H. D. MADDEN.

VACUUM PUMP.

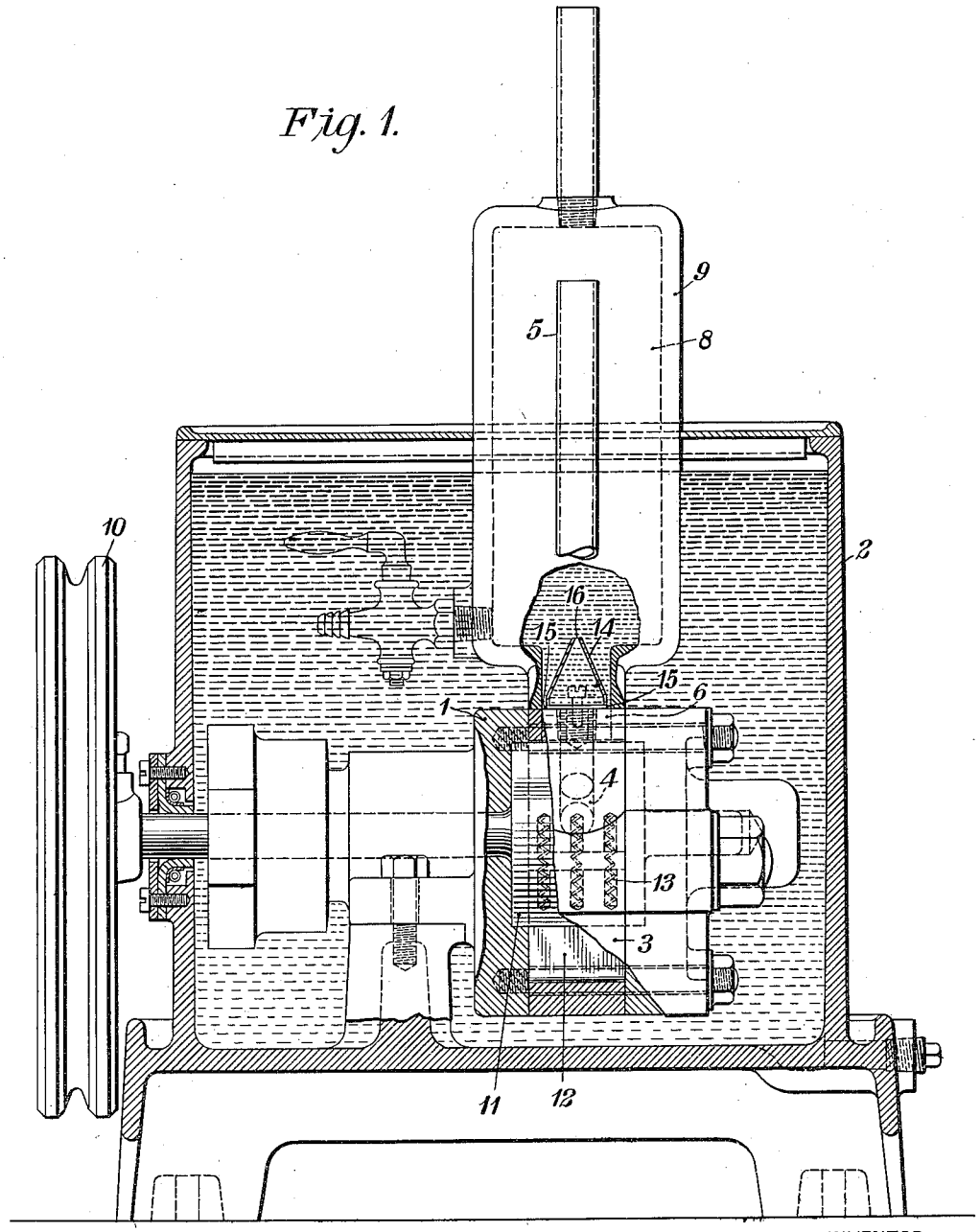
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1,031,801.

Patented July 9, 1912.

2 SHEETS—SHEET 1.

Fig. 1.



WITNESSES:

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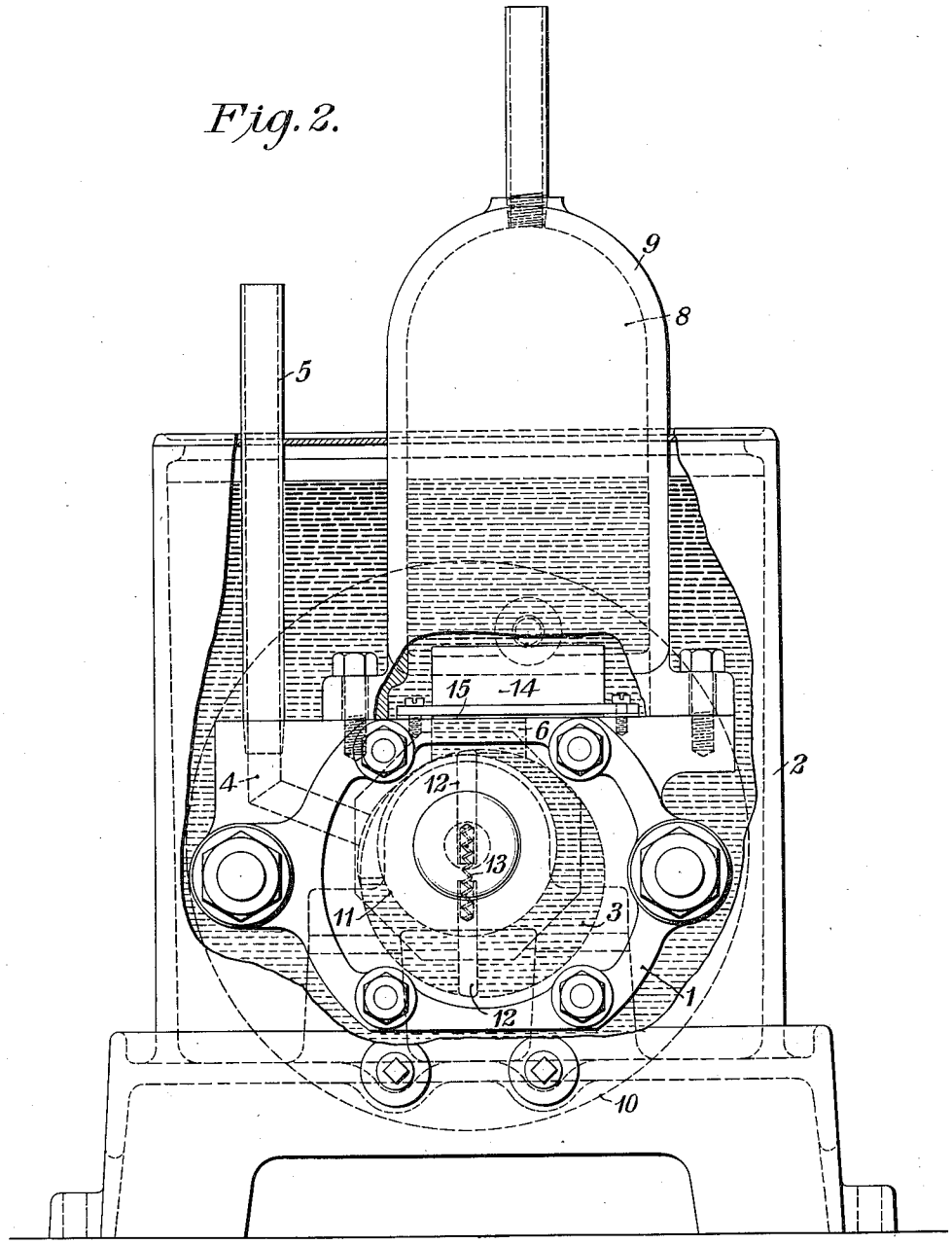
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2 SHEETS—SHEET 2.

Fig. 2.



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UNITED STATES PATENT OFFICE.

HARRY D. MADDEN, OF BLOOMFIELD, NEW JERSEY, ASSIGNOR TO WESTINGHOUSE LAMP COMPANY, A CORPORATION OF PENNSYLVANIA.

VACUUM-PUMP.

1,031,801. Specification of Letters Patent. Patented July 9, 1912.

Application filed October 8, 1910. Serial No. 586,082.

To all whom it may concern:

Be it known that I, HARRY D. MADDEN, a citizen of the United States, and a resident of Bloomfield, in the county of Essex and State of New Jersey, have invented a new and useful Improvement in Vacuum-Pumps, of which the following is a specification.

My invention relates to vacuum pumps and particularly to discharge devices or valves therefor.

The object of my invention is to provide a discharge device for vacuum pumps that shall have no movable parts, and shall be effective to prevent the gas being pumped from returning into the pump chamber.

Figure 1 of the accompanying drawings is a side and sectional view of a pump that embodies my invention, and Fig. 2 is an end and sectional view of said pump.

The pump to which the present invention is applied comprises a stationary member 1 that is mounted within a casing 2 and is provided, at one end, with a cylindrical chamber 3. The stationary member is also provided with an inlet port 4 leading to one side of the cylindrical chamber 3 from a pipe 5, that is connected to the chamber to be exhausted, and with an exhaust port 6 leading from the top of the cylindrical chamber 3 to a partially oil-filled chamber 8 provided by a member 9 that is mounted upon the stationary member 1 and in which an auxiliary vacuum is maintained.

Rotatably mounted in the stationary member 1, and adapted to be driven by a pulley 10, is a member 11 having a cylindrical enlargement upon its inner end, that is located within, and is mounted eccentrically with respect to, the cylindrical chamber 3 and bears against one side thereof. The enlarged end of the rotatable member 11 is provided with diametrically opposite slots in which operate two plates or valve members 12, that are normally pressed outwardly against the walls of the cylindrical chamber 3 by means of a spring 13. It will be understood that, as the member 11 rotates, the plates 12 are moved inwardly and outwardly, and air is taken in through the pipe 5 and the inlet port 4 and is discharged into the chamber 8 through the exhaust port 6, the chamber 3 being filled with oil, and the air being discharged in the form of bubbles in the oil.

The parts which have thus far been described are old in the art and constitute no part of the present invention, which will now be described.

Mounted upon the stationary member 1, over the exhaust port 6, is an inverted trough or V-shaped member 14, the ends of which are closed and at the base of which passages 15 are provided for affording communication between the chamber 8 and the exhaust port 6. The inverted trough or V-shaped member 14 is provided, at or near its apex, with an opening or slit 16 that is narrow and of small cross-sectional area as compared with the passages 15. Oil containing bubbles of air or gas is forcibly discharged by the movable pump parts into the member 14, and from there, through the passages 15 and the slit 16 into the chamber 8. As the air bubbles tend to rise in the oil, they are discharged principally through the slit 16, the force of the discharge being increased by the tapering of the member 14, and they are thereafter prevented from reëntering the member 14 through the slit because of its narrowness. Clear oil returns to the pump chamber through the passages 15 at the base of the member 14, these passages being considerably below the surface of the oil where the bubbles collect and burst.

As heretofore constructed, such valves have been provided with movable members that are raised to permit of the passage of bubbles therethrough and are closed upon the occurrence of tendency for the bubbles to return therethrough. Consequently, energy is lost in operating the valve and it is impossible to produce as good a vacuum therewith as with the valve of the present invention.

I claim as my invention:

1. In a vacuum pump, the combination with a stationary member having inlet and discharge ports, and a rotatable member cooperating therewith, of an inverted V-shaped shell over the discharge port in the narrow slit in its apex.

2. In a vacuum pump, the combination with a stationary member having inlet and discharge ports, and a rotatable member cooperating therewith, of an inverted V-shaped shell over the discharge port in the stationary member, the said shell having a

narrow slit in its apex and a passage communicating with the discharge port at the base of the shell.

3. In a vacuum pump, the combination with a stationary member having inlet and discharge ports, and a rotatable member cooperating therewith, of an internally tapered shell over the discharge port in the stationary member, the said shell having an outlet passage at its apex that is narrow as compared with the dimensions of the discharge port.

4. In a vacuum pump, the combination with a stationary member having a discharge port, of an internally tapered shell over the discharge port having a discharge opening in its upper narrower portion that is narrow as compared with the dimensions of the discharge port, a large opening relative to the said discharge opening being provided at the base of the said shell.

5. In a vacuum pump, the combination with a stationary member having a discharge port, of an internally tapered shell over the discharge port having a discharge opening in its upper narrower portion that is narrow as compared with the dimensions of the discharge port.

6. In a vacuum pump, the combination with a member having a discharge port, of an internally tapered member over the slit port having a discharge in its upper narrower portion that is narrow relatively to the discharge port.

7. A vacuum pump comprising a member having a discharge port, and a member having a discharge opening in its upper portion that is narrow as compared with the dimensions of the discharge port.

In testimony whereof, I have hereunto subscribed my name this 26th day of September, 1910.

HARRY D. MADDEN.

Witnesses:
W. C. HIPPLE,
B. W. OGDEN.