F. J. MATCHETTE & F. W. VAN NESS

ROTARY PUMP.

APPLICATION FILED MAY 9, 1910.

1,087,962.

Patented Feb. 24, 1914.

2 SHEETS—SHEET 1.

Fig. 2.

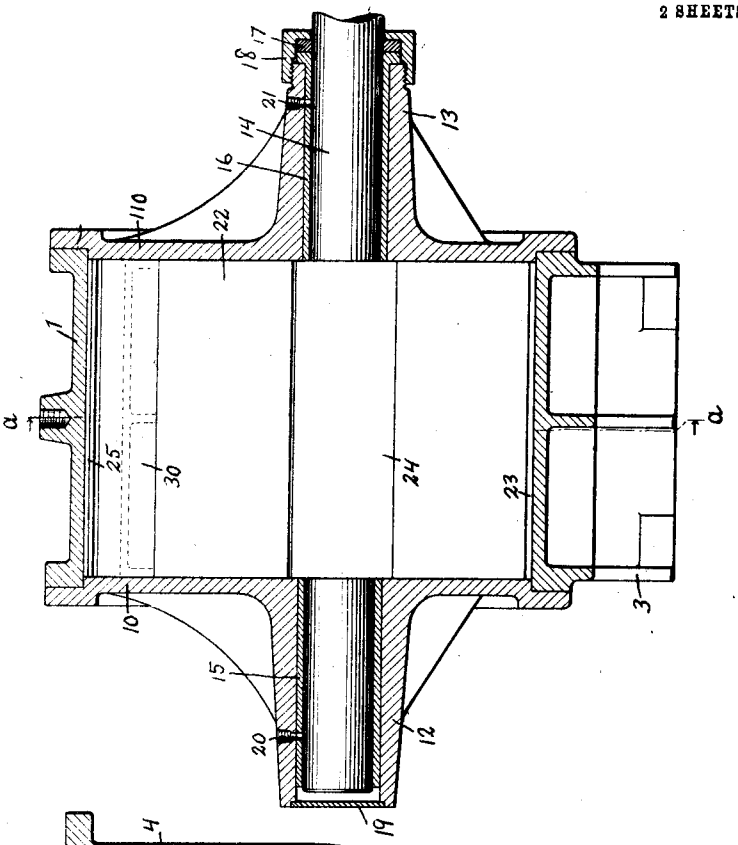
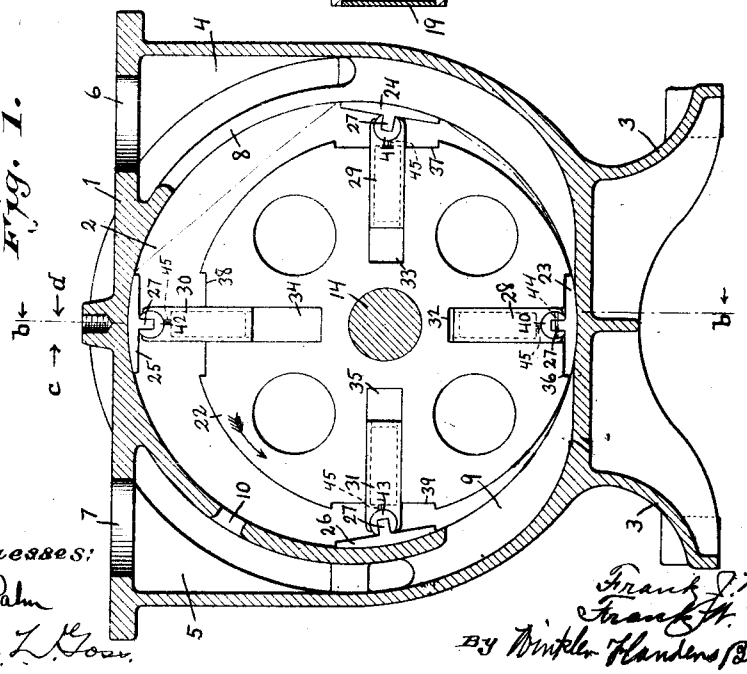


Fig. 1.



Witnesses:

Fred Palm

Chas. L. Goss.

Inventors:

Frank J. Matchette

Frank W. Van Ness.

By Winkler Flanders Bottum & Fawcett

Attorneys.

F. J. MATCHETTE & F. W. VAN NESS.

ROTARY PUMP.

APPLICATION FILED MAY 9, 1910.

1,087,962.

Patented Feb. 24, 1914.

2 SHEETS—SHEET 2.

Fig. 4.

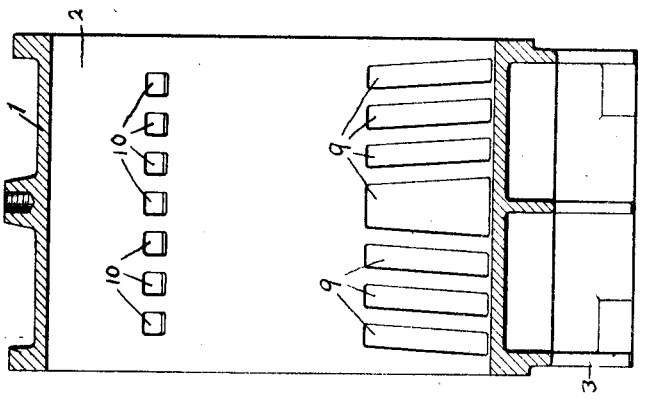
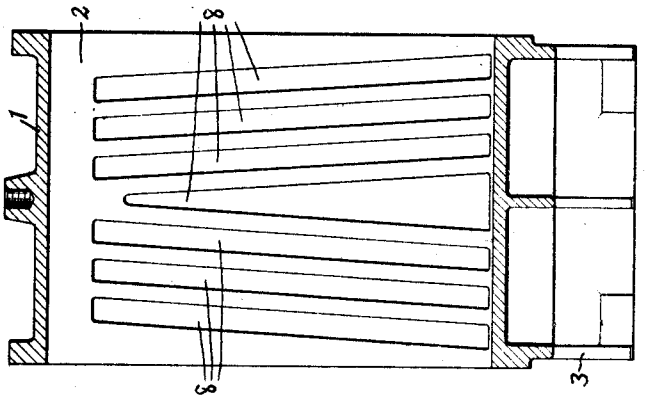


Fig. 3.



Witnesses:
Fred Palm
Chas. L. McCoon

Inventors:
Frank J. Matchette,
Frank W. Van Ness,
By Winkler, Flanders, Bottum & Fawcett
Attorneys.

UNITED STATES PATENT OFFICE.

FRANK J. MATCHETTE AND FRANK W. VAN NESS, OF MILWAUKEE, WISCONSIN; SAID VAN NESS ASSIGNOR TO SAID MATCHETTE.

ROTARY PUMP.

1,087,962. Specification of Letters Patent. **Patented Feb. 24, 1914.**

Application filed May 9, 1910. Serial No. 560,293.

To all whom it may concern:

Be it known that we, FRANK J. MATCHETTE and FRANK W. VAN NESS, citizens of the United States, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Rotary Pumps, of which the following is a specification, reference being had to the accompanying drawing, forming a part thereof.

This invention relates to pumps of the rotary type and the pump which is the subject-matter of this invention is especially designed for pumping air to create a vacuum in vacuum cleaning systems and the like.

The objects of this invention are to improve the construction of rotary pumps in the manner to be more specifically described herein and claimed.

Referring to the drawings which accompany this specification and form a part thereof and on which drawings the same reference characters are used to designate the same elements wherever they may appear in each of the several views, and which drawings illustrate embodiments of this invention, Figure 1 is a vertical transverse section of the pump casing taken on the line *a—a*, Fig. 2, looking in the direction indicated by the arrows, the ends of the rotor, buckets and wearing strips being shown in elevation; Fig. 2 is a longitudinal vertical section of the pump taken on the line *b—b*, Fig. 1, looking in the direction indicated by the arrows; Fig. 3 is a vertical longitudinal section of the pump casing (the rotor and ends of the pump being omitted) taken on the line *b—b*, Fig. 1, and looking in the direction of the arrow marked *c*; and Fig. 4 is a view similar to Fig. 3, but looking in the opposite direction, or the direction of the arrow *d*.

Referring specifically to the drawings, the reference numeral 1 designates a pump casing which is provided with a cylindrical bore 2, supporting lugs 3, an inlet chamber 4, outlet or exhaust chamber 5, inlet port 6 and exhaust port 7. The cylindrical bore 2 of the casing is in communication with the inlet chamber 4 by means of inlet ports 8 and with the exhaust chamber 5 by means of exhaust ports 9 and relief ports 10. The inlet ports 8 are preferably formed in the casing as elongated slots running circumferentially and diagonally with respect to the bore 2 of the casing, so that the wearing effect both on the casing and on the wearing strips will be reduced to a minimum by allowing plenty of contact surface for the wearing strips as they pass over said ports, and the exhaust ports 9 are similarly arranged circumferentially and diagonally with respect to the bore 2 of the casing. This diagonal arrangement of the ports provides for an even wearing of the wearing strips and the bore of the casing, and also provides for rolling or shearing dust and dirt, which may be caught at the edges of said ports, into and out of said ports, in a manner which will be readily understood.

The pump is provided with heads 10 and 110, which are preferably both removable from casing 1 and which may be secured to the casing 1 in any suitable or preferred manner. The heads 10 and 110 are provided with elongated bearings 12 and 13 respectively to afford ample bearing surfaces for the rotatable shaft 14 of the pump, and anti-friction bushings 15 and 16 of any suitable or preferred material may be interposed between shaft 14 and bearings 12 and 13. One end of shaft 14 projects from its bearings and may be directly connected with an electric or other form of motor, or may have a pulley wheel secured thereto for running the pump, and this end of the shaft 14 which projects from its bearing, is preferably provided with packing 17 retained in place by a gland 18, while the end of the bearing in the other head of the pump is closed by a plate or cap 19. The purpose of cap 19 and packing 17 is to keep oil fed to the bearings through oil holes 20 and 21, from escaping from the pump, and compel it to flow into the body of the pump or the bore 2 of the casing, to lubricate the rotor, buckets and wearing strips therein.

The rotor 22 may be constructed in any suitable or preferred manner, but it is preferred to construct it as a substantially cylindrical body with the shaft 14 concentrically located with respect thereto, but with said shaft eccentrically located with respect to heads 10 and 110 of the pump, so that the circumference of rotor 22 is substantially in contact with the interior of bore 2 at the bottom or lowermost part thereof, as clearly shown by Fig. 1 of the drawings.

The pump is preferably provided with four buckets, though a greater or less number may of course be provided for, and

these buckets are provided with wearing strips which are designated by the reference numerals 23, 24, 25 and 26. The wearing strips have their outside surfaces curved to correspond with the curve of the bore 2 of the pump, and their inside surfaces are preferably made flat, as clearly shown by Fig. 1 of the drawings, and are provided with projections designated by the common reference numeral 27, which preferably extend throughout their length. The wearing strips 23, 24, 25 and 26 are in reality the casing contact ends of the radially movable buckets 28, 29, 30 and 31, which are received within radial slots 32, 33, 34 and 35 respectively, formed in the rotor 22, and which slots open at their exterior into recesses 36, 37, 38 and 39, formed on the exterior of rotor 22, adapted to receive the wearing strips 23, 24, 25 and 26 respectively, so that when said wearing strips are received within said recesses they form with rotor 22 a substantially smooth cylindrical surface. Preferably the wearing strips 23, 24, 25 and 26 are formed of an aluminum alloy such as McAdamite, or other light metal, and the buckets 28, 29, 30 and 31 are likewise formed of the same metal or other suitable light metal, and said buckets are made hollow or cored out to further decrease their weight, and preferably the buckets are open at their inner ends so that the hollow interiors thereof are in open communication with slots 32, 33, 34 and 35, so that oil can pass from said slots into the hollow interiors of the buckets. The several buckets have formed in their outer edges recesses or sockets which are preferably a little more than semi-cylindrical in cross section, so as to receive the substantially cylindrical wearing strip rods 40, 41, 42 and 43, which are secured to the projection 27 on the wearing strips 23, 24, 25 and 26, by means of pins 44, or other suitable fastening means. Oil holes 45 are drilled, or otherwise made, to allow oil to flow from the hollow interiors of the buckets into the sockets in the outer edges of the buckets, to lubricate the wearing strip rods. It is preferred to have the buckets and wearing strips freely movable with respect to rotor 22, so that they are thrown out by centrifugal force, and it is preferred to make the buckets and wearing strips of as light weight as possible in the manner heretofore described, for the purpose of reducing the friction between the wearing strips and the interior of the bore of the casing. The primary function of the wearing strip rods 40, 41, 42 and 43, is to provide a wear-resisting material between the buckets and the wearing strips, so that friction will be reduced and the life of the movable parts in contact will be lengthened, and when the buckets and wearing strips are made from an aluminum alloy, such, for example, as McAdamite, the wearing strip rods are preferably made from steel. This construction gives extreme lightness to the wearing strips and buckets while at the same time it reduces friction by providing metal of different character at all friction surfaces. The reason for making the buckets and the wearing strips from a light metal is to reduce the centrifugal force created by these parts when in motion, and consequently to reduce the friction between the wearing strips and the pump casing.

It will be readily understood that oil in the bottom of the cylindrical bore 2 in the pump casing 1 will creep by capillary attraction between the buckets and the sides of the slots in which the buckets are received and this action will be increased by the pumping action of the buckets sliding into the slots as the buckets are coming to their lowermost positions. The oil will then pass into the interiors of the hollow buckets through their inner, open ends by creeping, or capillary attraction, or by centrifugal force or gravity, according to the speed of the rotor, and will then pass through oil holes 45 to lubricate the wearing strip rods.

The operation of the pump is as follows: The rotor is rotated in the direction indicated by the arrow on Fig. 1 of the drawings, and the buckets and wearing strips are thrown outwardly by centrifugal force, so that the wearing strips bear against the inside of the bore 2 at all points during their revolutions. Air enters between each pair of buckets as they pass the inlet ports 8, and before a leading bucket has uncovered the relief ports 10 the following bucket has passed the ends of ports 8 so that the air is pocketed between the two buckets. Because it is not desirable to waste energy by compressing the air contained in a pocket formed between two buckets, the relief ports 10 are provided, through which the air can escape into the exhaust chamber 5 soon after the inlet ports 8 have been closed, and before the preceding bucket has reached the exhaust ports 9 and before the air has been compressed. The relief ports 10 might be made longer circumferentially, and the exhaust ports 9 might be made shorter circumferentially, but it is found in practice that, with the said ports of substantially the proportions shown by the drawings, extreme efficiency and economy are realized.

What is claimed is:

1. The combination in a rotary pump of a casing provided with a bore, a rotor eccentrically disposed within said bore, buckets of a light weight material carried by said rotor and movable with respect thereto, wearing strips of light weight material carried by said buckets and movable with respect thereto, and wear-resisting and friction reducing material between said buckets and said wear-

ing strips, said wear-resisting and friction-reducing material being movable with respect to the said buckets to hinge the wearing strips thereto.

2. The combination in a rotary pump of a casing, provided with a bore, a rotor eccentrically disposed within said bore, buckets of a light weight material, such as aluminum or an aluminum alloy, carried by said rotor and movable with respect thereto, wearing strips of a light weight material, such as aluminum or an aluminum alloy, carried by said buckets, and steel wearing strip rods uniting said buckets and said wearing strips, the said steel wearing strip rods being movable with respect to the buckets and hinging the said wearing strips to the said buckets.

3. The combination in a rotary pump of a casing, provided with a bore, a rotor eccentrically disposed within said bore, hollow or chambered buckets of aluminum or an aluminum alloy carried by said rotor and movable with respect thereto, wearing strips of aluminum or an aluminum alloy, said buckets being provided with sockets in their outer ends, and steel wearing strip rods secured to said wearing strips and seated in the sockets in said buckets.

4. The combination in a rotary pump of a casing provided with a bore, a rotor eccentrically disposed within said bore and provided with slots, open-ended hollow buckets provided with sockets seated in said slots, wearing strip rods movably received within said sockets, and wearing strips to which said wearing strip rods are secured, said buckets being provided with oil holes affording communication between the hollow interiors of said buckets and said sockets.

In witness whereof we hereto affix our signatures in presence of two witnesses.

FRANK J. MATCHETTE.
FRANK W. VAN NESS.

Witnesses:
CHAS. L. GOSS,
JENNIE PAIKOWSKI.