J. H. WAGENHORST.

PUMP OR COMPRESSOR.

APPLICATION FILED AUG. 11, 1915. RENEWED JAN. 29, 1919.

1,352,107. **Patented Sept. 7, 1920.**

4 SHEETS—SHEET 1.

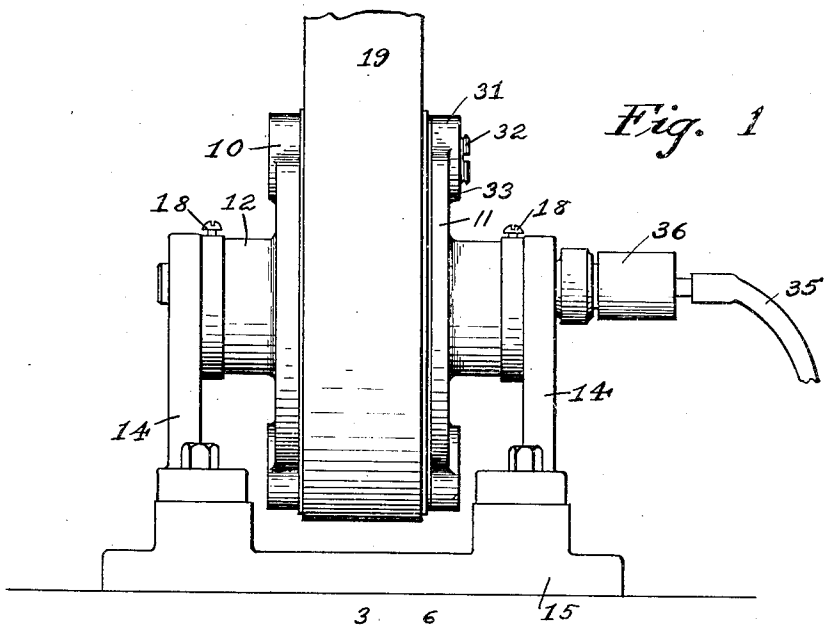

Fig. 1

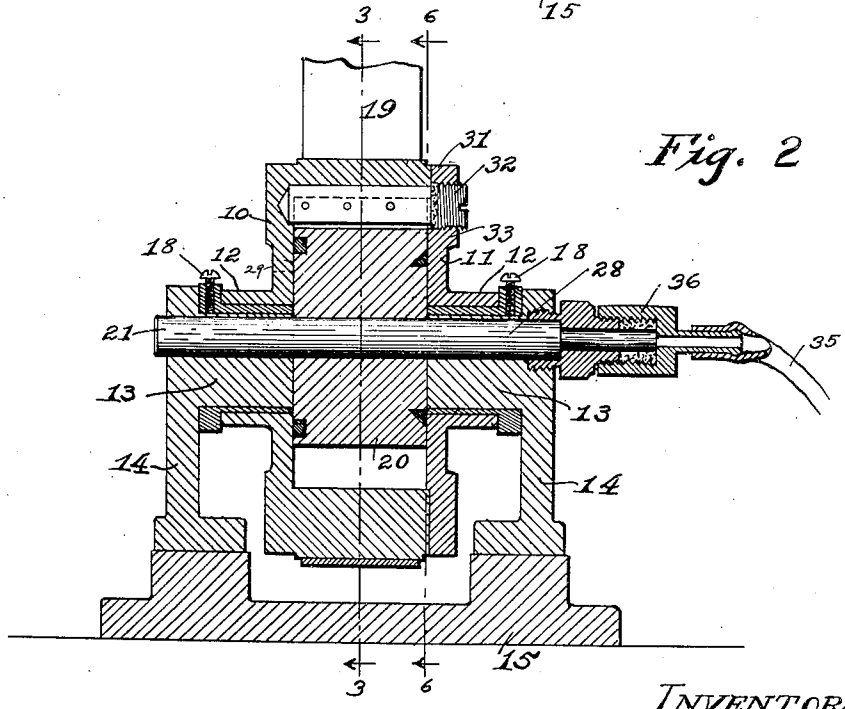

Fig. 2

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4 SHEETS—SHEET 2.

Fig. 4.

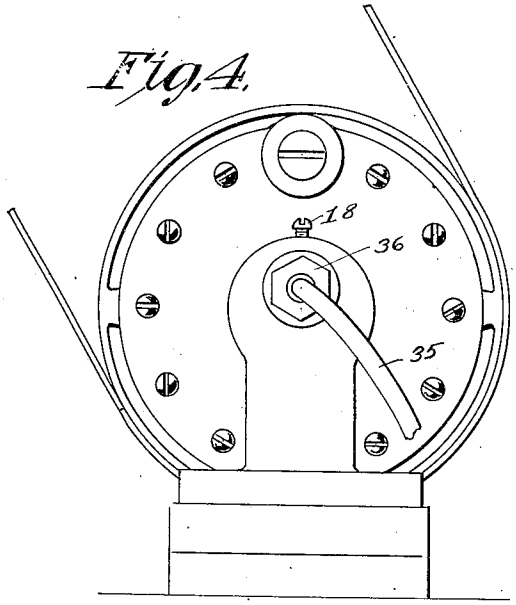


Fig. 3.

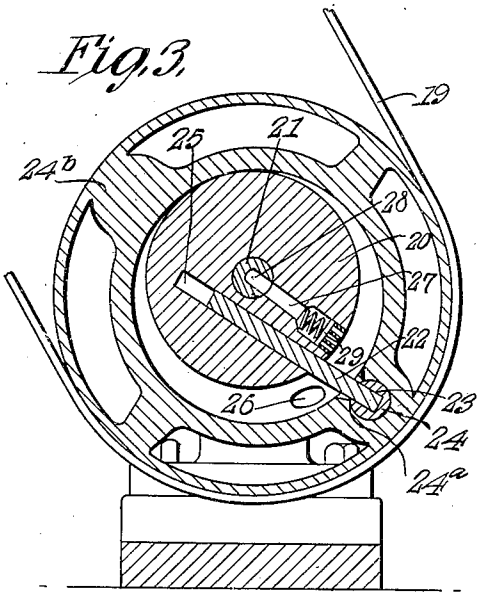


Fig. 12.

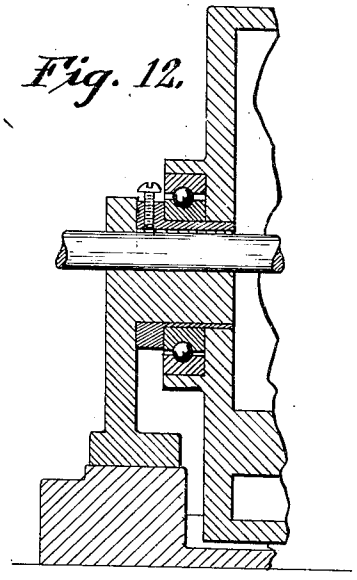
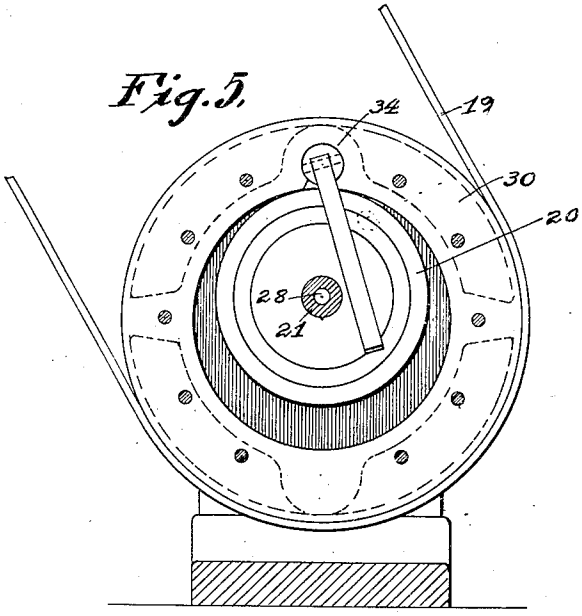


Fig. 5.



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4 SHEETS—SHEET 3.

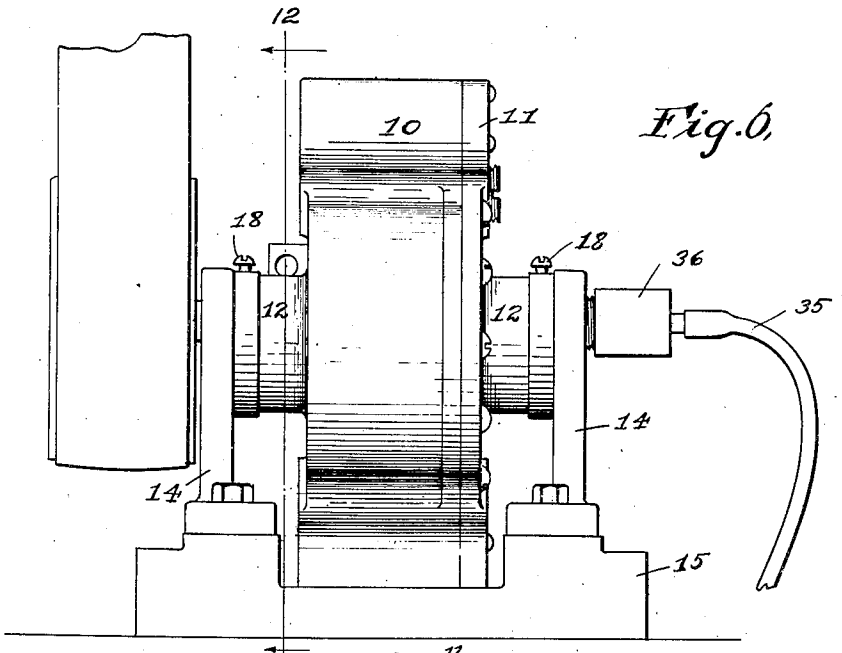

Fig. 6.

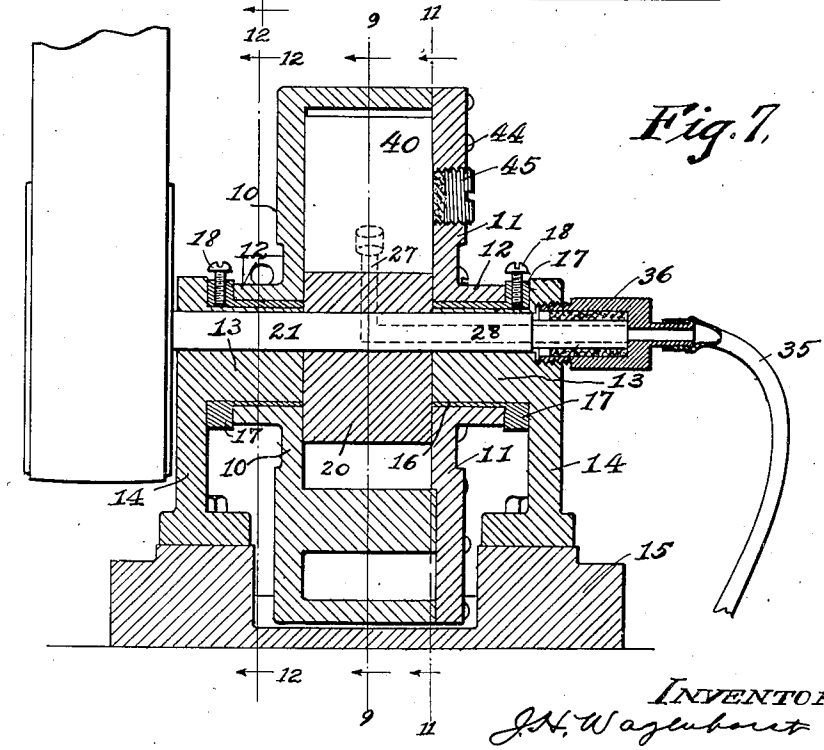

Fig. 7.

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4 SHEETS—SHEET 4.

Fig. 9.

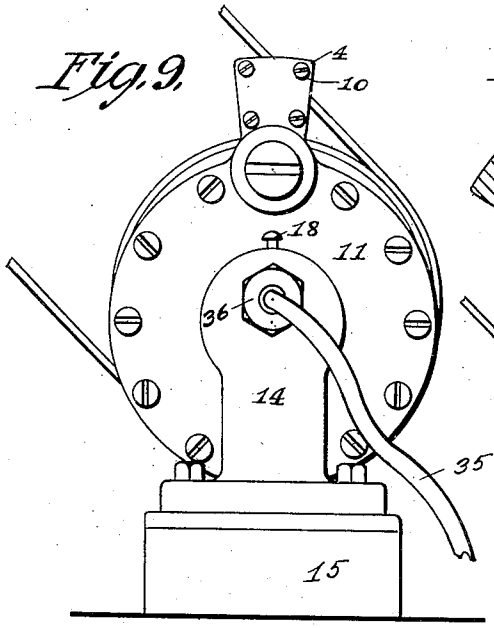
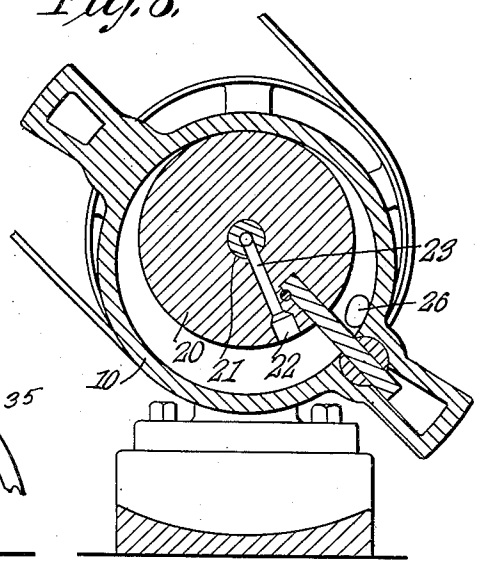


Fig. 8.



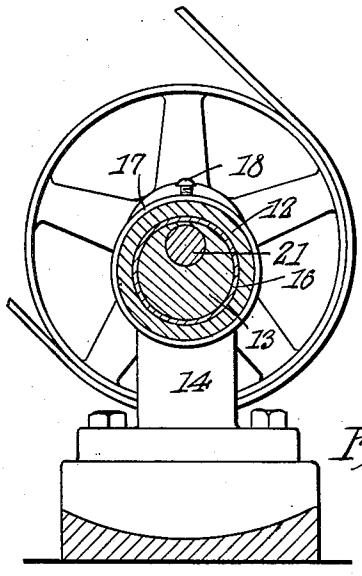


Fig. 11.

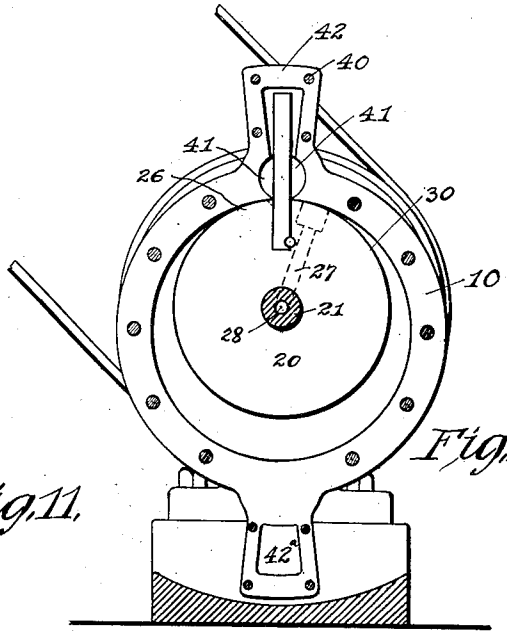


Fig. 10.

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UNITED STATES PATENT OFFICE.

JAMES H. WAGENHORST, OF AKRON, OHIO.

PUMP OR COMPRESSOR.

1,352,107. Specification of Letters Patent. Patented Sept. 7, 1920.

Application filed August 11, 1915, Serial No. 44,909. Renewed January 29, 1919. Serial No. 273,383.

To all whom it may concern:

Be it known that I, JAMES H. WAGENHORST, a citizen of the United States, residing at Akron, in the county of Summit and State of Ohio, have invented a certain new and useful Improvement in Pumps or Compressors, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

This invention relates generally to pumps and compressors and more particularly to a rotary pump or compressor.

One object of the invention is to provide a rotary pump or compressor of very few parts, of simple construction which when combined and operated will be highly efficient.

Another object of the invention is to provide a rotary pump or compressor of the eccentric type in which the moving parts are so mounted and arranged that friction will be reduced to a minimum thereby enabling the pump or compressor to be operated at high speeds rendering the device quick and easy in operation.

Another object of the invention is to so construct and arrange the parts that pressure upon the bearings will be distributed thereby relieving excessive strain in certain directions.

With these and certain other objects in view which will appear hereinafter my invention consists in the novel features of construction and combination more fully described hereinafter and pointed out in the appended claims.

In the drawings forming a part of this specification I have shown several embodiments of my invention and it will be understood that other changes and modifications can be made if so desired within the claims without departing from the broad scope of my invention.

Figure 1 is an elevation of a rotary pump or compressor embodying my invention; Fig. 2 is a longitudinal sectional view of the device illustrated in Fig. 1; Fig. 3 is a transverse sectional view of the same; Fig. 4 is an end view of the construction illustrated in Figs. 1, 2 and 3; Fig. 5 is a view showing one end of the cylinder or casing removed; Fig. 6 is an elevation of another embodiment of my invention; Fig. 7 is a longitudinal sectional view of the same; Fig. 8 is a transverse sectional view of said embodiment; Fig. 9 is an end view of the same; Fig. 10 is a view showing one end of the cylinder or casing removed; Fig. 11 is a sectional view of the bearings and bushings; and Fig. 12 shows a modified form of bearing.

In all of the forms of rotary pumps or compressors embodying my invention I employ a cylinder 10 having one or both heads 11 removable and the heads of the cylinder are provided or constructed with bearings 12 turning upon the journals 13 carried by the standards 14 bolted to any suitable base 15, and in practice I prefer to interpose an eccentric bushing 16 between the bearing 12 and journal 13, said eccentric bushing having a collar 17 at the outer end thereof from which works a set screw 18 for the purpose of holding the bushings at any desired point of adjustment.

Within each cylinder 10 is a circular piston 20 mounted eccentrically within the cylinder upon a shaft 21, said shaft passing through the journals 13 as shown and eccentric thereto by which arrangement the piston will have an eccentric motion within the cylinder when either the piston or cylinder is rotated, or when both are rotated together and I propose to rotate both cylinder and piston thereby permitting the operation of the device at high speeds by the proper balancing of the parts, the distribution of pressure and strain, and the reduction of friction to a minimum.

By the use of the eccentric bushing between the bearings and journals the eccentricity of the piston with reference to the cylinder can be increased or decreased within certain limits as may be desired.

In Figs. 1 to 6 power is applied direct to the cylinder for the purpose of rotating the same whereas in Figs. 7 to 11 power is applied to one end of the shaft for the purpose of rotating said shaft and transmitting power to the casing in a manner hereinafter described.

In Fig. 1 the cylinder is constructed with a round pulley surface about which travels a belt 19 thereby rotating the cylinder. In connection with the rotary piston and cylinder I employ a blade or wing 22 which is rigidly attached to a round plug or block 23 mounted in an extension 24 formed at one side of the cylinder and this blade or wing 22 works in a slot 25 cut through the piston as near the center thereof as possible and as the cylinder rotates the piston

is caused to rotate also, and the blade or wing will work back and forth in the slot 25 turning upon the pin or block 23 as an axis, the wall of the cylinder being cut away as shown at 24ª to permit a slight vibratory motion of the said blade or wing.

An inlet opening 26 is provided within the casing at one side of the blade or wing and upon the opposite side of said blade or wing the piston is constructed with a discharge passage 27 which communicates with a passage 28 produced in the shaft and communicating with the atmosphere or any suitable pipe coupling which may be attached to the end of the shaft for the purpose of conveying the air or other fluid which is being pumped. A suitably constructed check valve 29 is arranged in the piston at the entrance of the passage 27.

By means of this construction it will be seen that when the cylinder is rotated by the movement of the belt, the piston will be caused to turn with it and owing to the eccentric mountings of these parts the piston will have an eccentric motion within the cylinder and consequently air or other fluid will be drawn in through the opening 26 and discharged through the passages 27 and 28. The blade is subjected to pressure only at the exposed portion between the cylinder and piston, and turning freely upon its axis and working freely within the piston slot, friction between these parts is very small and as the only work thrown upon said blade is to cause the cylinder and piston to move in unison, the device can be driven at a high rate of speed thereby materially increasing the efficiency of the device. By having the shaft and cylinder supported with proper bearings at both ends the strain is evenly distributed and the danger of the bearings becoming impaired is reduced to a minimum. The piston is provided with suitable packing rings 30 and a suitable packing and plug 31 and 32 are provided in the head of the cylinder opposite the end of the pin or block 23 and the cylinder is preferably formed with a balancing enlargement 24ᵇ at the opposite side to compensate for the enlargement 24 which receives the pin or block 23. The air or fluid is preferably conveyed through a tube or hose 35, which as before stated is connected to the end of the shaft through the medium of any form of coupling 36.

In Figs. 7 to 11 I have shown a construction in which the parts are rotated from the shaft 21 and in this construction the cylinder is mounted exactly the same as previously described but the piston 20 instead of having the blade or wing movable therein carries a blade or wing 40 rigid therewith and which works between semi-cylindrical shaped bearing blocks 41 carried in the side of the cylinder, suitable provision being made for such bearing pieces and the cylinder is also constructed with a chambered extension or enlargement 42 into which the end of the piston works and this chambered enlargement may be supplied with lubricant by means of which the piston in its workings becomes lubricated. The cylinder is provided with a corresponding extension 42ª at the opposite side for the purpose of balancing the structure. The cylinder has an intake opening 26 and the piston has an outlet passage 27 communicating with a passage 28 in the shaft 21 exactly the same as previously described but in this construction the check valve is omitted.

In operating this type, power is applied to the end of the shaft 21 through the medium of a pulley and belt and as the piston is rotated the cylinder is carried with the same, the blade or wing 40 working back and forth between the bearing pieces 41, and air or other fluid is drawn through the opening 26 and forced out through the passages 27 and 28 to the hose 35, any suitable connection 36 being employed as in the construction previously described.

The eccentricity of the piston in this construction can be shifted or adjusted within certain limits by changing the position of the eccentric bushing arranged between the journal 13 and bearing 12. The piston can be provided with suitable packing rings 30 exactly the same as in the other construction. In this form of device as in the others the cylinder and piston are supported from two points and the strain thereon evenly distributed and the construction and arrangement of the moving parts is such that the only work which the blade is called upon to do is to carry the cylinder around with the piston, and the only point where said blade is subjected to pressure is between the piston and cylinder and the friction between the moving parts is reduced to a minimum.

Having thus described my invention, what I claim is:—

1. In a pump, the combination with a rotatable cylinder, of a rotary eccentric piston therein, a shaft upon which said piston is mounted, said cylinder, piston and shaft having openings for the passage of fluid, and a blade carried by one member and working in the other member, said blade forming a connection between said members whereby they rotate in unison.

2. In a pump, the combination with a rotatable cylinder, of a rotary eccentric piston arranged therein, a shaft upon which said piston is mounted, said cylinder, piston and shaft having openings for the passage of fluid, and a blade carried by one member and working in the other member, said blade having a reciprocating and vibrating movement during the simultaneous rotation of the cylinder and piston.

3. In a pump, the combination with a cylinder having bearings, of a piston eccentrically arranged in said cylinder, journals for said cylinder bearings, a rotatable shaft mounted in said journals passing through the piston, said piston being fast upon the shaft, said cylinder, piston and shaft having openings for the passage of fluid, and a blade carried by one member and working in the other member and causing said members to rotate in unison.

4. In a pump, the combination with a cylinder having bearings, of journals for said bearings, eccentric bushings upon said journals, a piston arranged in said cylinder, a shaft eccentrically mounted in the cylinder journals, said shaft being concentric with the piston and fast therewith, said cylinder, piston and shaft having openings for the passage of fluid, and a blade carried by one member and working in the other member, said blade having a reciprocating and vibrating movement simultaneous with the rotation of the said members.

5. In a pump, a rotatable cylinder, a piston eccentrically mounted within said cylinder, and a blade connected to one of said members and working in a slotted portion of the other member, said cylinder and piston rotating in unison, said blade having a reciprocating and vibrating movement during such rotative movements, said cylinder and piston having openings for the passage of fluid.

6. In a pump, a rotatable cylinder, a piston eccentrically mounted therein, a blade carried by one member and adapted to work in a slotted portion of the other member, said cylinder and piston rotating in unison, said blade having a reciprocating and vibrating movement during such rotative movements, and packings for said contacting parts, said cylinder and piston having openings for the passage of fluid.

7. A pump comprising a cylinder having inlet and outlet ports, a rotary eccentric piston arranged within said cylinder, a blade carried by one member and working in a slotted portion of the other member, said blade having a vibrating and reciprocating movement during the rotation of the rotary eccentric piston, said piston also having an opening for the passage of fluid.

8. A pump comprising a cylinder having inlet and outlet ports, a rotary eccentric piston arranged within said cylinder, a blade connected to said cylinder at one side, and working in a slot in its piston, said blade having a vibrating and reciprocating movement during the rotation of said parts, said piston also having an opening for the passage of fluid.

9. In a pump, the combination of a rotatable cylinder, of a piston therein, a shaft upon which said piston is mounted, said cylinder and piston having openings for the passage of fluid, and a blade carried by one member and working in the other member, said blade forming a connection between said members whereby they rotate in unison.

In testimony whereof I hereunto affix my signature in the presence of two witnesses.

JAMES H. WAGENHORST.

Witnesses:

Mrs. C. B. Whitney,

Chas. T. Grant.