

Sept. 2, 1924.

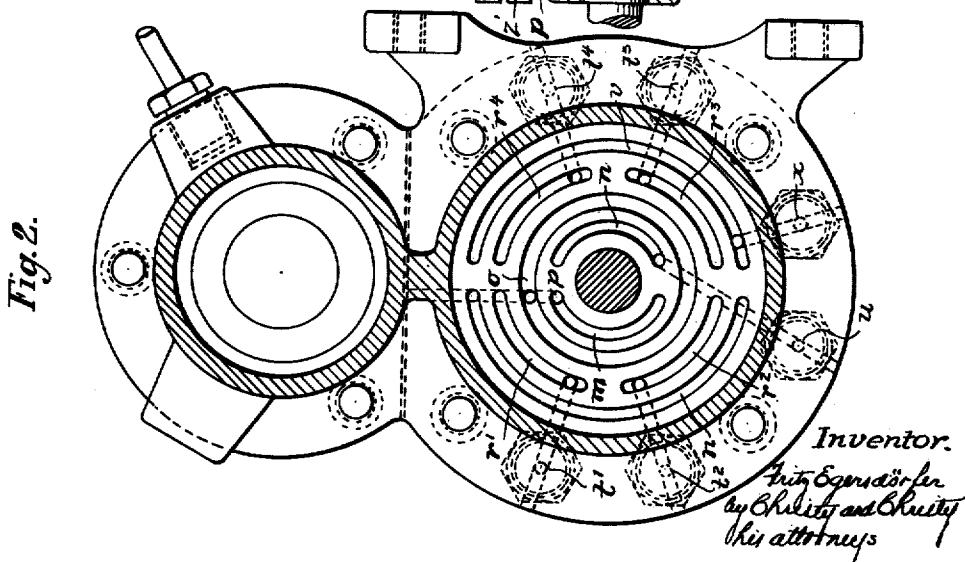
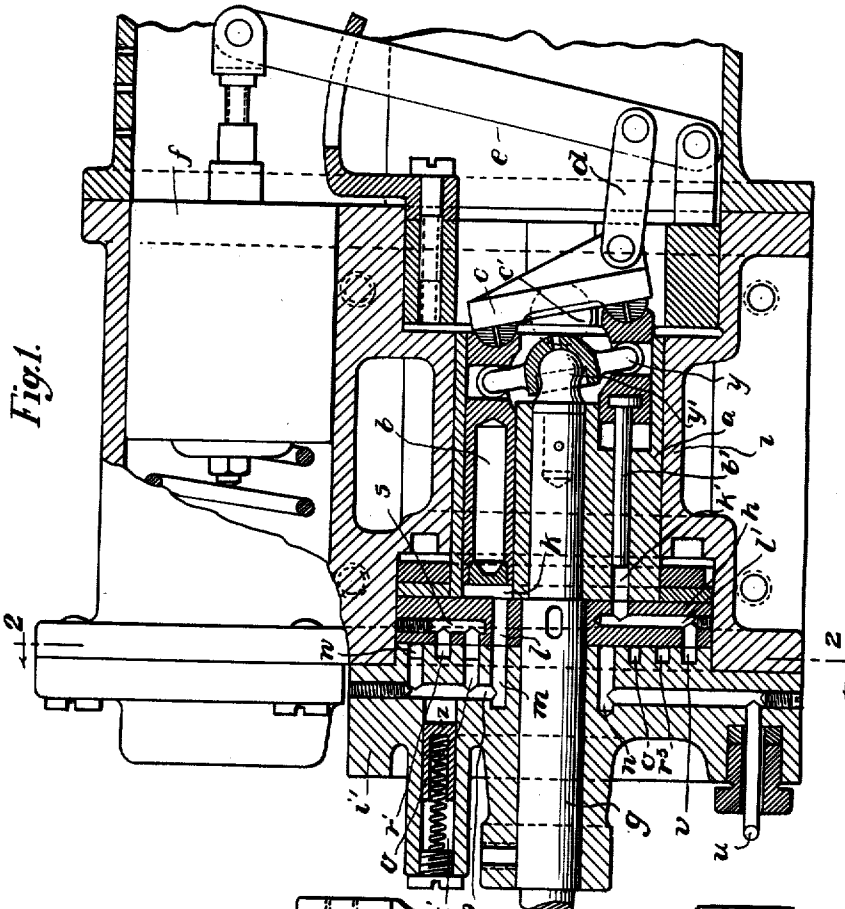
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F. EGERSDÖRFER

ROTARY PUMP OR BLOWER

Filed Dec. 13, 1922

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

Fig. 3.

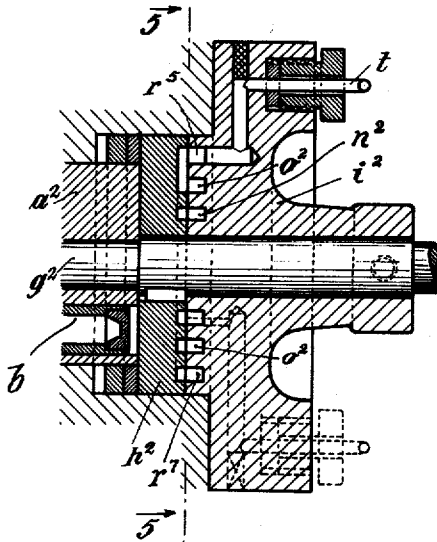


Fig. 4.

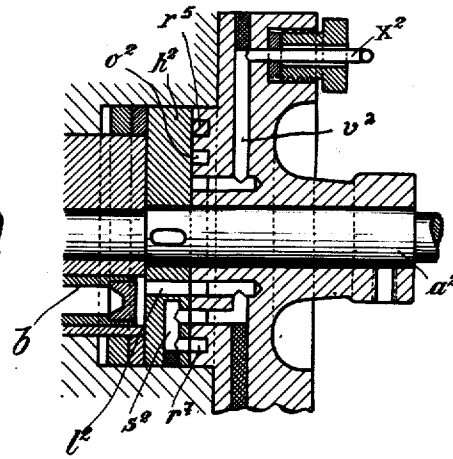
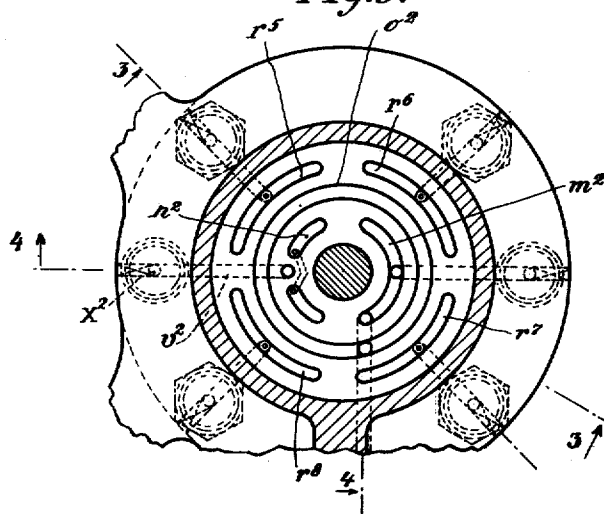


Fig. 5.



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UNITED STATES PATENT OFFICE.

FRITZ EGERSDÖRFER, OF CHARLOTTENBURG, GERMANY.

ROTARY PUMP OR BLOWER.

Application filed December 13, 1922. Serial No. 808,703.

To all whom it may concern:

Be it known that I, FRITZ EGERSDÖRFER, a citizen of Germany, residing at Charlottenburg, in the State of Prussia, Germany, have invented certain new and useful Improvements in Rotary Pumps or Blowers, for which I have filed an application in Germany; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in rotary pumps or blowers, and more particularly in pumps or blowers of the type in which a plurality of plungers or pistons have reciprocating movement within cylindrical pockets provided in a drum, and are engaged by a plate disposed at an angle to the axis of the plungers or pistons and adapted upon relative rotary movement of the drum and plate to operate the pistons or plungers. In machines of this type the pressure and suction ducts are provided within a member in sliding engagement with the drum, said member and drum having relative rotary movement for alternately connecting said pockets with the suction and pressure ducts, and the pressure and suction ducts have nearly semi-circular form. The object of the improvements is to provide a machine of this type in which the pressure ducts are successively thrown into communication with a plurality of fluid consuming apparatus without using controlling valves. With this object in view my invention consists in the matters to be described hereinafter and particularly pointed out in the appended claims.

For the purpose of explaining the invention two examples embodying the same have been shown in the accompanying drawings in which the same reference characters have been used in all the views to indicate corresponding parts. In said drawings,—

Fig. 1, is a longitudinal section of the pump,

Fig. 2, is a cross-section taken on the line 2—2 of Fig. 1,

Figs. 3 and 4, are partial longitudinal sections taken respectively on the lines 3—3 and 4—4 of Fig. 5 and showing a modification, and

Fig. 5, is a cross-section taken on the line 5—5 of Fig. 3.

My improved machine may be used for example in connection with a multiple-cylinder internal combustion engine for successively supplying fuel to the cylinders, and I shall describe the same in connection with an internal combustion engine. But I wish it to be understood that my invention is not limited to the use in a machine of the class referred to.

In the example shown in the drawing my improved machine comprises a stationary cylindrical casing *i*, a drum *a* having rotary movement within the cylindrical casing and formed around its axis with a suitable number of concentrically arranged cylindrical pockets *k* each having a plunger *b* reciprocating therein, and a disk *c* in sliding engagement with the ends of the plungers, rockingly mounted by means of trunnions *c'*, and adapted to be set by shifting mechanism *d*, *e* in different positions angularly of the axis of the drum *a*. The plungers are connected by a star shaped member *y* having oscillating movement on a spherical pivot *y'* formed by the end of a driving shaft *g* connected with the drum *a* for imparting rotary movement thereto, which member has the function to transmit inward movement of one plunger to the other for retracting the same from its cylindrical pocket. The pockets *k* are connected with ports *l* through which communication is established upon rotation of the drum alternately with suction and pressure ducts *m* and *n*. So far the machine is known in the art so that a more detailed description may be dispensed with.

In the example shown in the figures, to the shaft *g* a disk *h* is keyed which forms a part of the drum and takes part in the rotation thereof. The said disk contains the ports *l*, and the ports are adapted for cooperation with a plurality of controlling ducts provided in the head *i'* of the casing *i*, which head is in sliding contact with the disk *h*.

The drawing shows only one plunger *b* for feeding fuel, but I wish it to be understood that ordinarily a greater number of fuel plungers are provided in order to have a uniform fuel supply, a suitable number of fuel plungers being three. The suction and pressure ducts *m* and *n* are formed in the head *i'*, *m* being the pressure duct and *n* the suction duct. As appears from Fig. 2, the said ducts are nearly semi-circular in form,

and upon rotation of the drum the pocket or pockets k are successively thrown into communication with the said ducts. At their ends the ducts m and n are spaced apart sufficiently to prevent communication thereof through the ports l when the plunger passes through the dead point.

In the example shown in the drawing the machine is designed for feeding fuel to four cylinders of an internal combustion engine (not shown), and for thus distributing the fuel a circular passage o is formed in the head i' , which passage is disposed concentrically of the ducts m and n and is connected with the pressure duct m by a passage p . Concentrically of the passage p four segmental annular passages r_1, r_2, r_3 , and r_4 are formed in the head i' which are adapted upon rotation of the disk h to be successively thrown into communication with the passage o through a radially disposed U-shaped passage s formed in the disk h , and the passages r_1, r_2, r_3 , and r_4 are connected respectively with discharges t_1, t_2, t_3 , and t_4 each connected by a suitable pipe with the fuel supply of one of the cylinders of the internal combustion engine. The suction duct n is connected with a suction pipe u .

Upon rotation of the drum a and the disk h the plunger or plungers b slide with their ends on the plate c , and they are reciprocated thereby in the manner known in the art. Fuel is drawn in through the suction pipe u and the duct n and forced into the pressure duct m and the circular passage o , from which it is distributed by means of the passage s to the passages r_1, r_2, r_3 , and r_4 . Therefore, the same plunger or plungers during part of their travel draw fuel into the pocket or pockets k and during another part of their travel force previously indrawn fuel from the pockets k to the cylinders of the engine.

In such cases in which a single plunger b is provided I provide fluid storing means in order to have an uninterrupted fluid discharge. As shown, such fluid-storing means consist of a bore z' , connected with the pressure duct m and containing a spring-pressed plunger z .

In my improved machine means are provided for feeding additional fluids such for example as water together with the fuel. As shown the drum is formed with an additional bore or bores k' having a plunger b' reciprocating therein and adapted to be alternately connected through a passage l' made in the disk h with a nearly semi-circular suction duct v and a nearly semi-circular pressure duct w made in the head i' . The suction duct v communicates through a pipe x with a supply of a suitable liquid such as water, and the pressure duct w communicates through a radial duct p with the

circular passage o , which therefore has a supply of fuel and water and transmits the said fluids through the U-shaped passage s and the passages r_1, r_2, r_3 , and r_4 to the individual cylinders. I wish it to be understood that the pocket k' and cooperating parts are shown merely by way of example, and that I do not limit myself to a construction in which only one subsidiary fluid is added to the fuel.

The number of the distributing passages r_1, r_2, r_3, r_4 depends on the number of the fluid consuming members, such as engine cylinders, and the pump can readily be adapted to any desired number of fluid consuming members by providing the same with a head i' having the desired number of passages r_1, r_2, r_3, r_4 . The amount of the subsidiary fluid can be varied by providing pockets k' and plungers b' of the required diameter. In the example shown in the figures the diameter of the plunger b' is smaller than that of the plunger b , the plunger b' being designed to add a certain amount of water to the fuel.

In Figs. 3 to 5 I have shown a modification in which a special plunger b' for the supply of an additional fluid has been dispensed with, said fluid being supplied by means of the main plunger or plungers b . The general construction of the pump is similar to that described with reference to Figs. 1 and 2.

As shown the shaft g^2 carrying the drum a^2 has a disk h^2 keyed thereto, which disk cooperates with the head i^2 formed with suction and pressure ducts n^2 and m^2 , a circular duct o^2 , and segmental ducts r^5, r^6, r^7 , and r^8 . The disk h^2 is provided with a port l^2 and a U-shaped passage s^2 . The operation of the parts so far described is the same as that described with reference to Figs. 1 and 2. As appears from Fig. 5 the suction duct n^2 is made in two sections, and between the said sections there terminates a suction passage v^2 connected through a pipe x^2 with a supply of the additional fluid such as water.

Upon rotation of the drum a^2 the port l^2 successively passes over the sectional suction ducts n^2 and the terminal of the passage v^2 , so that in addition to the fuel a small amount of water is drawn in, which water is discharged together with the fuel into the pressure duct m^2 . By providing the passage v^2 with a terminal of the proper area the desired amount of water is taken in upon each suction stroke of the plunger b^2 .

While in describing the invention reference has been made to particular examples embodying the same I wish it to be understood that my invention is not limited to the construction shown in the drawings, and that various changes may be made in the

general arrangement of the apparatus and the construction of its parts without departing from the invention.

I claim:

1. In a machine of the class described, the combination, with a frame, a drum mounted on said frame and formed with an eccentric pocket, and means to impart relative rotary movement to said frame and drum, of a piston having reciprocating movement within said pocket, a plate angularly set with respect to the axis of rotation and connected with said frame and adapted to move the piston, said frame being formed with suction and pressure ducts adapted upon relative rotation of the frame and drum for alternate communication with the pocket, with a circular passage in constant communication with said pressure duct, and with a plurality of distributing passages adapted upon relative rotary movement of the frame and drum to be successively brought into communication with said circular passage.
2. In a machine of the class described, the combination, with a frame, a drum mounted on said frame and formed with an eccentric pocket, and means to impart relative rotary movement to said frame and drum, of a piston having reciprocating movement within said pocket, a plate angularly set with respect to the axis of rotation and connected with said frame and adapted to move the piston, said frame being formed with suction and pressure ducts adapted upon relative rotation of the frame and drum for alternate communication with the pocket, with a circular passage in constant communication with the pressure passage, and with separate distributing passages, said drum being formed with a passage adapted successively to establish communication between the circular passage and the distributing passages.
3. In a machine of the class described, the combination, with a frame, a drum mounted on said frame and formed with an eccentric pocket, and means to impart relative rotary movement to said frame and drum, of a piston having reciprocating movement within said pocket, a plate angularly set with respect to the axis of rotation and connected with said frame and adapted to move the piston, said frame being formed with a plurality of suction ducts and a pressure duct adapted upon relative rotation of the frame and drum for alternate communication with said pocket, a circular passage in constant communication with said pressure duct, and a plurality of distributing passages

adapted upon relative rotary movement of the frame and drum to be successively brought into communication with said circular passage.

4. In a machine of the class described, the combination, with a frame, a drum mounted on said frame and formed with an eccentric pocket, and means to impart relative rotary movement to said frame and drum, of a piston having reciprocating movement within said pocket, a plate angularly set with respect to the axis of rotation and connected with said frame and adapted to move the piston, said frame being formed with a plurality of suction ducts having different supplies and a pressure duct, said suction and pressure ducts being adapted upon relative rotation of the frame and drum for alternate communication with said pocket, a circular passage in constant communication with said pressure duct, and a plurality of distributing passages adapted upon relative rotary movement of the frame and drum to be successively brought into communication with said circular passage.

5. In a machine of the class described, the combination with a frame, and drum mounted on said frame and formed with a plurality of eccentric pockets, and means to impart relatively rotary movement to said frame and drum, of a piston having reciprocating movement within each of said pockets, and a plate angularly set with respect to the axis of rotation and connected with said frame, and standing opposite one head of said drum, and adapted when the parts are in relative rotation to effect reciprocation of the pistons, said frame being further provided with a plate standing opposite the other head of said drum, and having formed in it a plurality of suction ducts and a pressure duct, said suction ducts adapted to communicate with different sources of supply, one of said suction ducts and said pressure duct being adapted upon relative rotation of the said frame and drum for alternate communication with one of the said pockets, and the other of said suction ducts and said pressure duct being adapted upon relative rotation of the frame and drum for alternate communication with the other of the said pockets.

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

FRITZ EGERSDÖRFER.

Witnesses:

E. HOLTZEMAN,
R. T. AUSPACH.