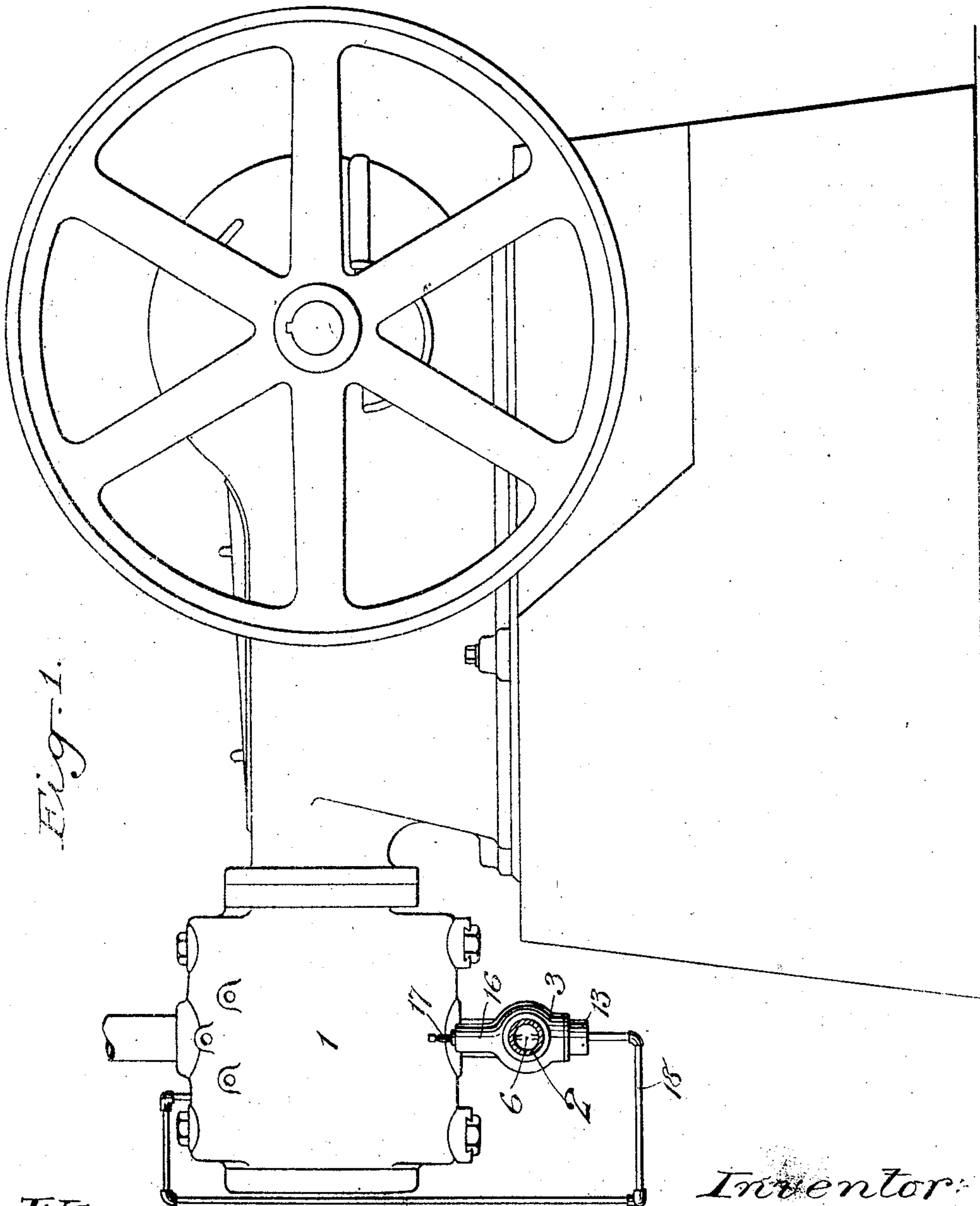


W. RAYMOND.
REGULATOR FOR FLUID COMPRESSORS.
APPLICATION FILED SEPT. 30, 1909.

998,201.

Patented July 18, 1911.

2 SHEETS—SHEET 1.



Witnesses:
George Barry
Mary Thorne

Inventor:
Ward Raymond
by his attorney
Thorn & Son

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2 SHEETS-SHEET 2.

Fig. 6.

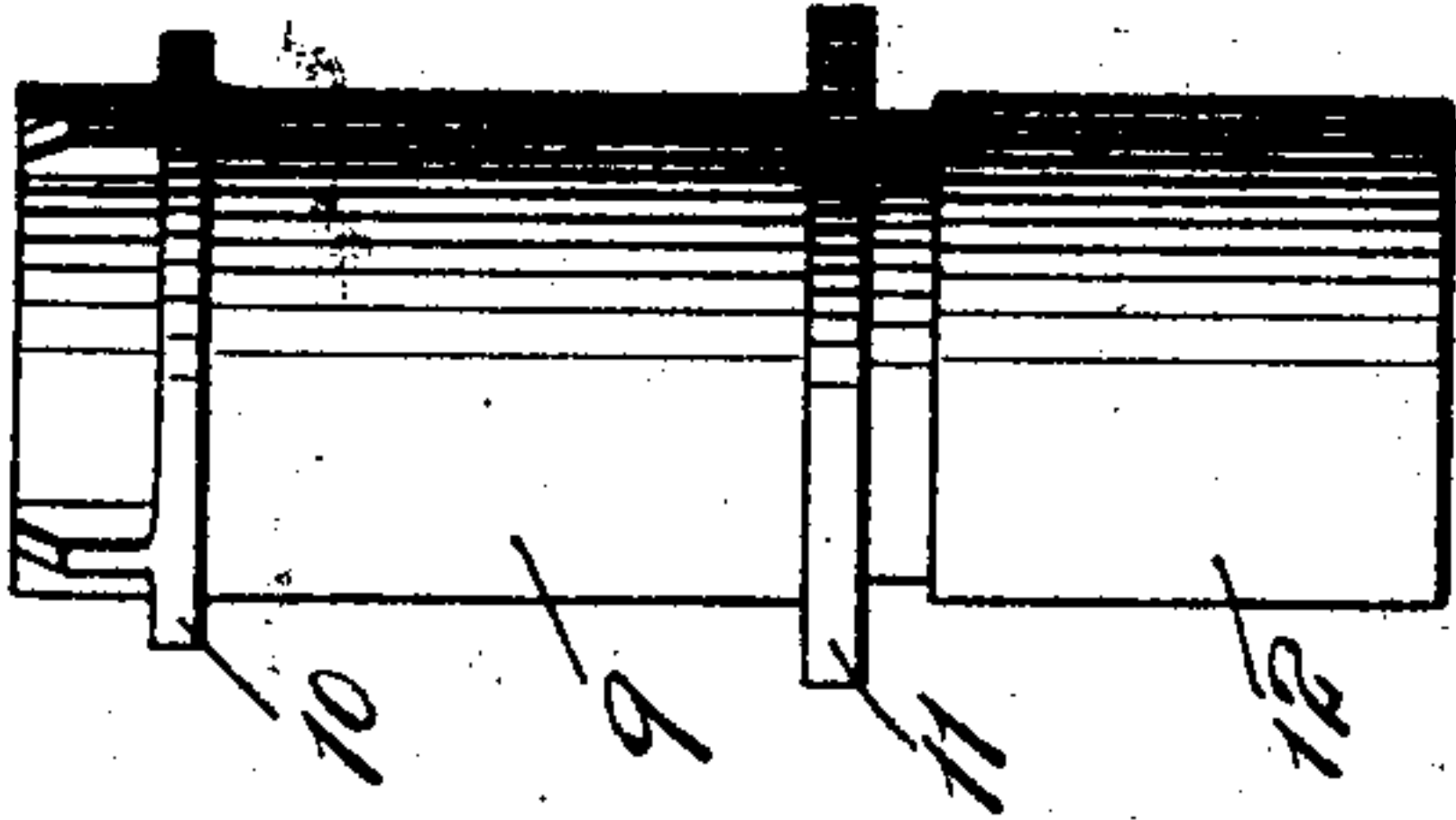


Fig. 5.

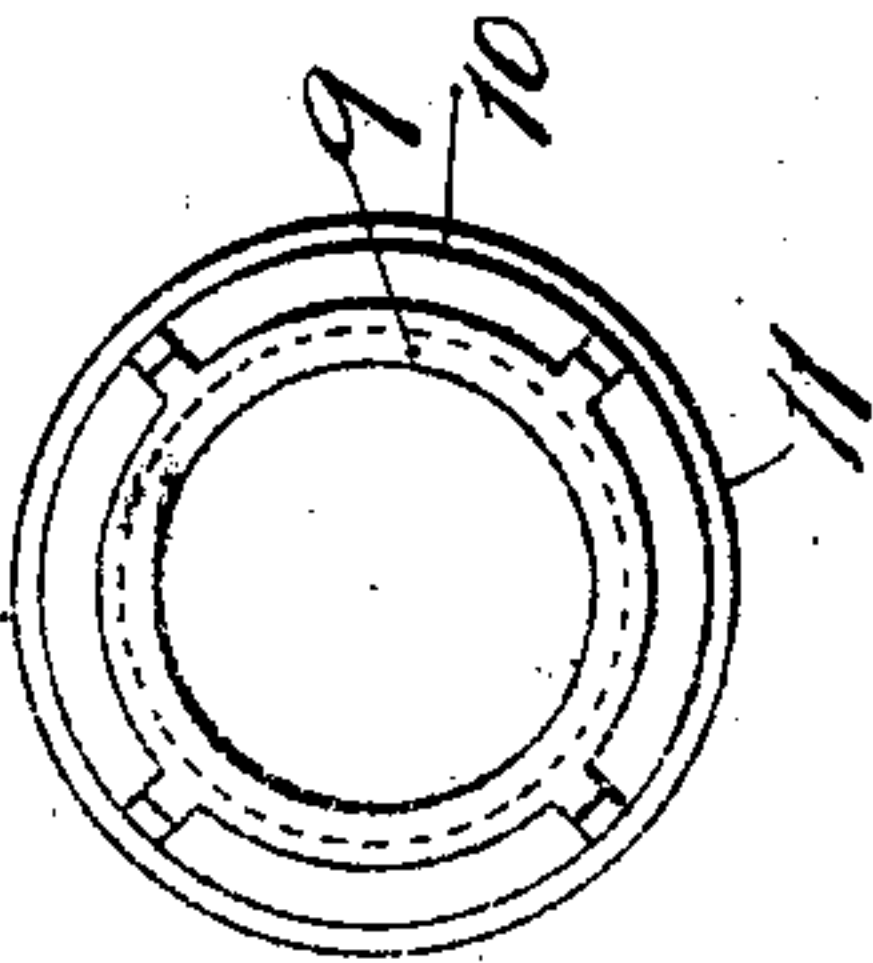


Fig. 4.

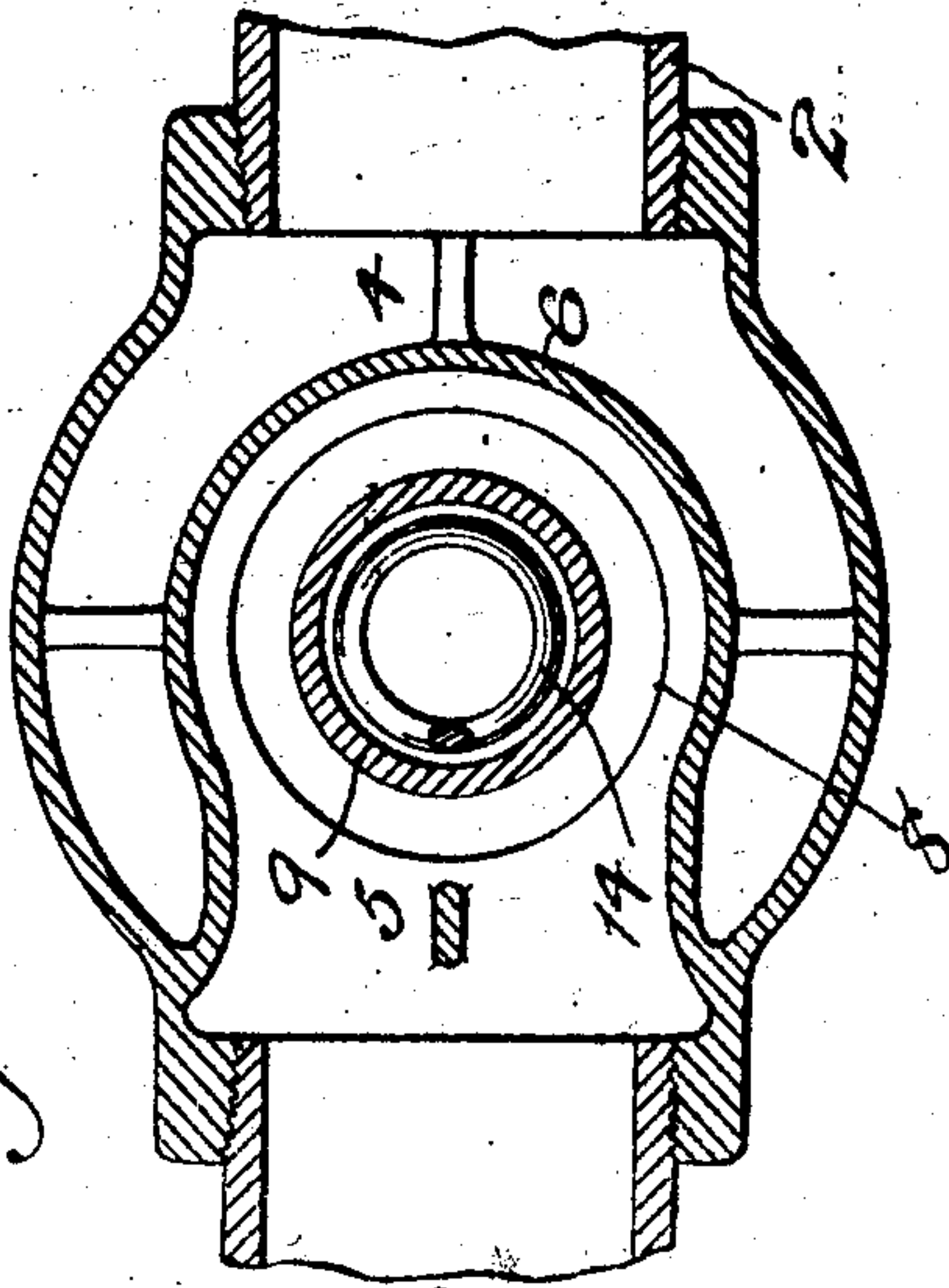


Fig. 3.

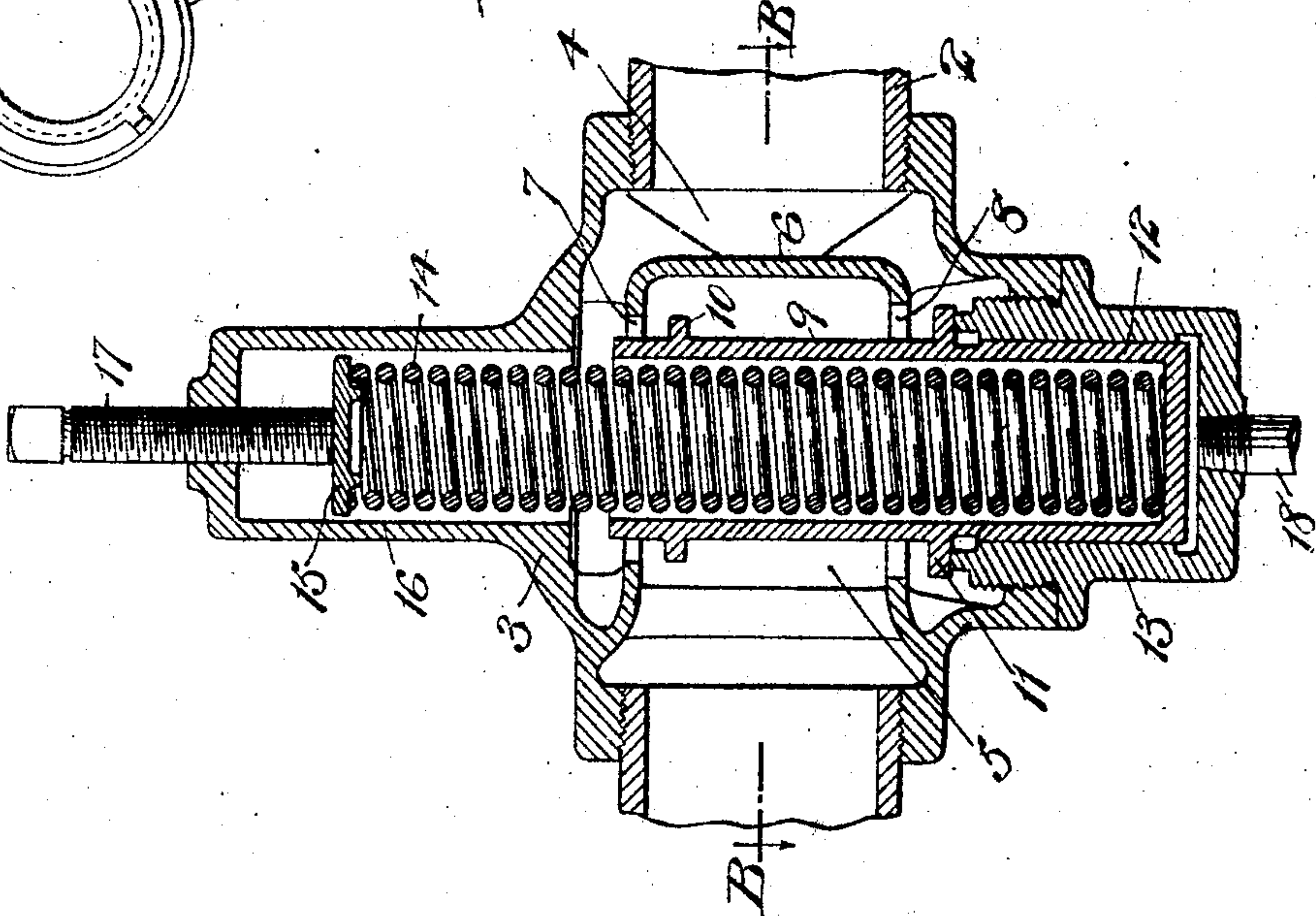
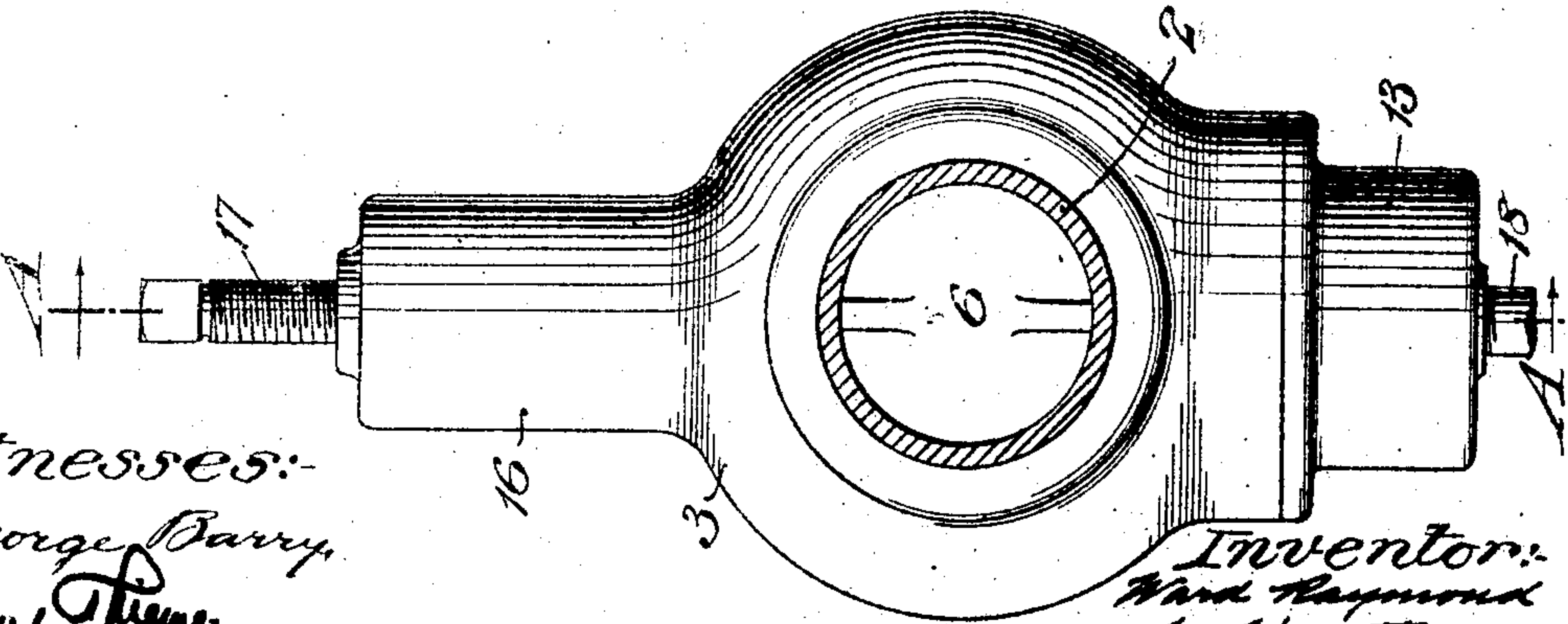


Fig. 2.



Witnesses:
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Harry Thorne.

Inventor:
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H. H. H. H. H.

UNITED STATES PATENT OFFICE.

WARD RAYMOND, OF EASTON, PENNSYLVANIA, ASSIGNOR TO INGERSOLL-RAND COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

REGULATOR FOR FLUID-COMPRESSORS.

998,201.

Specification of Letters Patent.

Patented July 18, 1911.

Application filed September 30, 1909. Serial No. 520,334.

To all whom it may concern:

Be it known that I, WARD RAYMOND, a citizen of the United States, and resident of Easton, in the county of Northampton and State of Pennsylvania, have invented new and useful Improvements in Regulators for Fluid-Compressors, of which the following is a specification.

The object of this invention is to provide certain improvements in regulators for controlling the admission of fluid to a fluid compressor and it consists in a novel choking controller for the compressor intake having its valve arranged to be closed by an increase of pressure upon one side thereof and acted upon by the reduction of pressure upon the other side thereof due to the closing of the valve to offset the increasing force of the valve opening means, the said valve having differential areas for securing the accomplishment of the object above set forth.

In the accompanying drawings my invention is represented in connection with a fluid compressor of the straight-line belt driven type, in which—

Figure 1 represents the compressor in side elevation with my improved choking controller applied thereto, Fig. 2 is an enlarged view in elevation of my improved controller, Fig. 3 is a section taken in the plane of the line A—A of Fig. 2 looking in the direction of the arrows, Fig. 4 is a section taken in the plane of the line B—B of Fig. 3 looking in the direction of the arrows, Fig. 5 is a plan view of the valve proper, and Fig. 6 is a side view of the same.

The compressor cylinder is denoted by 1 and its intake pipe by 2. The choking controller valve casing is denoted by 3 and it is located in the intake pipe 2. This casing is provided with an outer inlet chamber 4 and an inner outlet chamber 5, separated by a partition 6 having ports 7, 8, of smaller and larger area arranged to be opened and closed by a double valve 9 having flanges 10, 11, of differential areas corresponding respectively to the ports 7 and 8. This double valve 9 is provided with a piston head 12 fitted to slide in a cylinder 13 secured to the casing 3, the inner open end of which cylinder is arranged to be engaged by the larger flange 11 of the valve for limiting the opening movement of the valve. A coil spring 14 is utilized for normally holding the valve in its open position, which spring is inter-

posed between the closed end of the valve and a cap 15 located in a hollow extension 16 of the casing 3. An adjusting screw 17 is provided for regulating the tension of the valve opening spring 14.

The valve is closed by an increase of pressure as follows:—A pipe 18 leads from the discharge side of the compressor cylinder 1 to the interior of the cylinder 13 in front of the valve piston head 12. When the pressure has been raised to the desired degree to overcome the opening force of the spring 14, the valve 9 will be started on its closing movement against the tension of the said spring. As the tension of this spring 14 will increase as the valve approaches its closed position, the reduction in pressure in the chamber 5 will act upon the other side of the valve from that exposed to the increase in pressure for overcoming the increase of pressure due to the compression of the spring 14. This is accomplished because of the differential areas of the valve flanges 10 and 11, as the reduction of pressure in the intake pipe 2 between the valve and compressor will exert more influence upon the larger valve flange 11 than it does upon the smaller valve flange 10. As soon as the pressure in the compressor is reduced below the desired amount, it will be seen that the spring 14 will open the valve and, as soon as the valve is started, the effect of the reduction of pressure in the intake is withdrawn from the valve flanges thus permitting a rapid opening of the valve.

By the arrangement of the differential area of the valve flanges, it will be seen that a rapid opening and closing of the valve is provided for without the use of an auxiliary valve as has heretofore been common, for overcoming the increased tension of the valve opening spring due to the closing movement of the valve.

While this regulator has been shown in connection with a belt driven single stage straight-line fluid compressor, it is to be understood that it may be applied to compressors of any type where such a regulator can be effectively used, without departing from the spirit and scope of my invention; hence I do not wish to limit myself strictly to the structure herein set forth, but

What I claim is:—

1. In combination, a compressing pump, a choking controller valve, valve opening

means offering an increasing resistance to the closing movement, said valve having an unbalanced area on the pump intake side so located as to be exposed to pump suction in the closing movement and thus tend to neutralize the increasing resistance of the valve opening means.

2. In combination, a compressing pump, a choking controller valve, a valve opening spring offering an increasing resistance to the closing movement, said valve having an unbalanced area on the pump intake side so located as to be exposed to pump suction in the closing movement and thus tend to neutralize the increasing resistance of the valve opening spring.

3. In combination, a compressing pump, a choking controller valve, means for positively closing the valve, valve opening means offering an increasing resistance to the closing movement, said valve having an unbalanced area on the pump intake side so located as to be exposed to pump suction in the closing movement and thus tend to neutralize the increasing resistance of the valve opening means.

4. In combination, a compressing pump, a choking controller valve, means for positively closing the valve controlled by an increase in fluid pressure from the discharge

side of the pump, valve opening means offering an increasing resistance to the closing movement, said valve having an unbalanced area on the pump intake side so located as to be exposed to pump suction in the closing movement and thus tend to neutralize the increasing resistance of the valve opening means.

5. In combination, a compressing pump, a choking controller valve having a piston open to fluid pressure from the discharge side of the pump and acted upon by an increase of such pressure for positively closing the valve, valve opening means offering an increasing resistance to the closing movement, said valve having an unbalanced area on the pump intake side so located as to be exposed to pump suction in the closing movement and thus tend to neutralize the increasing resistance of the valve opening means.

In testimony, that I claim the foregoing as my invention, I have signed my name in presence of two witnesses, this twenty-seventh day of September 1909.

WARD RAYMOND.

Witnesses:

A. H. TAYLOR,

CHARLES T. MILLER.