

J. T. WILKIN.

VACUUM PUMP.

APPLICATION FILED AUG. 20, 1908.

924,024.

Patented June 8, 1909.

Fig. 2

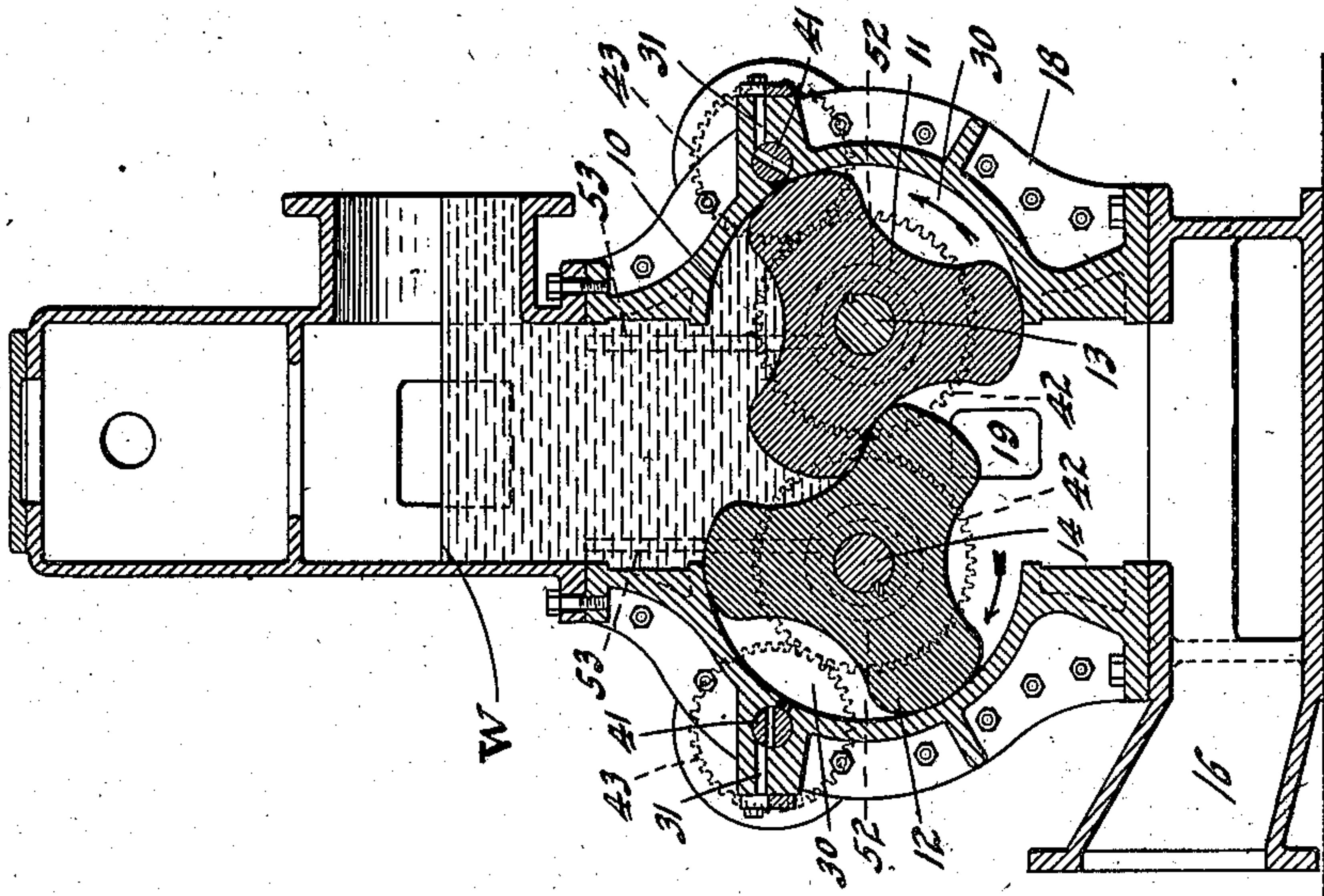
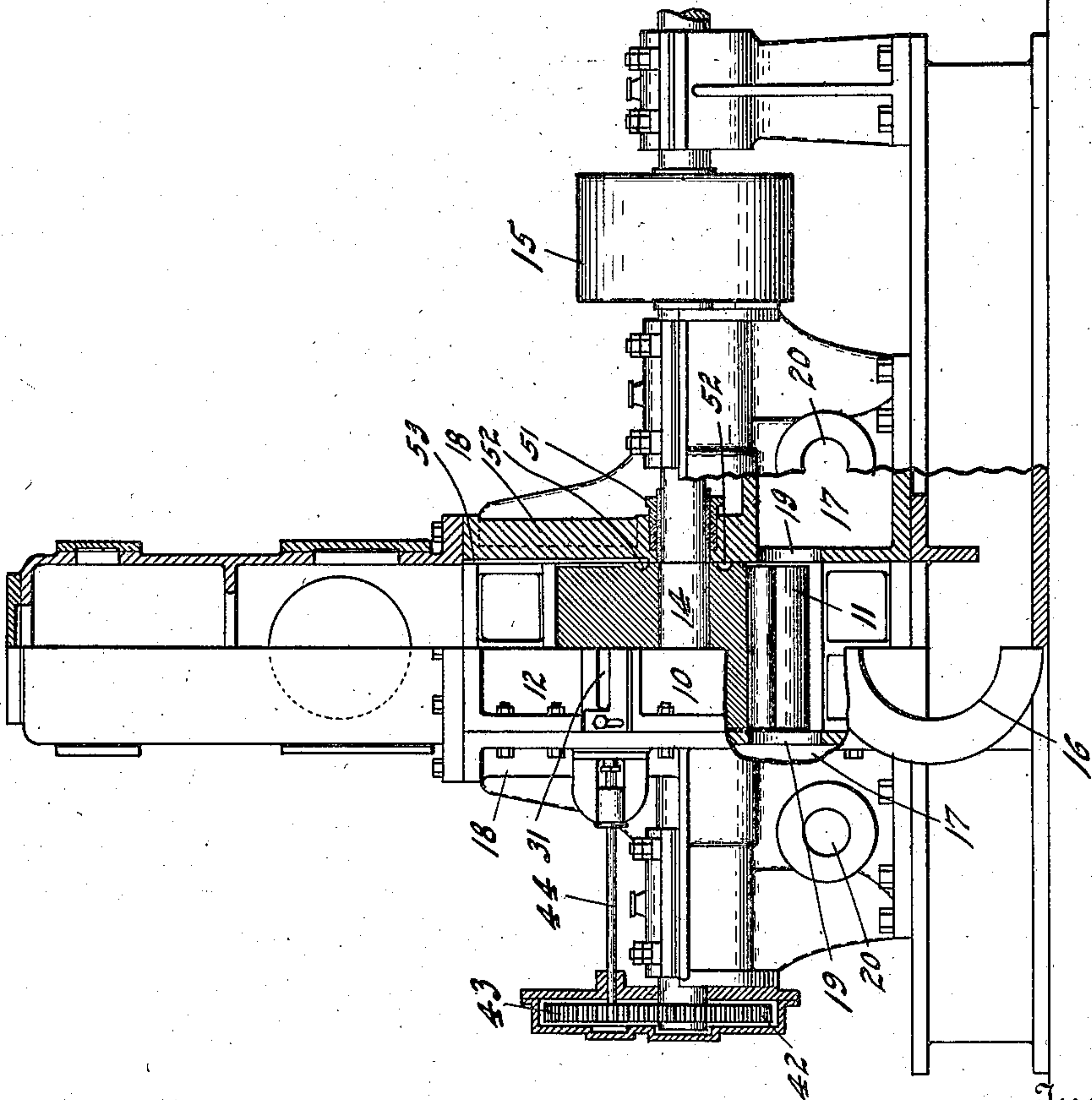


Fig. 1



Witnesses
Frank A. Fable
Thomas W. McMeans

Inventor
John T. Wilkin,

By Bradford & Hood
Attorneys

UNITED STATES PATENT OFFICE.

JOHN T. WILKIN, OF CONNERSVILLE, INDIANA, ASSIGNOR TO THE CONNERSVILLE BLOWER CO., OF CONNERSVILLE, INDIANA, A CORPORATION OF INDIANA.

VACUUM-PUMP.

No. 924,024.

Specification of Letters Patent.

Patented June 8, 1909.

Application filed August 20, 1908. Serial No. 449,389.

To all whom it may concern:

Be it known that I, JOHN T. WILKIN, a citizen of the United States, residing at Connorsville, in the county of Fayette and State of Indiana, have invented certain new and useful Improvements in Vacuum-Pumps, of which the following is a specification.

In the operation of large steam engine units it is customary to maintain a vacuum in the condensing chamber and to continuously withdraw the water condensed therein. In the use of pumps for this purpose, wherein the discharge from the condensing chamber is directly into the passage through which the discharging water flows, there is a tendency for the discharged water to flow back into the vacuum pocket produced by the pump and thus produce a water hammer which is very injurious to the mechanism. This is especially true when the pump is of the coacting lobed impeller type wherein a water seal is maintained on the discharge side of the impellers.

The object of my present invention is, therefore, to provide means for preventing the injurious water hammer referred to and to provide such other improvements and details of construction as shall hereinafter be pointed out.

The accompanying drawings illustrate my invention.

Figure 1 is a side elevation, in partial axial section, of a pump built in accordance with my invention, said pump being illustrated as a three-lobed coacting rotary impeller type; Fig. 2 is a section at right angles to Fig. 1.

In the drawings, 10 indicates the pump chamber in which are mounted the coacting lobed impellers 11 and 12, said impellers being carried by shafts 13 and 14, respectively, geared together for uniform motion in opposite directions by gears of the usual type contained within casing 15. In the drawings I have shown the lobed impellers provided with three lobes but it is to be understood that my invention is not in any way limited to the particular form shown. The water from a condensing chamber is introduced at 16 and rises to a point above the bottom of the propeller chamber 10 and, in order to facilitate the maintenance of a vacuum within the impeller chamber without the necessity of lifting the air against a column of water, I have found it convenient to form a chamber 17 within the foot of each head

plate 18, and each of these chambers communicates, by an opening 19, with the impeller chamber 10 at a point below the axes of the impellers but above the normal water within the impeller chamber, and these chambers 19 are connected by suitable connections 20 with the upper end of a condensing chamber so that the gases within the condensing chamber may flow through the head-plate-chambers 17 and the openings 19 into the suction side of the pump through a channel which is entirely distinct from the channel through which the condenser water flows.

In the operation of such pump, a water seal is maintained in the upper side of the pump, (the discharge side being uppermost) as indicated by the line *w* Fig. 2 and, as the impellers rotate, displacement spaces 30, between adjacent lobes of the impellers are successively carried from the suction side of the pump to the discharge side. In these displacement spaces there will be a small quantity of water and a vacuum substantially equal to the vacuum contained in the condenser chamber so that, as soon as any particular displacement space is opened into the discharge side of the pump, there will be, because of the vacuum in the displacement space, a backward rush of water from the water seal into the displacement space, thus causing a water hammer which is very injurious and noisy. In order to prevent this action I provide air inlet passages 31, each of which is adapted to permit entrance of atmospheric pressure into each displacement space 30, after it has been cut off (by a lobe of the impeller) from the suction side of the pump and before the displacement space is brought into communication with the discharge side of the pump, so that, in an intermediate position, the displacement space is brought into communication with the atmosphere and the vacuum relieved. In many instances, especially where the quantity of water is small, the air vent passage may be continuously open, but under some circumstances it is advisable to provide an automatic valve for opening and closing the air vent passage at proper times and I therefore show such a valve mechanism. In the form shown I have provided a rotary valve 41, arranged at an intermediate point in the air vent passage 31 and adapted to open and close the same, the passage being closed a greater portion of the time but opened when-

ever a displacement space 30 is brought into proper intermediate position. In the form shown a half rotation of the valve 41 will cause an opening of the air vent passage and

5 I therefore mount upon each of the shafts 13 and 14 a gear 42 which meshes with a gear 43 carried by shaft 44 of the adjacent valve 41, the proportion of the gears being such as to open and close the valves in proper time.

10 In order to protect the stuffing boxes 51 from the influence of the vacuum on the suction side of the pump I form, in the end of each impeller, an annular groove 52, and this groove is connected by a groove 53 with the

15 discharge side of the pump so that a water seal may be maintained in each groove 52 around the shaft of its impeller, in the manner described in my Patent No. 819,830.

I claim as my invention:—

20 1. The combination, in a vacuum pump of the lobed impeller type, of an air inlet passage leading into the pump chamber at a point to communicate with the displacement spaces after they are cut off from the suction

25 side of the pump and before they are delivered to the discharge side of the pump.

2. The combination, in a vacuum pump of the lobed impeller type, of an air inlet passage leading into the pump chamber at a

30 point to communicate with the displacement spaces after they are cut off from the suction side of the pump and before they are delivered to the discharge side of the pump, a valve controlling said air inlet passage, and

35 means for automatically opening and closing said valve.

3. The combination, in a vacuum pump having a pair of coacting rotary lobed impellers and its discharge outlet uppermost, of

an air inlet passage leading into each side of 40 the impeller chamber in position to communicate with the displacement spaces after they are separated from the suction side of the pump and before they are delivered to the discharge side of the pump. 45

4. The combination, in a pump having a pair of coacting rotary lobed impellers and its discharge outlet uppermost, of an air inlet passage leading into each side of the impeller chamber in position to communicate 50 with the displacement spaces after they are separated from the suction side of the pump and before they are delivered to the discharge side of the pump, and valve mechanism for automatically opening and closing said air 60 inlet passages.

5. In a rotary pump of the rotary lobed impeller type having the usual inlet and discharge passages, a head-plate therefor having an air chamber formed therein and a com- 65 munication between said air chamber and the impeller chamber at a point above the lowest line of movement of the impeller lobes.

6. A vacuum pump having a pair of coacting rotary lobed impellers mounted therein 70 and having a water passage leading into the bottom of the impeller chamber and an air passage leading into the suction side of the impeller chamber at a point above the lowermost position of the impeller lobes. 80

In witness whereof, I have hereunto set my hand and seal at Connorsville, Indiana, this 17th day of August, A. D. one thousand nine hundred and eight.

JOHN T. WILKIN. [L. S.]

Witnesses:

C. R. HOUGHTON,
G. W. ANCEED.