

June 21, 1932.

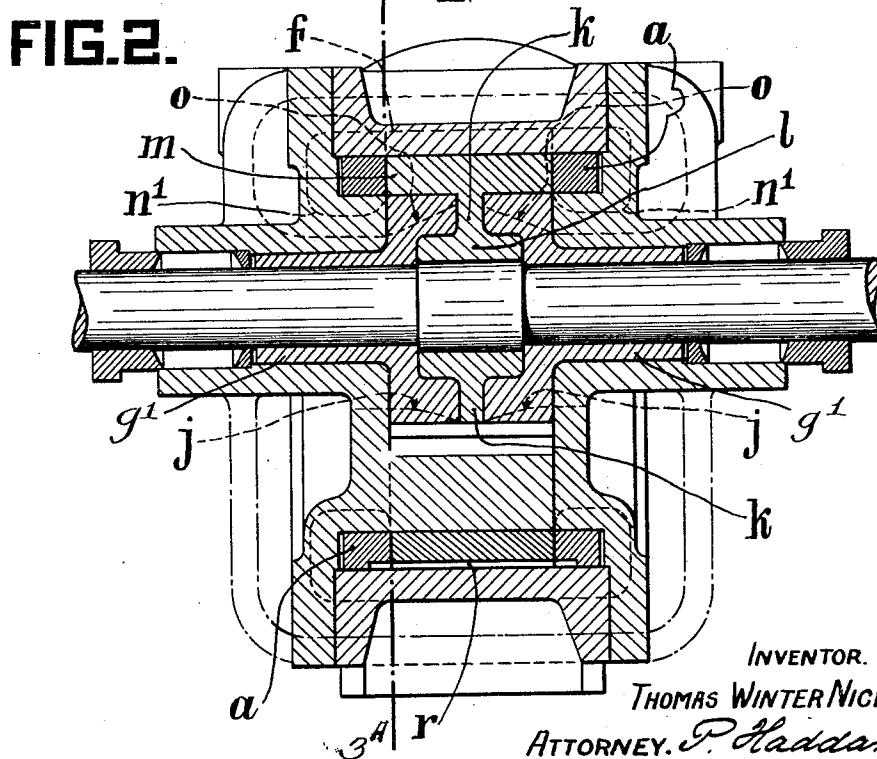
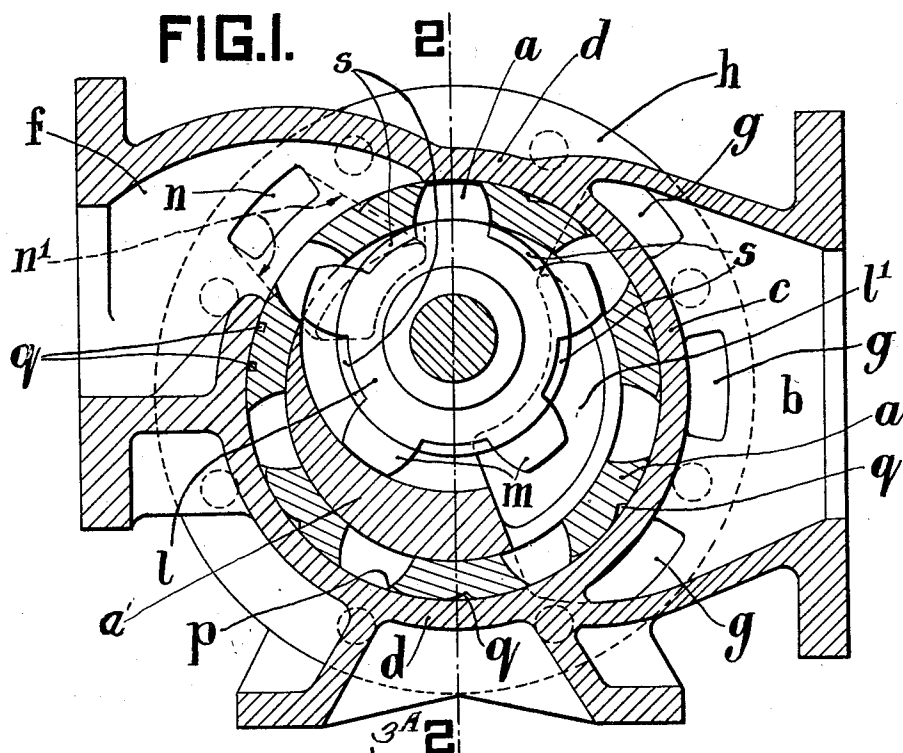
T. W. NICHOLS

1,864,458

ROTARY PUMP

Filed Nov. 13, 1931

2 Sheets-Sheet 1



INVENTOR.
THOMAS WINTER NICHOLS.
ATTORNEY. P. Hadden

June 21, 1932.

T. W. NICHOLS

1,864,458

ROTARY PUMP

Filed Nov. 13, 1931

2 Sheets-Sheet 2

FIG.3.

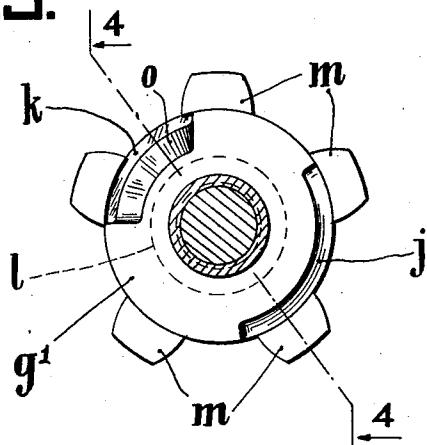
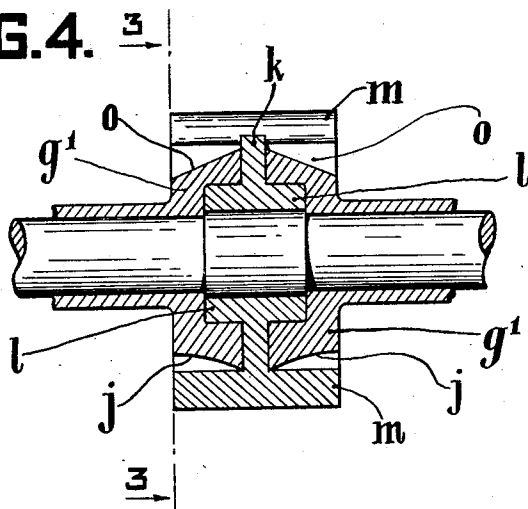


FIG.4.



INVENTOR.
THOMAS WINTER NICHOLS.
ATTORNEY. *P. Haddon.*

UNITED STATES PATENT OFFICE

THOMAS WINTER NICHOLS, OF LONDON, ENGLAND

ROTARY PUMP

Application filed November 13, 1931, Serial No. 574,882, and in Great Britain October 24, 1930.

This invention relates to improvements in rotary pumps.

In my United States Patent No. 1,802,527 I have described an improved form of construction of a rotary pump of the type in which the rotor is in mesh with a revoluble ring of teeth there being interposed between the rotor and the ring a crescent shaped block, the features of the construction being that the rotor has paddle-like teeth formed on or attached to a web of a sleeve forming the hub of the rotor, fixed bearing bushes being arranged between the bottoms of these paddle-like teeth of the rotor and said sleeve, and the ring being formed of two similar sized annular members connected by bars which constitute the teeth of the ring meshing with the teeth of the rotor. The pump is provided with the usual inlet and outlet at the respective ends of the casing and if the pump is to be used for heavy oils an additional inlet may be provided in the form of a lateral inlet passing through the side walls of the casing and having openings adjacent the side of the rotor.

My present invention relates to improvements in pumps of the above described or similar type; and the object of my improvement is first to provide an improved arrangement of the inlet and outlet ports in order to allow the pump to be run at very high speeds without damage to the rotor by the presence of dirt or foreign matter in the substance being pumped, and second to provide means whereby a thin film of the water or other liquid being pumped is formed between the ring and the casing this film operating as a cushion resisting any tendency of lateral movement or de-central rotation of the ring when revolving at high speeds thereby preventing scoring of the rotary parts by contact with the casing or crescent shaped block and consequent rapid wear thereof.

I attain these objects by the mechanism illustrated in the accompanying drawings in which:—

Fig. 1 is a vertical longitudinal section of the improved pump, and

Fig. 2 a transverse section thereof on line 2—2 of Fig. 1.

Fig. 3 is a detail view being a section on line 3—3 of Fig. 4 looking in the direction of the arrow.

Fig. 4 is a partial section on line 3A—3A of Fig. 2 and a full section on line 4—4 of Fig. 3, looking in the direction of the arrow.

Referring to Fig. 1 in the present improved construction the ring *a* instead of being directly open to the main inlet of the pump casing *b* as in the construction of my said United States patent is enclosed on the inlet side by a continuation *c* of the top and bottom circularly curved casing walls *d* within which the ring *a* rotates so that except for the main outlet *f* the ring is enclosed and rotates within a cylindrical wall.

From the main inlet *b* a series of inlet channels *g* are formed in each side cover *h* of the casing and are brought around so as to lead into the interior of the pump on each side of and within the ring, the inlet here being in the form of one large inlet port *l* in the lateral casing wall one on each side of the rotor and these inlet ports are extended along one side of each bush *g*¹ by recessing said bushes.

These recesses *j* are formed in each fixed bearing bush *g*¹ for the rotor and preferably to an extent reaching to the central web *k* of the rotor as shown by dotted lines in Fig. 2 and in full lines in Figs. 3 and 4 so that the inlet ports will besides leading to the sides of the rotor also lead into the spaces under the bottoms of the paddle-like teeth *m* of the rotor formed by said recesses *j* as clearly shown in Figs. 3 and 4. Between the rotor *l* and the ring *a* there is provided the crescent *a*¹ which is stationary.

The main outlet *f* communicates with the periphery of the ring *a* and of the rotor *l* and in addition a port *n* is provided on each side of the main outlet these being connected by symmetrical channels *n*¹ in the side covers of the machine with the lateral faces of the bearing bushes these being recessed on each side of the web of the rotor as at *o* so that each channel is in communication with the bottoms of the teeth *m* of the rotor on each side of and to preferably the full length of the bottoms of the teeth of the rotor on each

side of said web as shown in dotted lines in Fig. 2 and in full lines in Figs. 3 and 4.

To maintain a film of the liquid being pumped between the outer diameter of the ring and the casing, the front edge of each tooth of the ring is bevelled or radiused tangentially as at p , to allow the liquid to be forced over the teeth into small retaining grooves q , which preferably run the entire width of each tooth and partly into the annular members of the ring, as shown at r in Fig. 2. These grooves may be bevelled or radiused tangentially on the leading or both edges of the teeth. Also when liquids containing solid substances are to be pumped the web k at points between each of the teeth may be bevelled on each side as indicated in Fig. 1 at s .

It is to be remarked that with the internal ports arranged as hereinbefore described the ring is automatically balanced against delivery pressure which allows the pump to be run at very high speeds without undue wear and further the provision of the recesses j and o in the bearing bushes allows any particles of hard foreign matter in the liquid being pumped to pass through the pump without injuring or clogging the same.

The pump can be arranged to work horizontally or vertically.

What I claim as my invention and desire to secure by Letters Patent of the United States is:—

1. In a rotary pump of the character described the combination of a shaft, a rotor on said shaft having a hub, a web and teeth carried by said web, a casing having inlet and outlet ports facing said rotor in the axial direction of the pump, a ring cooperating with said rotor, a crescent between the rotor and the ring, and fixed bearing bushes for said shaft having flanges engaging between said hub and said teeth and having arcuate recesses at their rims facing said inlet and outlet ports.

2. A rotor according to claim 1, wherein the arcuate recesses extend into said bushes up to the hub of the rotor.

THOMAS WINTER NICHOLS.