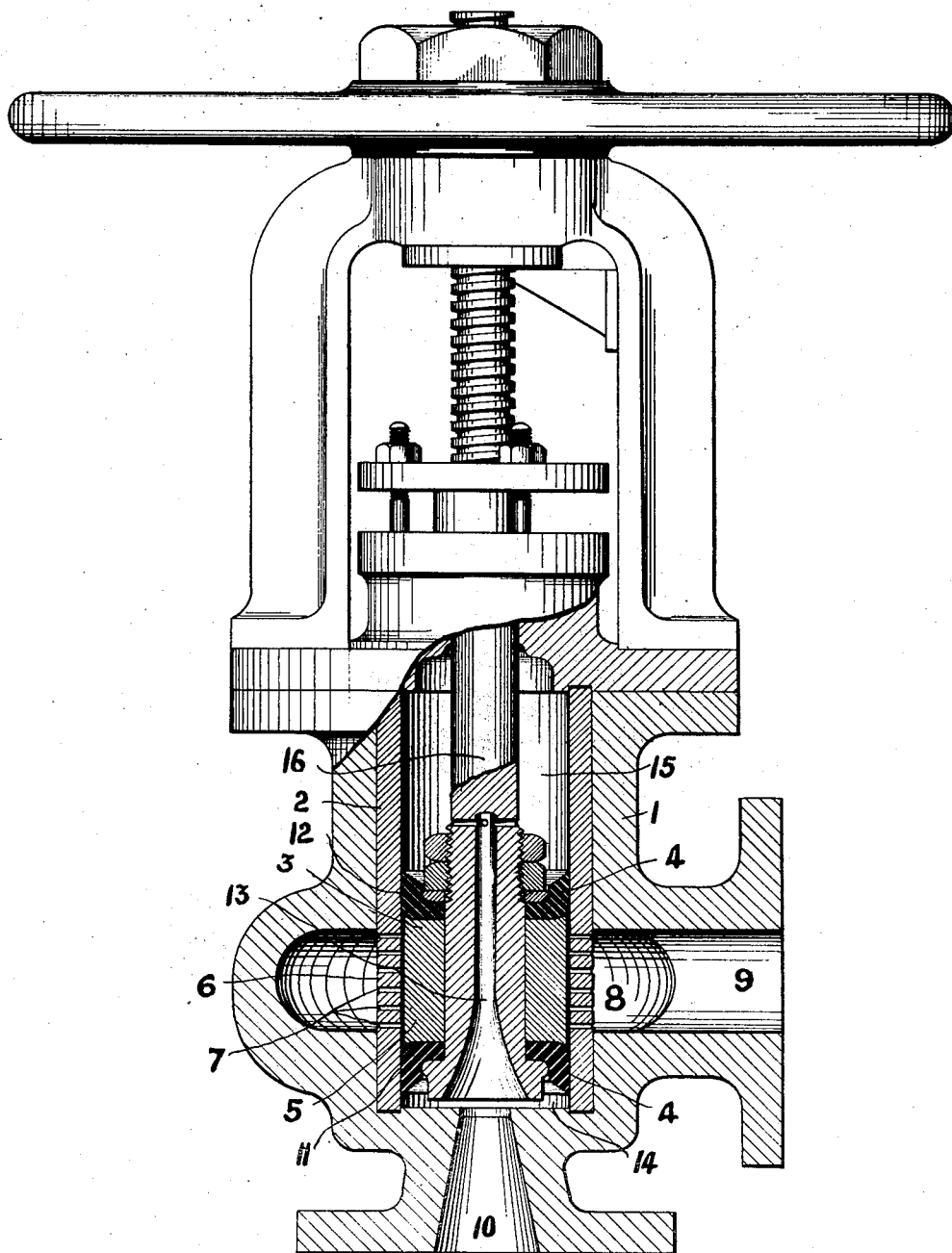
R. WILSON.

VALVE.

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1,111,244.

Patented Sept. 22, 1914.



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UNITED STATES PATENT OFFICE.

ROBERT WILSON, OF DEEP GOLD MINE, JOHANNESBURG, TRANSVAAL, SOUTH AFRICA.

VALVE

1,111,244.

Specification of Letters Patent.

Patented Sept. 22, 1914.

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To all whom it may concern:

Be it known that I, ROBERT WILSON, a British subject, of the village of Deep Gold Mine, Johannesburg, in the Province of the Transvaal, Union of South Africa, have invented certain new and useful Improvements in Valves, of which the following is a specification.

This invention has reference to valves, the object being to provide a valve constructed for high working pressures and for dealing with abrasive or corrosive fluids.

A special object of the invention is to provide an improved blow-down valve for the pump columns in deep mines where not only is the pressure very high, but the water to be dealt with is generally very acid and often also gritty.

The ordinary metal to metal valves and seats when exposed to excessively high pressures are liable to become cut by the action of the flowing fluid, causing escape of the fluid. This is particularly the case when the valve is employed for regulating the flow of a liquid of an acid or gritty nature.

A valve constructed according to this invention is shown in section in the accompanying drawing.

The valve comprises a casing 1 having a cylindrical internal bore which is preferably provided by a liner 2. The valve proper consists of a piston 3 packed at its ends by means of cup leathers or like hydraulic packings 4, which are separated usually by a non-corrosive distance piece 5.

One annular section 6 of the liner is perforated by a number of relatively small ports 7 which provide communication between the cylindrical bore of the valve and an annular passage 8 which in turn communicates with the passage 9; the latter being, in this case, the outlet. The collective area of the ports 7 is preferably made equal to that of the outlet passage.

The other passage 10 opens to one end of the casing; it is generally made the inlet and of smaller diameter than the outlet 9.

When the valve is closed, as shown, the piston 3 covers the aforesaid annular series of ports 7; the distance piece 5 lying immediately over the ports 7 and the packings seating upon the unbroken surfaces 11, 12 of the liner at either side thereof; while opening of the valve is effected by traversing the piston along the bore to uncover said ports 7. Consequently, so long as the valve

is closed, the piston packings 4 completely exclude the fluid from the piston and from the unbroken liner surfaces 11, 12, which surfaces constitute the valve seat. Moreover, when the valve is lifted, there is little tendency to abrade said surfaces 11, 12, owing to the flow of fluid within the cylindrical bore being substantially longitudinal thereof; while the large flow area afforded by the annular series of ports minimizes the tendency to cutting at that point. Should either the valve seats or the packings become scored or worn, the valve will nevertheless tend to remain tight owing to the yielding nature of the packing and the pressure of the fluid forcing it to conform closely to the metal surface; and the small initial leakages, which in a metal to metal blow-down valve would rapidly develop, are thus avoided.

The individual diameter of the ports 7 is such that the packings 4 in passing over them are adequately supported against being torn away and forced through them by the pressure of the liquid. Holes one-eighth of an inch diameter have been found to be satisfactory with the incoming liquid at 1000 lbs. per square inch pressure.

The piston is usually balanced by providing a passage 13 which puts the spaces 14, 15 at its ends in communication. The forces at the valve ends due to the pressure may be so differentiated by adjustment of the area of the valve spindle 16 as to facilitate the movement of the valve against pressure, either when opening or closing it, as may be desired. In the construction illustrated, the passage 13 is formed in the valve spindle 16 which passes completely through the piston. The lower end of the passage 13 is flared; while the inlet passage 10 is positioned in alinement with said passage 13 and of inwardly converging form. The result is that the incoming liquid is cushioned upon itself in the mouth of passage 13 and thereby prevented from seriously damaging the parts of the valve.

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

1. A valve comprising a casing providing a cylindrical valve chamber, the ends of which are constantly in communication, a piston working therein and fitted at each end with outwardly directed cup packing, an inlet passage opening to one end of the valve chamber, an outlet passage communicating

with the interior of the valve chamber by means of a group of relatively small ports in the wall of the chamber, such piston covering said ports to close the valve, and being
5 movable away from the inlet passage to put the latter in communication with the ports, and thereby open the valve.

2. A valve comprising a casing providing a cylindrical valve chamber, the ends of
10 which are constantly in communication, a piston working therein and fitted at each end with outwardly directed cup packing, an inlet passage opening to one end of the valve chamber, an outlet passage commu-
15 nicating with the interior of the valve chamber by means of a group of ports in the wall of the chamber, said ports being individually so small that the packing cannot be forced appreciably into them, the wall of
20 the chamber about and on either side of said group of ports forming a continuous and

substantially unbroken surface upon which the packing is constantly seated.

3. A valve comprising a casing providing a cylindrical valve chamber, a piston struc- 25
ture working therein and provided at each end with outwardly directed cup packing, an inlet at one end of the casing and directed toward said piston structure, said structure having a longitudinal hole affording com- 30
munication between the two ends of the valve chamber, the end of said hole toward the inlet passage being flared to a greater diameter than that of the inlet passage.

In testimony whereof I have signed my 35
name to this specification in the presence of two subscribing witnesses.

ROBERT WILSON.

Witnesses:

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