J. R. KINNEY.

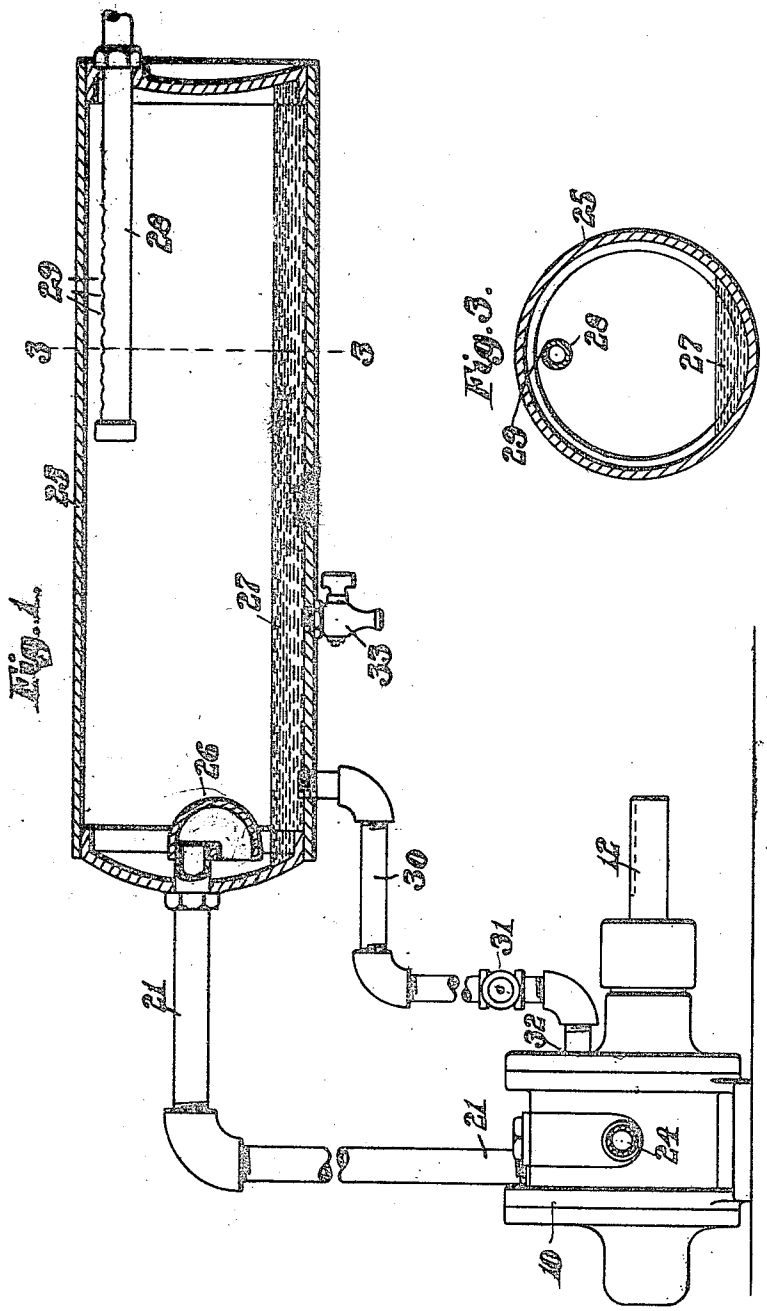
OIL SEPARATOR FOR PUMPS.

APPLICATION FILED SEPT. 8, 1911.

1,096,110.

Patented May 12, 1914.

2 SHEETS—SHEET 1.



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OIL SEPARATOR FOR PUMPS.

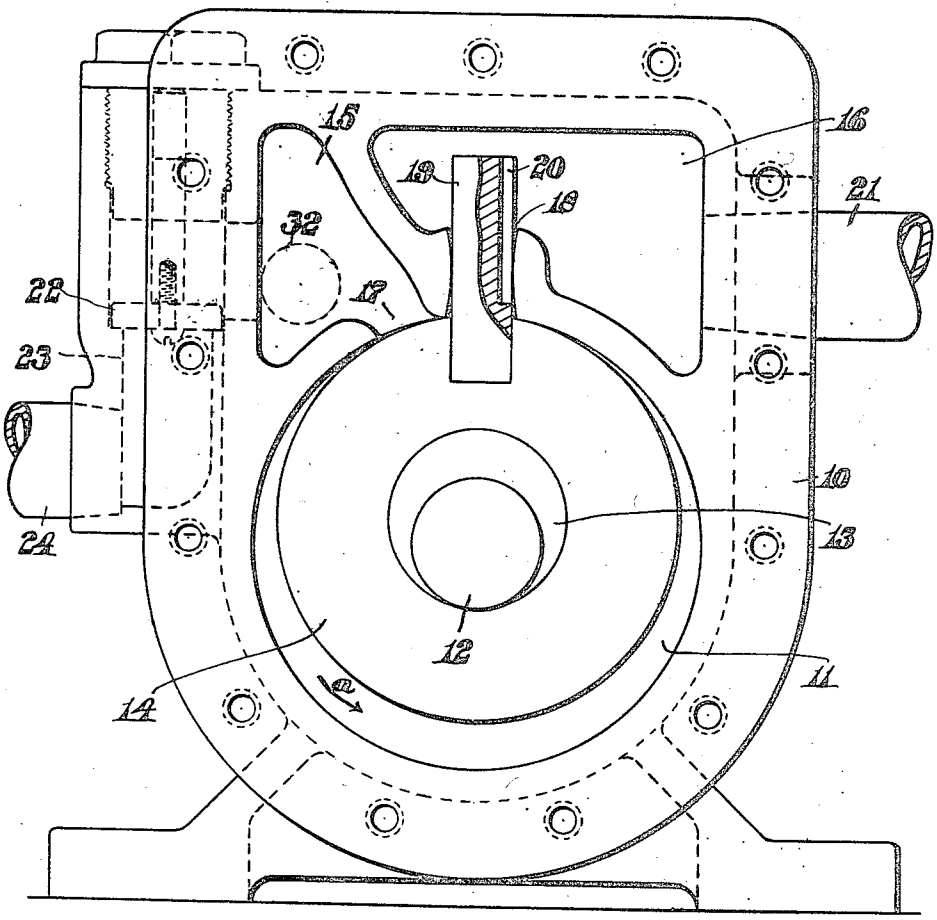
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2 SHEETS—SHEET 2.

Fig. 2.



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UNITED STATES PATENT OFFICE.

JUSTUS R. KINNEY, OF DORCHESTER, MASSACHUSETTS, ASSIGNOR TO THE KINNEY MANUFACTURING COMPANY, OF BOSTON, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

OIL-SEPARATOR FOR PUMPS.

1,096,110. Specification of Letters Patent. Patented May 12, 1914.

Application filed September 8, 1911. Serial No. 648,375.

To all whom it may concern:

Be it known that I, JUSTUS R. KINNEY, a citizen of the United States of America, and a resident of Dorchester, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Oil-Separators for Pumps, of which the following is a specification.

This invention relates to oil separators to be used in connection with pump systems, and particularly with such a system in which a rotary pump is used, having an inlet compartment normally closed by means of an automatic valve.

The object of the present invention is to provide a means whereby the pump is lubricated thoroughly when in operation, and the oil used in this manner is returned to the supply reservoir from which it is originally drawn without waste thereof.

The invention consists primarily in an oil supply tank connected by suitable pipes to the inlet compartment of a rotary pump said inlet compartment being normally closed by means of a valve which is adapted to automatically open during the operation of the pump, the outlet compartment of the pump being connected to the supply tank by means of a pipe extending through the wall thereof and having secured to its inner end a reverse bend.

The invention further consists in certain novel features of construction and arrangement of parts which will be readily understood by reference to the description of the drawings and to the claims hereinafter given.

Of the drawings: Figure 1 represents a vertical section of an oil supply tank embodying the features of the present invention, connected to a rotary pump shown in elevation, Fig. 2 represents an enlarged elevation of one form of pump adapted for use in connection with said oil supply tank, the end plate being removed and a portion of the piston blade being broken in section, and Fig. 3 represents a transverse section of a storage tank, the cutting plane being on line 3—3 on Fig. 1.

Similar characters designate like parts throughout the several figures of the drawings.

In the drawings, 10 represents a pump casing having an interior piston chamber 11, through which extends a shaft 12 having secured thereto or formed thereon an eccentric 13, on which is mounted an annular piston member 14. The casing 10 has also formed therein an inlet compartment 15 and an outlet compartment 16. The inlet compartment 15 is connected to the piston chamber 11 by means of the passage 17, and the outlet compartment 16 is similarly connected to said piston chamber 11 by means of a passage 18 in which is mounted a radial blade 19 secured to or formed upon the annular piston member 14. During the rotation of the piston member 14 in the direction of the arrow *a* on Fig. 2 of the drawings, the blade 19 will oscillate slightly and reciprocate in the passage 18, and in this reciprocation the groove 20 formed in said blade will be uncovered sufficiently to permit the material being pumped to pass from the piston chamber 11 into the outlet compartment 16 from which compartment it is adapted to pass through the outlet pipe 21. The inlet compartment 15 is normally closed by means of a valve 22 in the passage 23 thereto, this passage 23 being connected with any suitable source of supply by means of the pipe 24. In the present invention the pump is intended for use in pumping air into a suitable storage tank (not shown) in which the air is intended to be retained under pressure. As soon as the pump commences to operate, the suction created in the inlet compartment will be sufficient to open the valve 22 and permit air under atmospheric pressure to enter the same and pass through the passage 17 into the piston chamber 11 from which it will ultimately be forced during the rotation of the piston member 14 into the outlet compartment 16 and then through the pipe 21 into an oil tank 25. The pipe 21 extends beyond the inner wall of the tank 25 and has secured to its inner end a continuously curved reverse bend 26, the outlet thereof being above the level of the oil 27 contained in said tank. An air outlet pipe 28 is se-

cured in the opposite end of said tank and passes therefrom to any suitable storage reservoir. This pipe 28 extends a considerable distance into the upper part of the tank 25 and is provided in its upper portion with a plurality of perforations 29 through which the air in the tank enters said outlet pipe 28.

From the bottom of the tank 25 extends a return pipe 30 having a valve 31 therein, the opposite end of said pipe entering the inlet compartment 15 of the pump at 32. The end of the pipe 30 extends slightly above the inner wall of the tank 25 so that it will not receive any of the sediment which is liable to collect in the bottom of the tank. This sediment, however, and any water which may accumulate in the bottom of the tank may be drawn off through a pet cock 33 extending through the lower wall of the tank 25. The oil is placed in the tank 25 in such quantities that its level will always be beneath the reverse bend 26.

In the operation of the invention when the valve 31 is slightly opened a portion of the oil 27 will pass through the pipe into the inlet chamber 15 and when the pump is placed in operation, and the piston revolved in the direction of the arrow *a* the valve 22 will first be opened to permit the inlet of air under atmospheric pressure to the inlet compartment 15 and thence to the piston chamber 11. As the piston revolves the oil will be drawn through the pump with the air and lubricate the running parts thereof, and ultimately this oil, thus passing through the piston chamber will be delivered with the air being pumped through the outlet pipe 21 into the tank 25 above the level of the oil 27.

As the air and oil pass through the reverse bend 26, the velocity thereof is greatly reduced and the oil and air are separated, the oil being heavier passes down the surface of the inner wall of this reverse bend into the bottom of the tank while the air passes upwardly in the direction of the outlet pipe 28 therefrom. This reverse bend forms an important feature of the present invention. It has been found in practice that it is quite essential that the bend should be positioned as shown in the drawings, that is, extending downwardly from the end of the pipe 21. The air thus entering the tank will pass therefrom through the perforations 29 in the outlet pipe 28 into the storage reservoir. The continued admission of air with oil mingled therewith into the tank 25 is liable to cause considerable agitation thereof so that it has been found quite essential in order to have the air pass from the tank free from oil, to provide the perforations 29 in the outlet pipe 28 in the upper portion of said pipe. By such a system as this the pump will be thoroughly lubricated while the continued flow of oil from the supply tank 25 into the inlet chamber and through the pump, back again into said supply tank, makes it possible to use the same oil over and over again. In this manner all waste of oil is prevented and the pump is kept in perfect running order at all times.

Another advantage of this device is that the continued circulation of oil keeps the operating parts of the pump cool under all conditions.

It is believed that the operation and many advantages of the invention will be fully understood from the foregoing.

Having thus described my invention, I claim:

1. The combination with a pump provided with an inlet compartment normally closed by an automatic valve adapted to open during the operation of said pump and permit the admission of a fluid to the piston chamber to be continuously acted upon by the rotation of the piston therein; a horizontal cylindrical tank; a pipe leading from the outlet of said pump to the interior of said tank; an air outlet pipe in the interior of said tank having a closed end and a plurality of perforations in its upper portion adjacent to the inner surface of said tank; and a return pipe leading from the bottom of said tank to the inlet compartment of said pump.

2. The combination with a pump provided with an inlet compartment normally closed by an automatic valve adapted to open during the operation of said pump and permit the admission of a fluid to the piston chamber to be continuously acted upon by the rotation of the piston therein; a horizontal cylindrical tank; a pipe leading from the outlet of said pump to the interior of said tank and provided with a continuously curved reverse bend on its inner end adapted to separate the oil from the air and deflect the former against the end of said tank; an air outlet pipe in the interior of said tank having a closed end and a plurality of perforations in its upper portion adjacent to the inner surface of said tank; and a return pipe leading from the bottom of said tank to the inlet compartment of said pump.

3. The combination with a rotary pump provided with an inlet compartment communicating with the piston chamber; an air inlet thereto normally closed by a valve adapted to be opened by the suction created by the rotation of the piston; a horizontal cylindrical oil tank; a pipe leading therefrom to said inlet compartment; an outlet pipe from said pump extending through one

end of said tank into the interior thereof and provided with a continuously curved reverse bend thereon adapted to separate the oil and air passing therethrough; and a discharge pipe from the opposite end of said tank, said discharge pipe extending into said tank and being provided with perforations in the upper portion of said inwardly extending portion adjacent to the inner wall of said tank.

Signed by me at 4 Post Office Sq., Boston, Mass., this 2nd day of September, 1911.

JUSTUS R. KINNEY.

Witnesses:

WALTER E. LOMBARD,

NATHAN C. LOMBARD.