No. 727,171. PATENTED MAY 5, 1903.

A. MAYER.

ROTARY PUMP.

APPLICATION FILED OCT. 9, 1902.

NO MODEL.

Fig 1

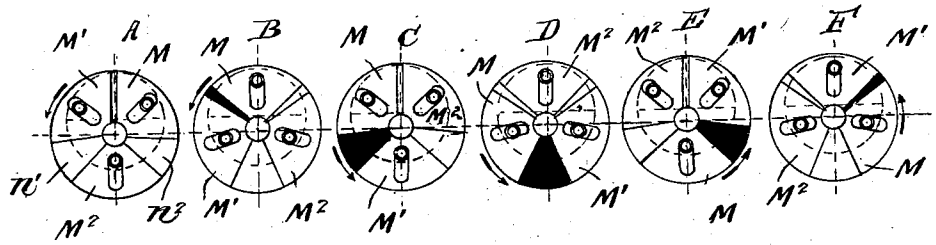


Fig. 2

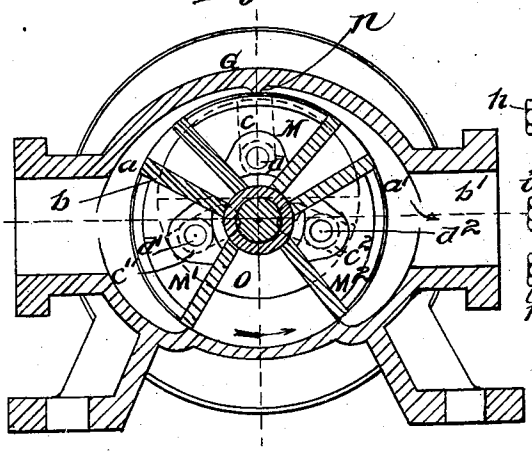


Fig. 3

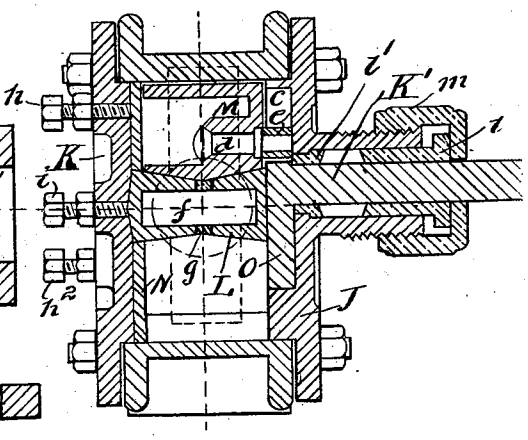
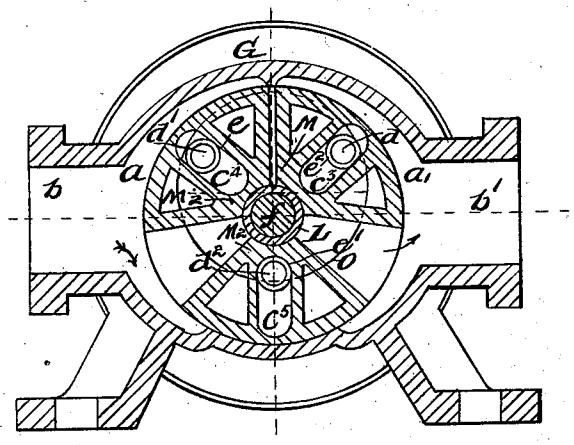


Fig. 4.



Witnesses.

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UNITED STATES PATENT OFFICE.

AUGUST MAYER, OF BUDAPEST, AUSTRIA-HUNGARY.

ROTARY PUMP.

SPECIFICATION forming part of Letters Patent No. 727,171, dated May 5, 1903.

Application filed October 9, 1902. Serial No. 126,613. (No model.)

To all whom it may concern:

Be it known that I, AUGUST MAYER, a subject of the Emperor of Austria-Hungary, residing at Budapest, Austria-Hungary, have invented certain new and useful Improvements in Rotary Pumps, (for which I have applied for Letters Patent in Germany on the 28th day of January, 1901,) of which the following is a specification.

My invention has for its object to so construct a rotary pump that it will continuously create a vacuum-chamber on the suction side thereof and concurrently therewith will forcibly close a corresponding chamber on the discharge side to expel its load of water; and to this end it consists in the employment of independently-movable sector-pistons in the cylindrical pump-casing, with mechanism for rotating them and simultaneously causing them to open away from each other to form in succession vacuum-chambers and for moving them up against each other to forcibly close said chambers, all as will hereinafter appear.

In the drawings, Figures 1^A to 1^F are diagrammatic representations of the pistons in successive stages of action. Fig. 2 is a vertical section through the pump transversely to the line of the actuating-shaft. Fig. 3 is a vertical section at right angles to the foregoing—that is, coinciding with the axis of said shaft. Fig. 4 is a section similar to Fig. 2, but with the piston in a more advanced stage of action and showing an alternative mounting of the wrist-pins.

G is the casing of the pump, tightly closed by heads K and J and partly encircled on one side by the suction-channel *a*, opening from the suction-pipe *b*, and on the other by the force-channel *a'*, opening into the force-pipe *b'*. These sector-shaped wing-pistons M, M', and M^2 are mounted upon the conical sleeves or shaft-sections L, so as to readily turn thereon. In each of the wing-pistons is mounted a wrist-pin $d\ d'\ d^2$, having loose sleeves $e\ e'\ e^2$ upon their projecting ends. The drive-shaft K' is fixed to the face-plate O, and both are mounted eccentrically to the axis of the pump-cylinder. The face-plate has three radial symmetrically-spaced slots $c\ c'\ c^2$, with which the sleeves of the above-mentioned wrist-pins engage. The regulating-disk N, through which the sectional shaft L is passed, is adjusted inward by set-screws $h\ h^2$, &c., just so far as necessary for the tight closing in of the wing-pistons, without, however, materially interfering with their easy-running. The set-screw *i*, Fig. 3, serves for the closing together of the conical sections of shaft L over the roller *f*, by means of which the wing-pistons are adjusted out against the internal periphery of the pump-cylinder, an elastic ring or intermediate piece *g* being interposed between said sections. The driving-shaft is passed through a stuffing-box *l m* and connected therebeyond with a suitable source of power.

Instead of making slots in the face-plate the wrist-pins may be mounted therein and work in slots $c^3\ c^4\ c^5$ in the respective wing-pistons, as represented in Fig. 4, showing such alternative form. The action will be the same either way.

Referring to the diagrammatic representation in Fig. 1 and assuming a starting position, such as shown in Fig. 1^A, it will be seen that the two uppermost pistons M M' have come in contact with each other upon a line corresponding to a vertical radius from their axis of rotation and registering with the narrow rib *n*, which divides the suction-channel from the force-channel at the vertically overhead point of the pump-cylinder, while the lowermost piston M^2 is separated from both, forming two chambers $n'\ n^2$, one opening at the left into the suction-channel and the other at the right into the force-channel. As the eccentric face-plate turns in the direction of the arrow it acts more rapidly upon the wrist-pin *d'* of piston M' and moves said piston away from piston M, as shown in Fig. 1^B, this representing the opening at the incipient end of the suction-channel, and at the same time it begins to close piston M^2 up against piston M. By this means a gradually-widening vacuum-chamber is produced between pistons M and M', which sucks in water from the supply-pipe *b*, while at the same time a gradually-closing force-chamber is effected between pistons M^2 and M to expel water through the delivery-pipe *b'*. As pistons M and M' are carried along the suc-

tion-channel, the vacuum-chamber successively reaches the magnitudes shown in Figs. 1^C and 1^D, the latter being its maximum and corresponding to the moment when it is entirely cut off from the suction-channel and also from the force-channel by engagement with cut-off surface n^3. At this instant a perpendicular let fall from the axis will bisect the space between the said pistons, as in Fig. 2, and form, with the starting radius in Fig. 1^A, a vertical diameter through the machine. Further movement of the pistons M and M′ opens the vacuum-chamber filled with water from the suction-channel into the force-channel, where it immediately becomes a force-chamber, since the face-plate O now acts to retard the piston M′ and close the piston M up thereagainst, as represented in Figs. 1^E and 1^F, the latter showing the two pistons on the point of leaving the force-chamber and approaching the starting-point. (Indicated in Fig. 1^A.)

It will be understood that the action between piston M^2 and pistons M and M′ is relatively the same as that above described between pistons M and M′, so that, as shown by the diagram, there is at all times a vacuum-chamber being opened in the suction-channel and a force-chamber closing in the force-channel.

The machine may be reversed and work in the same way, provided water is introduced into pipe b' and allowed to flow out through pipe b.

It will be observed that the rib n forms a sharp division between the force-chamber and the suction-chamber of the pistons. On one side the force-chamber is closing up to the time it reaches it, and the advancing piston there comes into contact with the lagging piston in front, after which the instant they pass it, or rather pass the vertical diameter which bisects it, the lagging piston becomes the hurrying one and the previously-hurrying one begins to lag and the suction-chamber commences to form. Thus the closing of the force-chamber practically culminates and the opening of the suction-chamber may be said to commence on the vertical diameter of the pump-cylinder. This, in connection with the fact that the lower cut-off surface is or may be raised, gives an extremely large suction-channel and an extremely large force-channel to the pump-cylinder and an imperceptible transition from one to the other. After the working contact of the pistons against the casing has been closed by the conical sleeves and the lateral contact also closed by the adjusting-plate N the contact of the pistons at the crown leaves no dead room, and therefore the suction of the pump approaches very near a complete vacuum, and since this suction is not periodically broken, but acts continuously, the exhaust acts accurately at the greatest permissible depths and without necessity of a foot-valve in the suction-pipe or of priming. The pump also works with entire absence of shock and thumping and without the use of air-chambers.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, in a rotary pump, of a series of sector-formed wing-pistons, a cylinder in which they work, suction and discharge channels partly surrounding and opening into said cylinder on opposite sides thereof, an eccentric face-plate, wrist-pins connecting the pistons with said face-plate, and having a radial sliding movement relatively to one of said members, whereby said pistons are driven at varying speed, to open away from each other in the suction-channel and close toward each other in the discharge-channel, a cut-off rib between said channels at the point of complete closing, and a cut-off surface between said channels at the point of maximum opening.

2. The combination, in a rotary pump, a series of sector-formed ring-pistons, a cylinder in which they work, suction and discharge channels partly surrounding and opening into said cylinder on opposite sides thereof, an eccentric face-plate, wrist-pins connecting the piston with said face-plate and having a radial sliding movement relatively to one of said members, whereby said pistons are driven at varying speed, to open away from each other in the suction-channel and close toward each other in the discharge-channel, a narrow cut-off rib between said channels at the point of complete closing and a raised cut-off surface between said channels at the point of maximum opening, and corresponding in extent therewith and the center line of which is diametrically opposite the center line of said rib.

3. The combination, in a rotary pump, of a series of sector-formed wing-pistons, a cylinder in which they work, means for rotating them at variable speeds, a sectional shaft composed of two cone-shaped sleeves upon which they rotate, means for adjusting said sleeves toward each other to force the pistons out against the cylinder, suction and discharge passages on opposite sides of said cylinder and cut-offs between said passages.

4. The combination, in a rotary pump, of a series of sector-formed wing-pistons, a cylinder with suction and discharge passages, in which they work, cut-offs between said passages, means for rotating said pistons at relatively varying speeds, a sectional shaft composed of two converging cones mounted upon a bolt or roller, supporting said sections as they rotate, a movable plate in one side of the cylinder through which plate the corresponding outer end of said shaft passes, and means for adjusting said plate up against the pistons.

5. The combination, in a rotary pump, of a

series of sector-formed wing-pistons, a cylinder with suction and discharge passages in which they work, cut-offs between said passages, means for rotating said pistons at relatively varying speeds, a sectional shaft composed of two conical sleeves and an inclosed bolt or roller upon which they rotate, means for setting said sleeves up toward each other to adjust the pistons against the cylinder, a plate in one side of the cylinder and means for setting it in toward said pistons.

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

AUGUST MAYER.

Witnesses:
BERNARD G. ELLIOT,
LOUIS VAINLOVE.