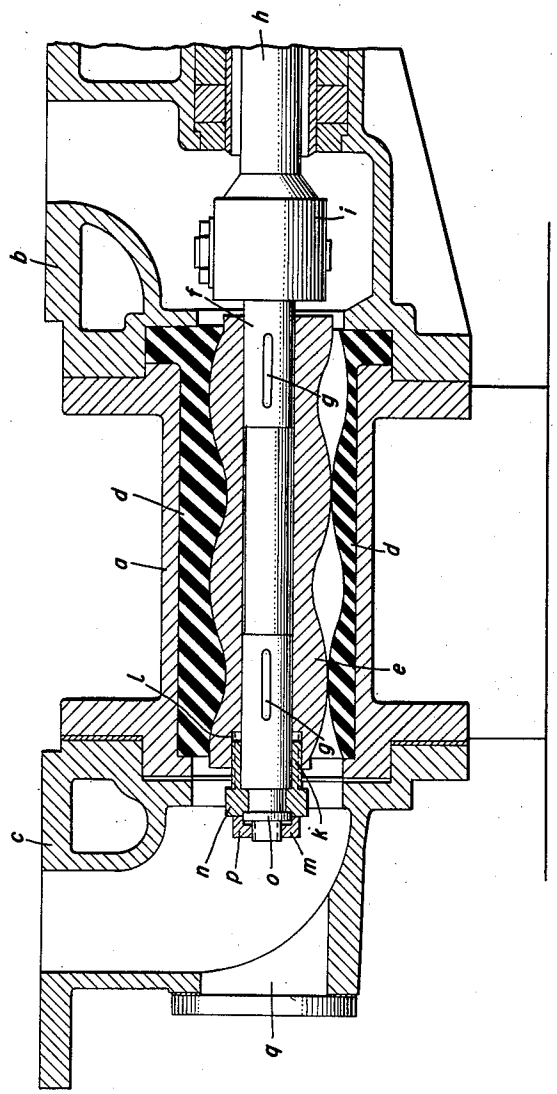
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WORM PUMP

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Fig. 1.



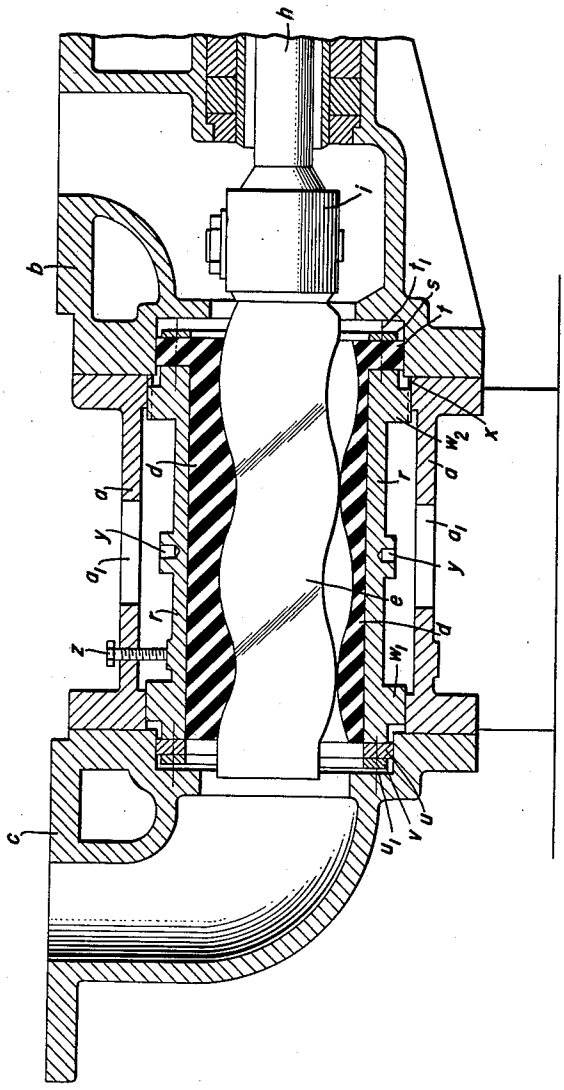
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Fig. 2.



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WORM PUMP

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The invention relates to a worm pump, the stator and rotor of which have a different number of helical threads.

In the known pumps of this type, the support of which is as a rule made from non-metallic, elastic material, such as rubber, whereas the rotor is of very hard metal, generally steel, the two parts, which are both in the form of screws, are of the same diameter from the front to the rear. The imaginary surface contact between the helical threads is therefore cylindrical. The basic theory of the type of pump described is widely known in the prior art and has been specifically disclosed in the United States patents to Moineau Nos. 1,892,217 and 2,028,407.

These pumps are open to several objections. The stator and rotor must be replaced when the wear has reached a certain amount. For this purpose it is necessary to dismantle the pump. The expense incurred for procuring and fitting the new parts is not inconsiderable. During the replacing of the parts, the pump must be taken out of service. In addition, when the pump serves for feeding chemical substances, the rubber stator swells. To take into consideration the possible swelling it is necessary to work with too great tolerances when assembling the pump, with the result that the output factor of the pump is reduced.

In order to overcome these objections, a worm pump of the type described at the outset is proposed according to the invention in which the stator and rotor are conical and at least one of these parts is axially adjustable and fixable for compensating inexact contacting. According to the invention therefore the imaginary surface of contact of the helical threads is conical. By axially displacing the stator and/or the rotor it is thus possible to compensate inaccurate contact, irrespectively of whether this is due to wearing of the parts, swelling of the stator or other causes.

If the idea constituting the subject matter of the invention is realized in such a manner that the rotor is adjustable, this is preferably effected by making the rotor slidable on its driving shaft in relation to the stationary stator with the aid of a screw sleeve which is rotatable on the shaft and cooperates with a counter screw thread on the rotor. This screw sleeve can be accessible through a handhole in the pump housing arranged coaxially to the shaft.

If, on the other hand, the stator is, according to the invention, adjustable, the design is so chosen that the stator is shiftable in the housing on the rotor by means of a screw thread which cooperates with a screw thread in the housing. Thereby it is advisable to form the thread on a sleeve rigidly connected with and surrounding the stator, which sleeve is guided longitudinally shiftable in the housing by means of collars provided at its ends, one of these collars being provided with the adjustment screw thread. The turning of this sleeve together with the stator is preferably effected with the aid of a key pin which can be inserted in a hole in the sleeve through a radial aperture in the housing.

Other advantages and features of the invention will be hereinafter described with reference to the accompanying drawings which illustrate diagrammatically and by way of example two embodiments of the invention.

FIG. 1 is a longitudinal section through a worm pump with axially displaceable rotor, and

FIG. 2 shows, also in longitudinal section, a pump with axially displaceable stator.

In the embodiment illustrated in FIG. 1, the support *d*, made from rubber, is fixed, that is non-rotatable in the pump housing composed of a middle part *a*, a feed bend *b* and a discharge bend *c*. A rotor *e* is rotatable in the support *d*. The two parts are, as shown in the drawing, screw-shaped, positive displacement elements. The support has in known manner one helical thread more than the rotor.

According to the invention, the stator or support and the rotor are tapered to define a frusto-conical contact surface.

The rotor *e* is mounted on a shaft *f* and connected therewith by keys *g*. It is longitudinally shiftable in relation to the shaft *f* which is rotated by a driving shaft *h* through the intermediary of a coupling *i*.

On the delivery end of the shaft *f* a screw sleeve *k* is arranged which sits loosely rotatable on the shaft and cooperates with a counter-thread *l* of the rotor *e*. Its headpiece *m* bears against a shoulder *n* of the shaft *f* and is secured against axial displacement by a washer *o* and nut *p*.

By turning the screw sleeve *m*, *k* the motor can be shifted in a simple manner either to the left or right, according to whether it is a question of compensating wear or swelling of the support. The sleeve is accessible through a handhole *q* in the bend *c*.

In the form of construction illustrated in FIG. 2, the support *d* is surrounded by a sleeve *r* which is rigidly connected to it, for example in that a cover disc *s* and a collar *t* of the support are united by bolts t_1 which screw into the sleeve *r*.

The collar *t* effects the sealing against the housing at the drive end.

At the discharge end a gasket or packing disc *u* placed in front of a cover disc *v* serves the same purpose. The two discs are fixed on the sleeve *r* by bolts u_1. The sleeve *r* is guided in the housing *a* during its longitudinal displacement by means of collars w_1 and w_2. The collar w_2 has a screw thread which cooperates with a screw thread *x* in the housing. Thus the sleeve *r* and with it the support *d* are axially displaced when the sleeve *r* is turned in one direction or the other.

To facilitate this turning, the housing *a* is provided with an aperture a_1 through which a key pin or some other suitable tool can be inserted in a hole *y* in the sleeve *r*.

In order to secure the sleeve *r* and with it the support or stator *d* in the axially adjusted position, a set screw *z* may be provided.

I claim:

1. A worm pump comprising: a housing having an inlet and an outlet therein; a stator slidably positioned in said housing for axial movement relative thereto and having internal helical threads, means between said stator and said housing for blocking rotation therebetween; a rotor positioned within said stator and having external helical threads of different number than said internal threads for coacting with said internal threads to provide a pumping chamber therebetween which progresses along the axis of the rotor upon rotation of the rotor, said stator and rotor threads being tapered from one end of the pump to the other to define a frusto-conical contact surface therebetween, and means accessible through said housing for moving said stator axially of said rotor to adjust the contact pressure between the rotor and stator threads.

2. The combination recited in claim 1 in which said means for moving said stator includes a sleeve rigidly connected to said stator, said sleeve and said housing being provided with coacting screw threads.

3. Worm pump according to claim 2, wherein the sleeve

has a radial hole and the housing an axial aperture opposite said hole for inserting a pin for adjusting the stator.

4. Worm pump according to claim 2, wherein the sleeve is fixable in its adjusted position by means of a setting element in the housing acting on its periphery.

5. Worm pump according to claim 2, wherein packing discs are provided on the ends of the sleeve and slide on guides of the housing.

6. Worm pump according to claim 5, wherein the packing disc at the drive end is formed by a radial collar of the stator and at the discharge end by a packing disc fixed on the end face of the sleeve.

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