

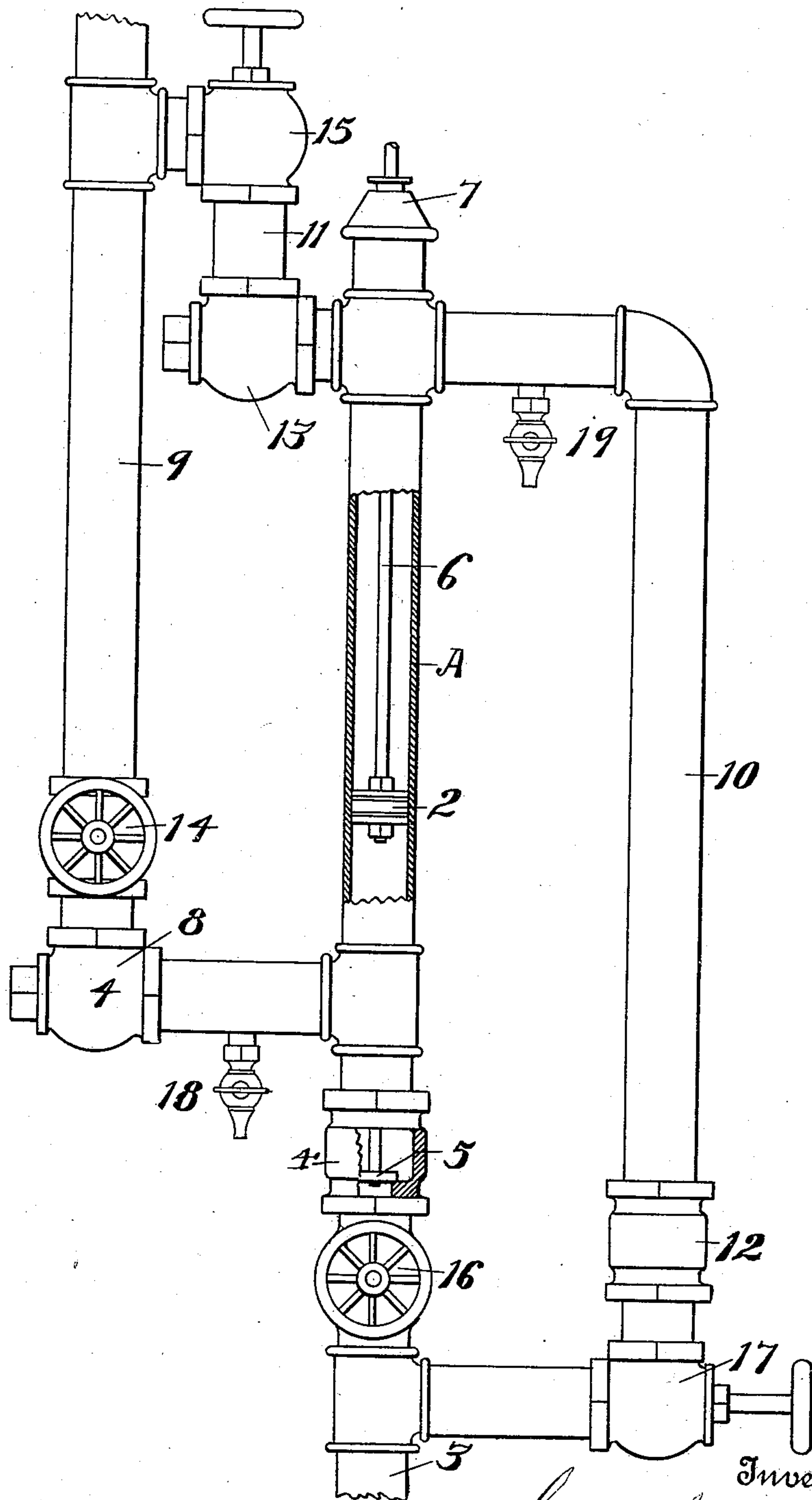
No. 742,471.

PATENTED OCT. 27, 1903.

G. MORRICE & C. G. GRIM.  
PUMP.

APPLICATION FILED AUG. 29, 1902.

NO MODEL.



Witnesses,  
Dudley Moss.  
By *James*

Inventors  
George Morrice  
Charles G. Grim  
By *Dwight Houghton* atty

# UNITED STATES PATENT OFFICE.

GEORGE MORRICE AND CHARLES G. GRIM, OF SONORA, CALIFORNIA.

## PUMP.

**SPECIFICATION** forming part of Letters Patent No. 742,471, dated October 27, 1903.

Application filed August 29, 1902. Serial No. 121,474. (No model.)

*To all whom it may concern:*

Be it known that we, GEORGE MORRICE and CHARLES G. GRIM, citizens of the United States, residing at Sonora, county of Tuolumne, State of California, have invented an Improvement in Pumps; and we hereby declare the following to be a full, clear, and exact description of the same.

Our invention relates to improvements in pumps of the double-acting type, in which a reciprocating plunger is adapted to draw water alternately into valve-controlled passages connecting with the pump-barrel above and below the plunger and to discharge the water in a continuous stream. Its object is to provide a pump of this character suitable particularly for deep-mining operations, which shall be simple in construction and which is readily convertible into a single-acting pump, thereby allowing repairs or renewals to be made without suspending the operation of the pump.

It comprises the parts and the construction and combination of parts hereinafter described, and set forth in the claims, and illustrated in the accompanying drawing, which represents the pump and connections.

A represents a pump barrel or cylinder in which the plunger 2 is reciprocable. The lower end of the barrel communicates with the suction-pipe 3 and is provided with a removable casing 4, having a suitable stop-valve 5. The plunger-rod 6 is slidable in a stuffing-box 7 in the opposite end of the barrel. Water is drawn in on alternate reciprocation through valve 5 and discharged on successive reciprocation through stop-valve 8 into the main discharge-pipe 9. A by-pass 10 connects the suction-pipe just below valve 5 with the opposite end of the cylinder. Water is drawn in on alternate reciprocations of the piston through this by-pass and is discharged through the pipe-section 11 into the main discharge-pipe 9. Respective valves 12 13 in the by-pass and section 11 hold the water against

back pressure. Stop-cocks 14 15 are disposed above the respective discharge-valves 8 and 13, while the cocks 16 17 are disposed below the respective intake-valves 5 and 12.

In operation with all the cocks open the plunger draws water alternately into each end of the cylinder, first acting to close one set of valves 12 8 and to open the other set 5 13 and then to close the latter and to open the former, thus sending a continuous stream to the surface through the discharge-pipe 9.

By closing cocks 14 16 the pump is converted into a single-acting pump and the water is drawn in through stop-valve 12 and thence forced outward through valve 13. By opening cocks 14 16 and closing cocks 15 17 the pump will act similarly on the opposite side.

A salient feature of this pump is the fact that by disposing the cocks on the opposite sides of the intake and discharge valves any of the valves can be repaired or replaced at any time without stopping the pump. This is of greater importance in deep mining, where large quantities of water have to be handled.

With our apparatus either pump-column may operate independently of the other or both may act in conjunction, as desired.

18 19 are blow-off cocks, one or the other of which may be opened when the pump is single-acting.

Compared with single-acting pumps of equal capacity this pump requires practically but half the power of those pumps to operate it, or, in other words, with the same power it will pump double the amount of water.

Having thus described our invention, what we claim, and desire to secure by Letters Patent, is—

An improved deep-mining pump consisting of a vertically-disposed cylinder; a plunger reciprocable therein; a suction-pipe connecting with the lower end of the cylinder and provided with a removable casing having a stop-valve; a valved main discharge-pipe



vertically disposed at one side of the cylinder and having a lateral connection with the lower portion thereof; a valved by-pass vertically disposed at the opposite side of the cylinder  
5 having one end connecting with the suction-pipe and the opposite end connecting with the upper end of the cylinder; a vertical pipe-section between and parallel with the cylinder and main discharge-pipe; and valve connections between said section and the cylinder and discharge-pipe.  
10

In witness whereof we have hereunto set our hands.

GEORGE MORRICE.  
CHARLES G. GRIM.

Witnesses for George Morrice's signature:

W. J. KENNY,  
JO. MORRIS.

Witnesses for Charles G. Grim:

JAMES ATCHESON,  
EDWARD TUNNACE.