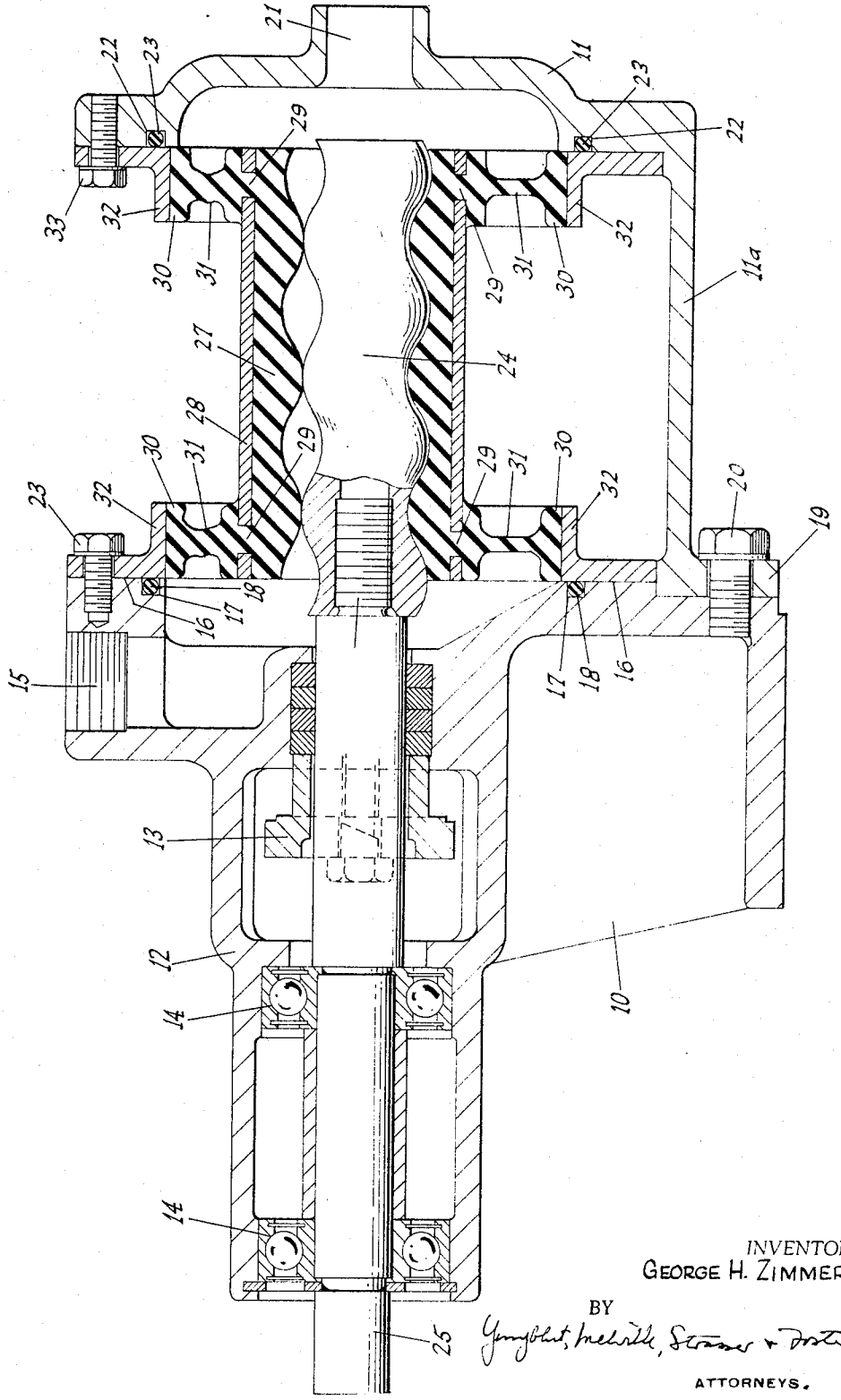
Oct. 25, 1966 G. H. ZIMMER 3,280,753

PUMP WITH ECCENTRIC DRIVEN STATOR

Filed Aug. 13, 1964



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United States Patent Office

3,280,753
Patented Oct. 25, 1966

3,280,753

PUMP WITH ECCENTRIC DRIVEN STATOR

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Filed Aug. 13, 1964, Ser. No. 389,351
2 Claims. (Cl. 103—117)

This invention relates to a pump with an eccentric driven stator and more particularly to a helical gear pump wherein the pumping elements comprise a stator member having internal helical grooves or threads pumpingly coacting with a rotor having a helical external thread, the stator having one more thread than the rotor.

Pumps of the general type above discussed are available on the open market under the trademark Moyno manufactured by applicant's assignee. It is a characteristic of such pumps that the rotor axis and stator axis of any given pump must be offset. Thus if the stator is fixed in its position the rotor when it rotates within the stator will also orbit about the stator axis, and it is then necessary to connect the rotor to its drive shaft by means of a double universal joint.

If the rotor is to rotate on its own axis then the stator must orbit about the rotor.

It will be clear that both of these situations raise problems in that a double universal joint is an expensive item which it would be desirable to eliminate, and with respect to an orbiting stator there is the problem of sealing surfaces.

With the foregoing considerations in mind, it is an object of the present invention to provide a pump of the type described above wherein the rotor rotates on a fixed axis whereby universal joints are eliminated, and to provide a novel mounting and construction for the stator which eliminates the necessity of providing seals for moving end surfaces of the stator.

The foregoing and other objects of the invention which will be described in greater detail hereinafter on which will appear as this specification proceeds, are accomplished by that construction and arrangement of parts of which the following discloses an exemplary embodiment.

The single figure of the drawing shows a pump according to the present invention in longitudinal cross-section.

Briefly in the practice of the invention, the rotor rotates on a fixed axis in bearings provided in the pump casing and a shaft seal or stuffing box of usual or conventional type is provided. The stator may be of rigid material or it may be of flexible resilient material within a rigid sleeve, and it is provided adjacent its two ends with a flexible resilient annular flange secured to corresponding flanges in the pump casing. By this mounting the stator is capable of orbiting without rotation.

Referring now in more detail to the drawing, the pump casing may comprise two parts indicated generally at **10** and **11**. The part **10** is provided with the longitudinally extending portion **12** within which a shaft seal **13** of any desired type is provided, and also bearings **14** for the pump shaft. These structures may be in all respect conventional and need not be described further. The casing portion **10** will provide a discharge port **15** and will have an annular flange **16**. It will also be provided with an annular groove **17** within which an O-ring **18** is seated. The casing portion **11** will have a fastening flange **19** by means of which it may be secured to the casing portion

10 with the use of the bolts **20**. The flange **19** may only extend partially around the circumference and the casing portion **11***a* likewise may extend only partially around the circumference. Axially of the structure the casing portion **11** is provided with the suction port **21** and it will also have an annular groove **22** within which is seated an O-ring **23**.

The pump rotor **24** is secured to the pump shaft **25** as by the threaded engagement indicated at **26**. From the foregoing it will be clear that the shaft **25** runs on its own center and the rotor **24** thus also rotates on its own center. The shaft seal **13** prevents fluid passing from the pump or from getting into the bearing **14**.

The stator in the preferred embodiment is of flexible resilient material such as rubber or rubber-like material and is indicated at **27**. While the stator may be of rigid material, for most applications a resilient stator is preferable, and therefore the stator **27** may be enclosed within a rigid sleeve **28**. The rigid sleeve **28** is provided with a circumferential series of perforations **29** adjacent each end so that during the molding operation the rubber or rubber-like material of the stator **27** may pass through the perforations **29** and be formed into the flanges **30** having the reduced cross-section web portion **31**. The flanges **30** are suitably bonded to the flanges **32** which are then secured to the casing portion **10** by means of bolts **33** and the O-rings **18** and **23** seal the flanges **32** against the casing portions **10** and **11** respectively.

In the position of the figure, the stator is at the uppermost point in its orbit and it will be seen that the webs **31** are thickened at the top and attenuated at the bottom. As the stator arrives at the bottom of its orbit, the webs **31** at the top will be attenuated and at the bottom will be compressed so that the stator structure is free to orbit in a cylinder which is enforced upon it by rotation of the rotor about its own fixed axis.

It will be observed that with the structure shown it is unnecessary to provide for the sealing of moving surfaces and that the O-rings **18** and **23** simply seal fixed surfaces. Since the rotor rotates on its own axis no universal joints are required so that the pump of this invention is substantially simplified.

It will be understood that if the stator is entirely of rigid material, the flexible flanges **30** may simply be bonded to the outside of the stator at its two ends and the same result will be achieved.

Modifications may be made in this invention without departing from the spirit of it.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A helical gear pump comprising a stator constituted of an elongated cylindrical member of resilient flexible material having internal helical grooves, said stator being encased in a rigid sleeve and having at each end a radially extending mounting flange of resilient flexible material, said rigid sleeve is provided adjacent each end with a circumferential series of perforations, said stator and mounting flanges being integrally connected through said perforations, a casing for said pump having an inlet and an outlet port, and spaced annular flanges to which said mounting flanges are secured, said casing also having a bearing structure, a helical rotor having external threads in pumping engagement with the helical grooves of said stator, a shaft secured to said rotor and rotatably mounted

in said bearing, said casing also having sealing means for said shaft between said bearing and said rotor, whereby when pumping, said rotor rotates on a fixed axis and said stator orbits in a cylindrical path by virtue of said flexible mounting flanges.

2. A pump according to claim 1, wherein the flexible mounting flanges of said stator are bonded respectively to annular metallic flanges, and said casing is provided with spaced annular mounting surfaces, said metallic flanges being secured respectively to said mounting surfaces with annular sealing means therebetween.

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