

E. W. CHRISTIE.
VALVE.

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Fig. 1

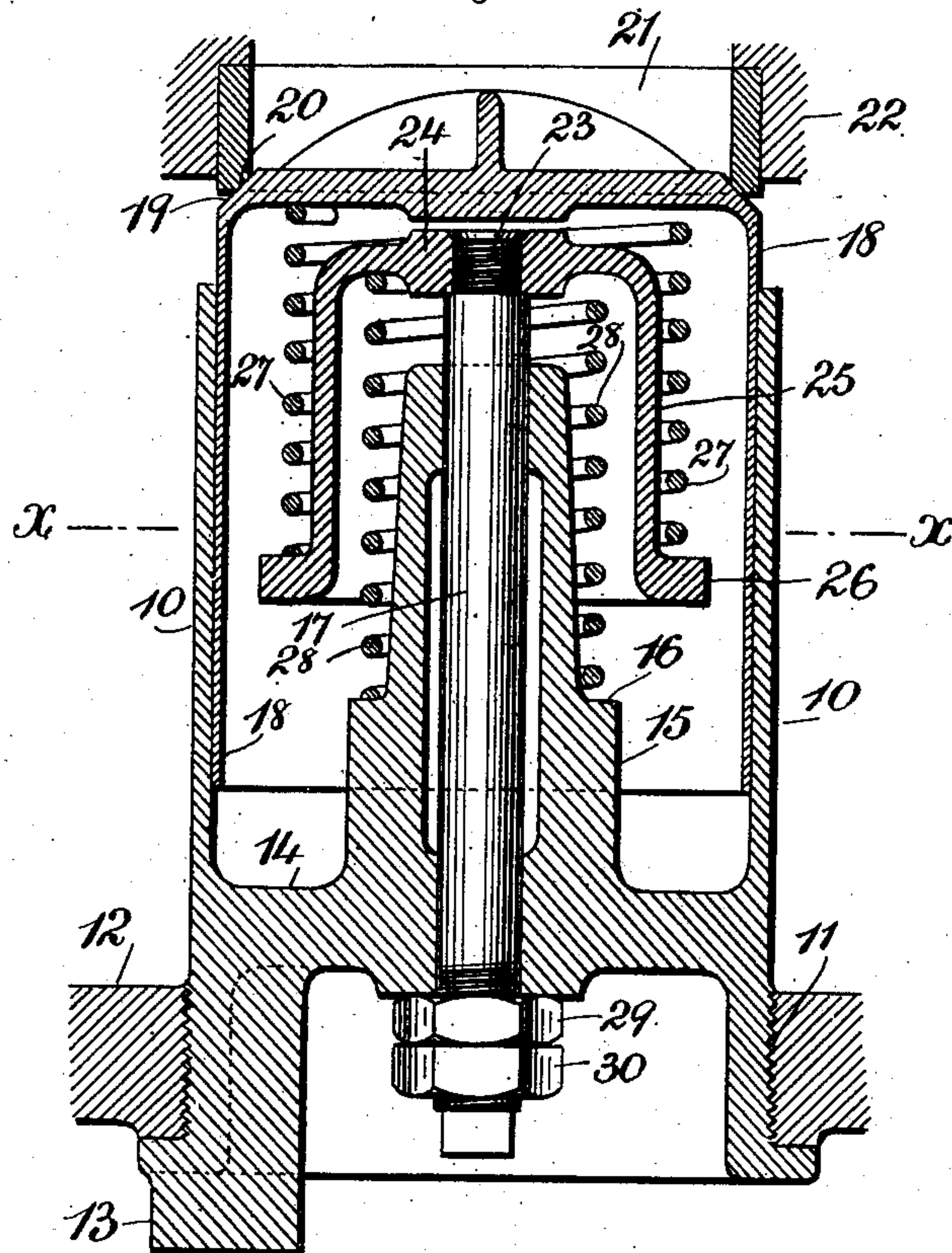
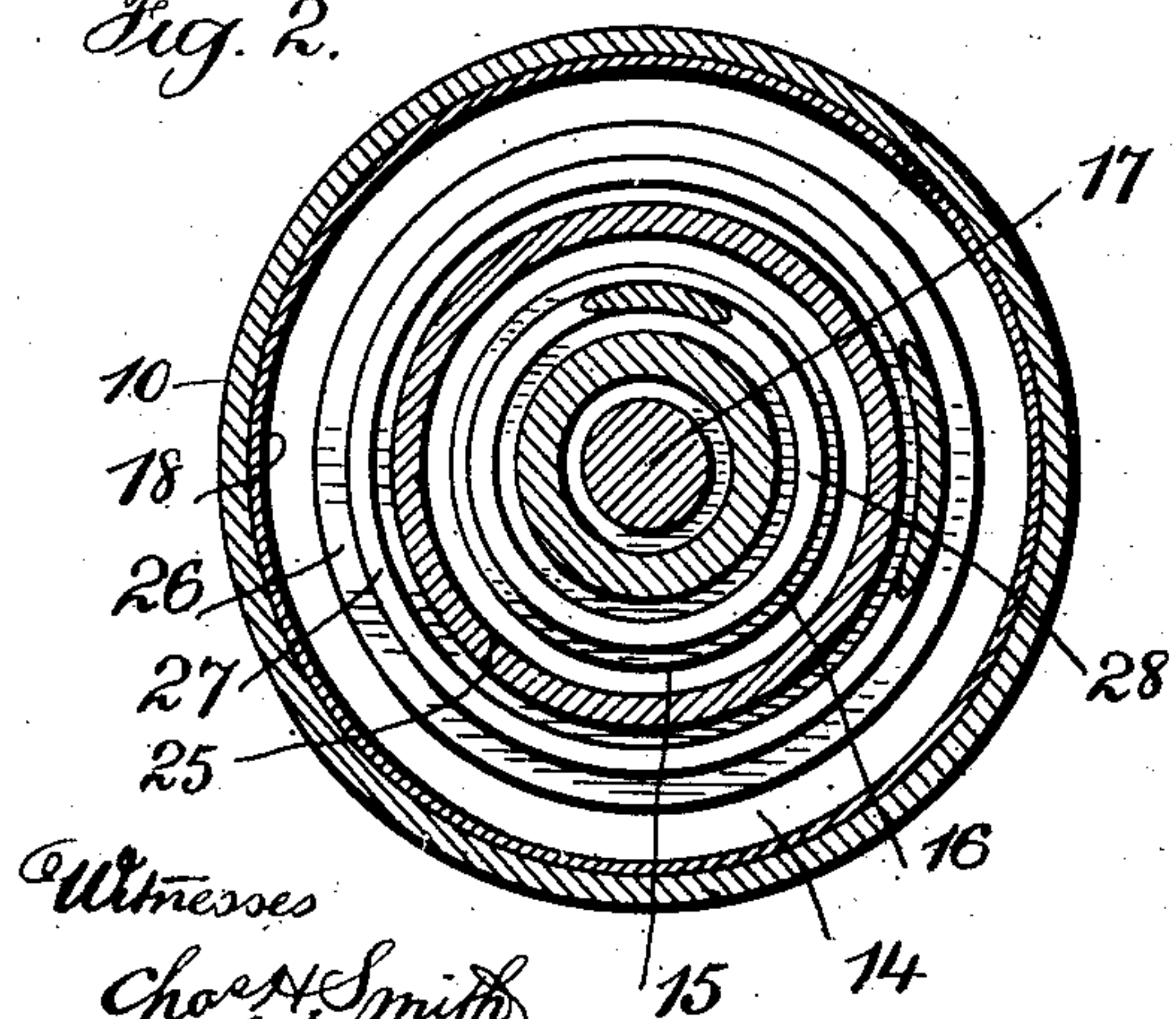
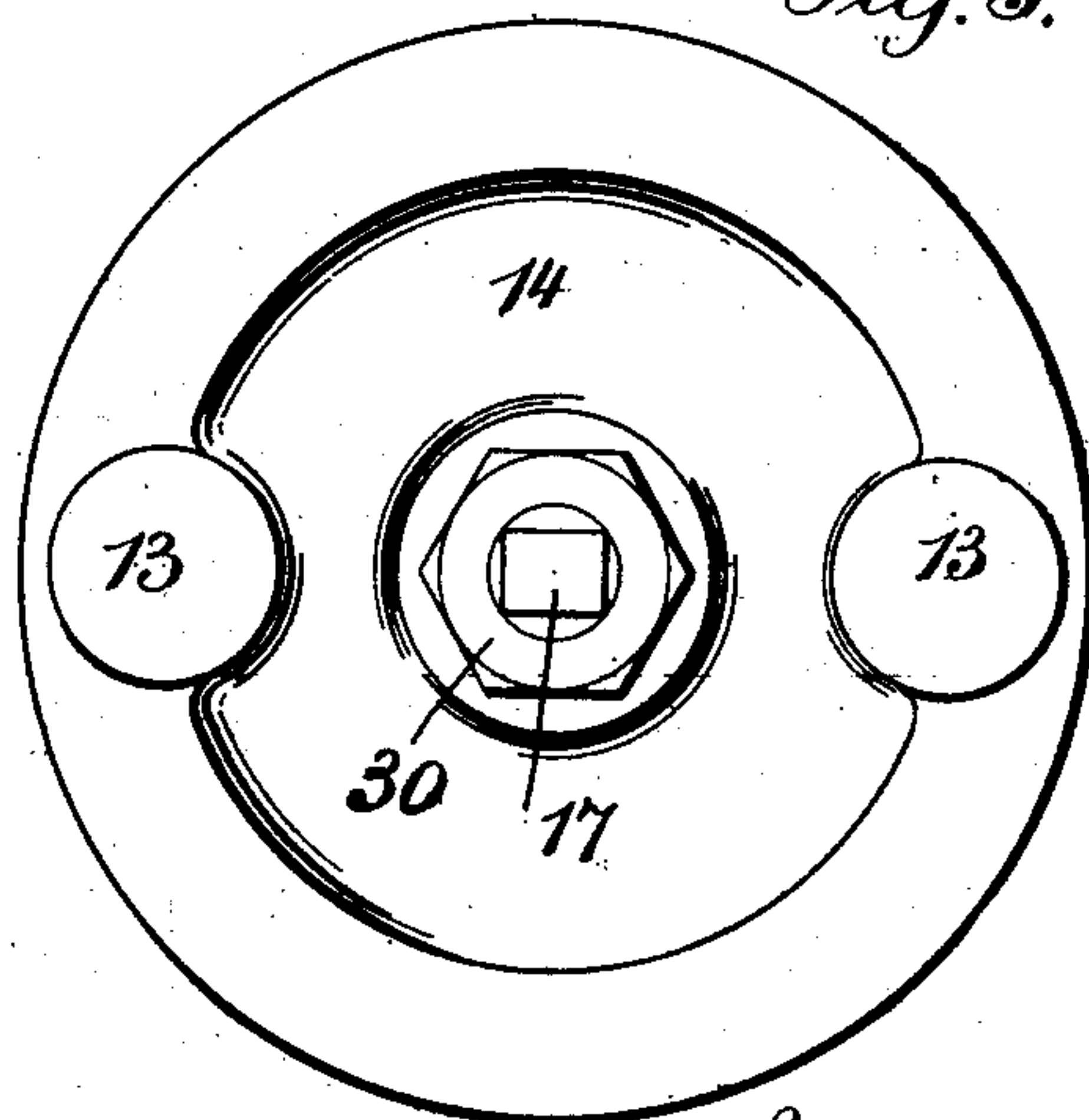


Fig. 2.



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Fig. 3.



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UNITED STATES PATENT OFFICE.

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VALVE.

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To all whom it may concern:

Be it known that I, EVI W. CHRISTIE, a citizen of the United States, residing at Sewaren, in the county of Middlesex and State of New Jersey, have invented an Improvement in Valves, of which the following is a specification.

My present invention relates to valves and particularly to puppet valves adapted for use in dry vacuum pumps and similar apparatus.

Puppet valves as at present constructed, in so far as I am aware, are designed to have a predetermined lift under maximum conditions of service. Ordinarily this fixed and limited lift of the valve is not objectionable in some classes of work, as for instance, in connection with air compressors, but when used in connection with a dry vacuum pump the lift of the valve under normal working conditions is only a relatively small part of its lift when the pump is started, or when the pump is working under low vacuum conditions. This is due to the fact that when the pump is started there is a substantially free suction opening and when working under low vacuum conditions the suction action is more or less free. As the vacuum created by the pump increases, the air in the suction necessarily gradually diminishes, so that when the pump has created any material degree of vacuum there is only a relatively small quantity of air discharged each time the valve operates, and this, as will be understood, is the normal working condition of this type of pump. Now the area of these valves is generally limited and the valve-stops are usually so set that the valve lifts approximately an eighth of an inch under normal working conditions, and as will be understood, this limited lift of the valve is objectionable either in the starting of the pump or in the event of the pump taking water, as under either of these conditions this does not permit of a free discharge.

The object of my present invention is to overcome the objectionable features of the ordinary puppet valves as hereinbefore mentioned, and to this end I employ a valve, which under ordinary and normal working conditions, lifts a predetermined distance, but which as will be hereinafter described, is so constructed that under abnormal conditions, as for instance when starting the

pump, or in the event of the pump taking water, the valve will lift a greater than the predetermined distance in order that the discharge may be as unrestricted as possible under all the working conditions of the pump.

In the drawing, Figure 1 is a central longitudinal section of a puppet valve made in accordance with my invention, Fig. 2 is a cross section on line *x, x*, Fig. 1 and Fig. 3 is an end elevation of a valve.

Referring particularly to the drawing, my improved valve preferably comprises a body or casing indicated at 10 and which is preferably cylindrical. Adjacent to one end thereof the casing 10 exteriorly is screw-threaded as indicated at 11 in order to be received and secured in position in the valve-deck 12 of the pump, and this end of the valve casing for this purpose may be provided with lugs 13, oppositely or otherwise disposed, to be received in a suitable tool for turning the valve into position. Also adjacent to this end of the valve casing there is a transverse wall 14 having a projection 15 preferably integral therewith and extending centrally therefrom into the casing and toward the other end thereof. The outer end of this projection 15 is preferably reduced in cross section, providing for the shoulder indicated at 16, the function of which will be hereinafter described. Extending through the bore provided therefor in the projection 15 I employ a stem 17. Within the body or casing 10 is a valve 18. This is also preferably cylindrical and the edge between the circular portion thereof and the head is beveled as indicated at 19, so as to bear against the valve-seat 20 provided in the ring 21 set into the wall 22, defining the inlet connection to the pump or other apparatus.

The head of the valve may be exteriorly provided with ribs for the purpose of strengthening the valve as indicated in Fig. 1.

The end 23 of the stem 17 adjacent to the valve 18 is slightly reduced in cross section and screw-threaded and adapted to receive the valve-stop 24. This valve-stop is preferably bell-shaped, having a cylindrical portion 25 on the extremity of which is an out-turned flange 26. Surrounding the cylindrical portion 25 of the stop 24 and extending between the flange 26 and the in-

ner surface of the head of the valve 18 I employ a spring indicated at 27, the function of which, as will be understood, is to return and normally maintain the valve 18 against its seat.

Surrounding the reduced portion of the projection 15 and extending between the shoulder 16 thereof and the inner surface of the head of the stop 24, I employ an auxiliary spring 28, the function of which is to normally maintain the stop 24 in such a position that the adjusting nuts 29 and 30 will be in the position shown in Fig. 1, with the face of the nut 29 against the adjacent surface of the wall 14 or the boss thereon against which the nut 29 is adapted to bear.

It will be understood that in the operation of the hereinbefore described puppet valve, under normal working conditions, the valve 18 will lift sufficiently to contact with the stop 24, in so doing compressing the spring 27 which also returns the valve to its seated position, whereas under abnormal conditions, such for instance as when the pump suction is approximately free as at the beginning of a run with the starting of the pump, or in case the pump takes water, the valve 18 may come against the stop 24 with sufficient impact to also move the stop 24 with the stem 17 by compressing the auxiliary spring 28, in which event of course the extent of additional lift will depend upon the force of the impact with which the valve strikes the stop. It will also be understood that by shifting the positions of the nuts 29 and 30 on the stem 17 the position of the stop 24 may be adjusted to vary and control the normal lift of the valve 18.

I claim as my invention:

1. A puppet valve comprising a casing,

a valve member, a stop, means for adjusting the position of the stop, means co-acting with the valve and stop permitting the valve to lift a predetermined distance under normal conditions and for returning and maintaining the valve against a seat provided therefor, and means whereby the valve and stop are permitted to move more than a predetermined lift of the valve under abnormal working conditions.

2. A puppet valve comprising a casing, a valve member therein, a stop, means for adjusting the position of the stop, a stem on which the stop is secured, a support in which the stem is journaled, means co-acting with the valve and stop permitting the valve to lift a predetermined distance under normal working conditions, and means co-acting between the said stop and the support for the stem permitting the valve to move a greater than the predetermined lift under abnormal working conditions.

3. A puppet valve comprising a casing, a valve member therein, a stop, a stem on which the stop is secured, a support in which the stem is journaled, a spring extending between the said stop and the said valve for returning and normally maintaining the valve in position against a seat, a spring extending between the said stop and a shoulder on the support for the stem, and lock-nuts on the said stem at the end thereof opposite that to which the stop is secured for adjusting the position of the said stop.

Signed by me this 11th day of March, 1911.

EVI W. CHRISTIE.

Witnesses:

J. J. BROWN,
S. M. LAMBOT.