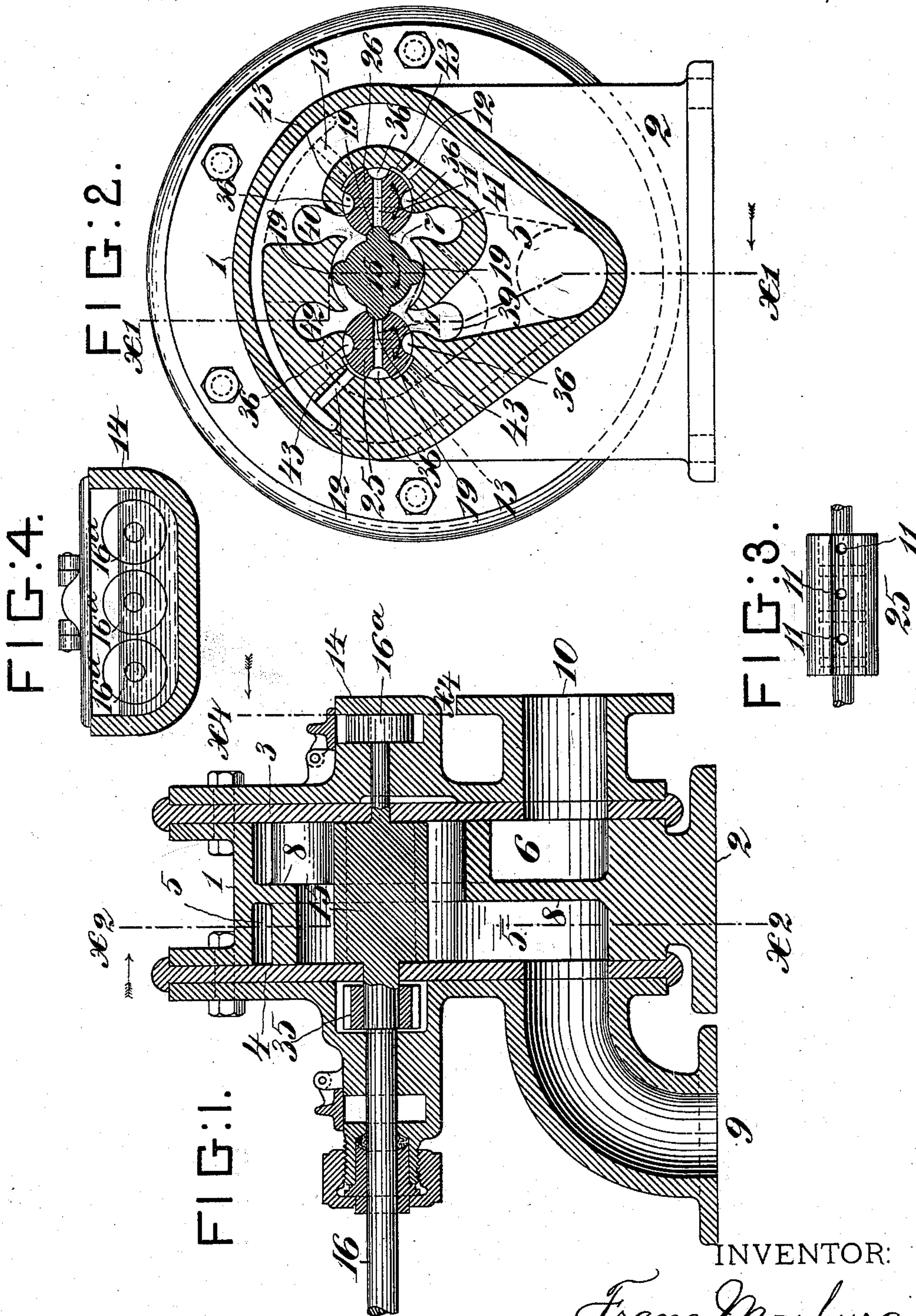


(No Model.)

F. MARBURG, Jr.
ROTARY PUMP.

No. 578,938.

Patented Mar. 16, 1897.



WITNESSES:

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FRANZ MARBURG, JR., OF NEW YORK, N. Y.

ROTARY PUMP.

SPECIFICATION forming part of Letters Patent No. 578,938, dated March 16, 1897.

Application filed September 16, 1896. Serial No. 606,027. (No model.)

To all whom it may concern:

Be it known that I, FRANZ MARBURG, JR., a subject of the Emperor of Germany, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Rotary Pumps, of which the following is a specification.

This invention relates to the class of rotary pumps, engines, blowers, and the like having balanced rotary abutments, of which the pump illustrated and described in the patent to Marburg, Jr., and Stone, No. 547,380, dated October 1, 1895, is an example. Indeed, the invention of this application relates to certain improvements on the pump described in said patent, and the latter is here referred to in order that a full understanding of the present invention may be obtained. The main purpose of the invention described in the said patent to Marburg, Jr., and Stone was to balance the pressure on the rotary pistons, and this balancing of the pressure is attained in the present pump by the same or substantially the same means; but the purpose of the present invention is to avoid shocks created by the incarceration of water, which is not compressible, in the recesses in the abutments which receive the piston-heads on the rotary piston.

The accompanying drawings illustrate an embodiment of the invention in a pump of the general form and proportions of that shown in the said patent to Marburg, Jr., and Stone.

Figure 1 is a vertical section in the plane indicated by broken line x' in Fig. 2, said plane being parallel to the axes of the rotary piston and abutments. Fig. 2 is a vertical section in the plane indicated by the line x'' in Fig. 1, said plane being at right angles to the sectional plane of Fig. 1. Fig. 3 is a plan view of one of the rotary abutments detached. Fig. 4 is a section in the plane indicated by line x^4 in Fig. 1.

1 represents the chambered pump-casing, 2 the base thereof, and 3 4 the closing-heads.

5 is the induction-chamber in the casing, 6 the eduction-chamber, and 7 the piston-chamber, of the pump, the said chambers 5 and 6 being separated from each other by a partition 8, integral with the casing. Said chambers 5 and 6 have respectively an inlet

9 and an outlet 10. In the piston-chamber is rotatively mounted the piston 15 on a shaft 16, journaled at its ends, as shown. The piston 15 is provided with a plurality of equidistant piston-heads 19 of semicircular contour, which, as the piston rotates, sweep over the curved walls of the chamber and close enough thereto to prevent leakage between them and the walls. The piston 15 rotates between the members 25 26 of a pair of rotating abutments, the journals of which have bearings, as shown. These abutments rotate in circular chambers with their peripheries in close proximity to the walls thereof to prevent leakage, and each abutment has in it recesses 36 to receive the piston-heads 19 as the piston and abutments rotate together. The piston and abutments are geared together by toothed wheels 35, Fig. 1, so that all must rotate together. The induction-chamber communicates with the piston-chamber by a pair of ports 39 40, which enter the chamber upon diametrically opposite sides of the piston, and the eduction-chamber communicates with the piston-chamber through a pair of similarly-arranged ports 41 42. The object of this symmetrical arrangement of the ports is to equalize as far as possible the pressure on the piston.

To balance the pressure on the rotating abutments, channels 43 are formed in the walls of their chambers opposite to the several ports and of about the same width as the ports, and these channels communicate with the induction-chamber 5 and eduction-chamber 6.

So far as above described, the construction is the same in substance as that of the pump shown in the above-named patent to Marburg, Jr., and Stone, and the same reference-numerals have been employed on the parts in order to facilitate cross-reference.

The novel features of the invention will now be explained.

In each abutment are the four oppositely-arranged recesses 36, and connecting the opposite recesses of each pair of recesses is a port or ports 11, which are clearly shown in Fig. 2 and in the detached view, Fig. 3.

In the wall of each abutment-chamber are two ports 12 and 13, the former connecting

one recess 43 with the induction-chamber 5 and the latter connecting the other recess 43 with the eduction-chamber 6.

In the operation of the pump, when a piston-head 19 enters a recess 36 in the abutment, it incarcerates some water in the recess, and unless relief is afforded there is a shock and strain. The device above described provides the required relief. When the piston-head is closing into the recess 36, the latter will be open at the back by way of a transverse port 11 in the abutment and one of the ports 12 or 13, either with the induction or eduction chamber, so as to allow the water under the piston-head to escape freely in that direction and relieve the strain.

I do not claim any novelty, broadly, for the use of cross-ports in the abutment in themselves, as these have been employed for balancing pressures on the abutment, and the recesses 43, connected by ports with the induction and eduction chambers, have also been used for the purpose of balancing pressures and are not broadly new. Both of these features, as alternative devices for equalizing pressures, are shown in the patent to Marburg, Jr., and Stone; but they are not therein arranged in such a manner as to effect the result sought and attained in the construction shown.

It will be understood that the cross-ports 11 in the abutments are arranged as represented in the drawings—that is, so that when a piston-head 19 is entering a piston-recess in the abutment the said piston-recess will open to a port 12 or 13, so as to allow the water therein to be driven out through the ports thus brought into line. This is the main feature and purpose of the invention.

In order to avoid end pressure of the piston and abutments on the inner walls of the casing and yet permit a close fit, the means illustrated in Figs. 1 and 4 are employed. An oil-box 14 receives the projecting ends of the journals of the rotating piston and abutments, and on these journals are secured disks 16^a, which are of such thickness as to fit snugly and closely in the oil-box and prevent any

endwise movement whatever of the said piston and abutments.

Having thus described my invention, I claim—

1. In a rotary pump, the combination with a casing having in it induction and eduction chambers, piston and abutment chambers, and induction and eduction ports, of a rotating piston having projecting piston-heads adapted to engage corresponding recesses in the abutment, and a rotary abutment having in it cross-ports connecting the oppositely-arranged recesses therein, the said casing having in it ports connecting the abutment-chamber with the respective induction and eduction chambers and situated so as to be in communication with that piston-recess in the abutment which is being engaged by the piston-head as the pump operates, substantially as set forth.

2. In a rotary pump, the combination with a casing having in it induction and eduction chambers, piston and abutment chambers, induction and eduction ports arranged symmetrically in pairs about the piston-chamber, recesses 43 in the walls of the abutment-chambers and opposite the respective induction and eduction ports, and ports leading from two of said recesses to the induction-chamber and from the other two to the eduction-chamber, of the rotary piston 15, having piston-heads 19, and the rotary abutments, 25, 26, having recesses to receive said piston-heads, said recesses being in pairs, the elements of which are oppositely arranged, and said abutments having ports 11, connecting the opposite recesses of each pair, whereby when a piston-head is entering a recess in the abutment, the said recess will be opened for the escape of the incarcerated liquid.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

FRANZ MARBURG, JR.

Witnesses:

HENRY CONNETT,
PETER A. ROSS.