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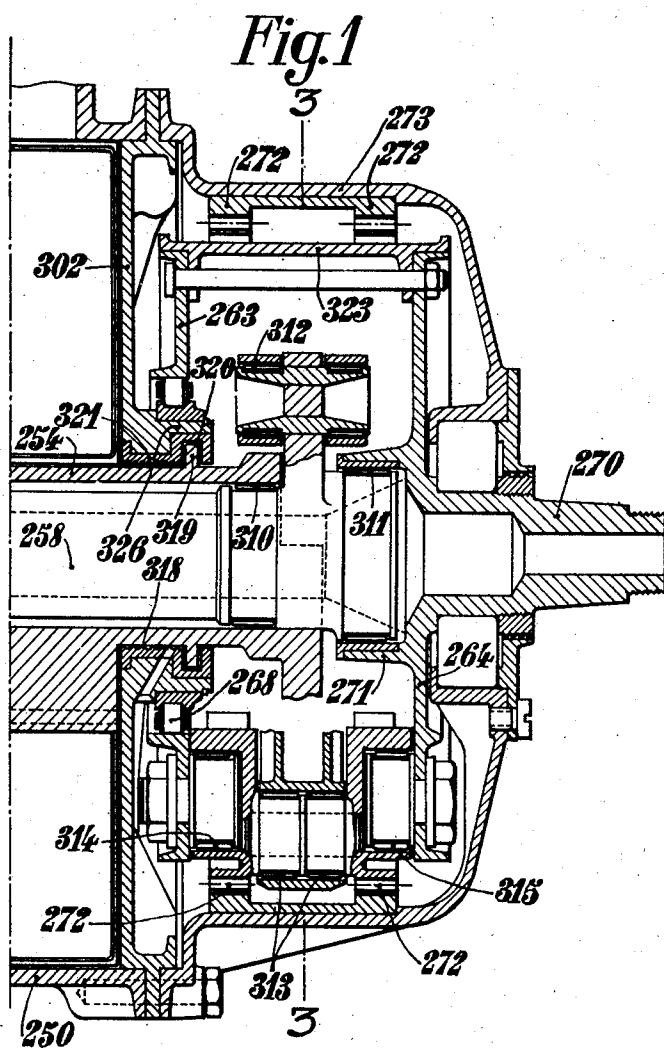
P. ZENS

1,889,508

PUMP OR COMPRESSOR

Filed June 18, 1930

4 Sheets-Sheet 1



P. Zens
INVENTOR

By: Marks & Chase
Attys.

Nov. 29, 1932.

P. ZENS

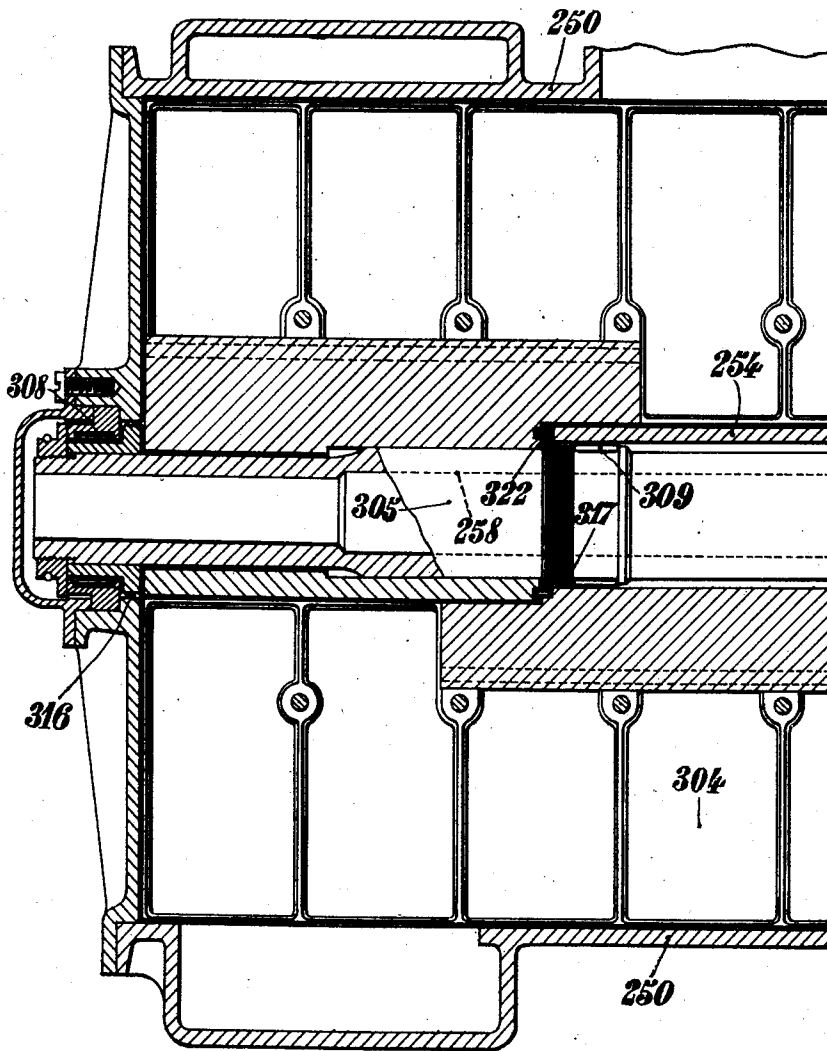
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Fig. 1^a



P. ZENS
INVENTOR

By: *Marb & Clem*
Attys.

Nov. 29, 1932.

P. ZENS

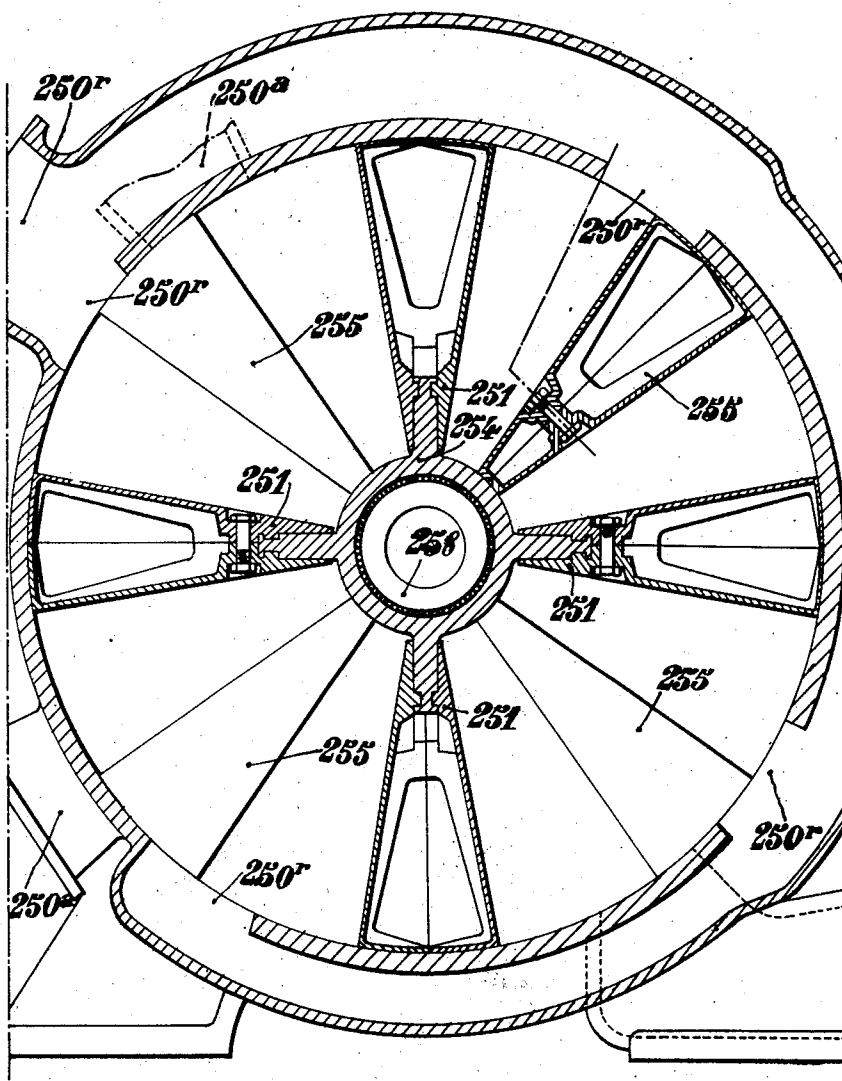
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Fig. 2



P. Zens
INVENTOR

By: *Marks & Clark*
ATTYS.

Nov. 29, 1932.

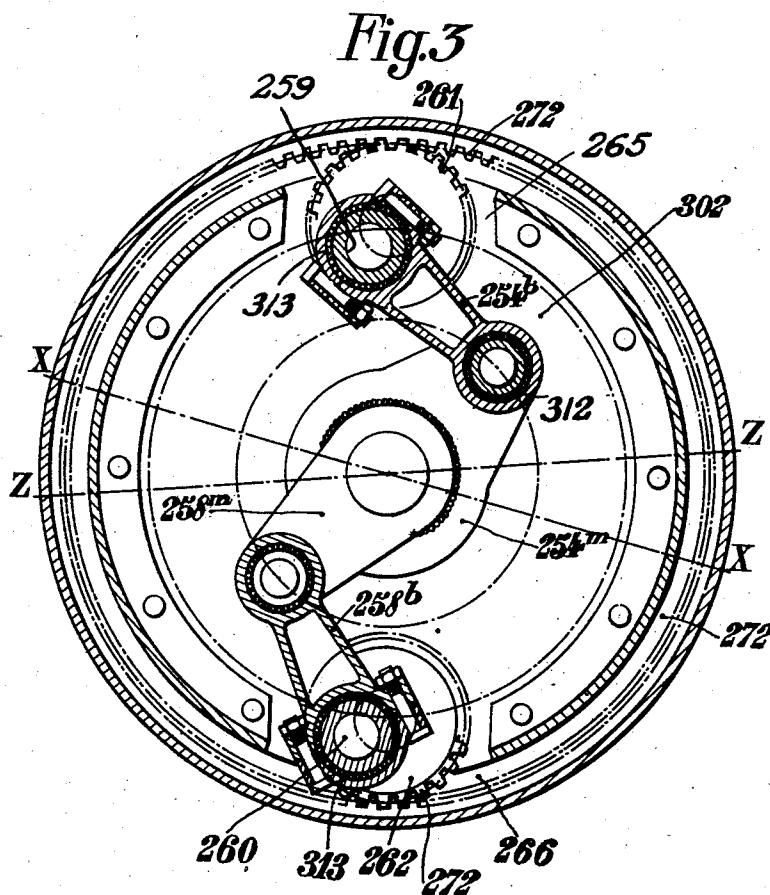
P. ZENS

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PUMP OR COMPRESSOR

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4 Sheets-Sheet 4



P. Zens
INVENTOR

By: Marks & Clerk
ATTY

UNITED STATES PATENT OFFICE

PIERRE ZENS, OF PARIS, FRANCE

PUMP OR COMPRESSOR

Application filed June 18, 1930, Serial No. 462,095, and in France June 28, 1929.

The present invention has for object a constant feed pump substantially consisting in combining, in one and the same structure a pump casing the general external shape of which is that of a solid generated by any surface rotating about an axis, pistons or blades angularly movable in the pump casing about the said axis, and means for displacing these pistons in the pump casing and for causing the relative speed of each piston to periodically vary relatively to the adjacent pistons, so that the volumes of the various chambers formed by the pump casing and the said pistons periodically vary and allow the suction and delivery of the fluid in combination with ports accessorially provided with control means.

In the accompanying drawings wherein an approved embodiment of the invention is illustrated:

Figs. 1 and 1a taken together present a longitudinal sectional view through a pump or compressor constructed in accordance with the invention.

Fig. 2 is a transverse section through the pump showing the construction and arrangement of the blades.

Fig. 3 is a transverse section on the line 3—3 of Fig. 1.

Referring to the drawings in detail, a casing or cylinder 250 is provided with suction ports 250^a and delivery ports 250^b which are suitably located. The blades (eight in number in the example illustrated) are rigid, the blades 251 with the shaft 254, and the blades 255, with the shaft 258 co-axial with the shaft 254. Cranks 254^m and 258^m, rigid with the shafts 254 and 258 respectively, are controlled, through the medium of links 254^b and 258^b, by eccentrics 259 and 260 carried by toothed wheels 261 and 262. The said wheels are journaled, through the medium of special roller bearings, in cheeks 263 and 264 connected by a cylindrical part 323 provided with cut away parts 265 and 266 for the passage of the gears 261 and 262. The cheeks are centered relatively to the general axis of the compressor. The cheek 263 is journaled, through the medium of roller bearings 268, and the cheek 264 is axially ex-

tended, on the one hand, to form a shaft 270 coupled to a driving shaft (not shown) and, on the other hand, by a centering ring 271. The toothed wheels 261 and 262 mesh with a fixed double internally toothed crown 272. This crown is rigidly secured to a casing 273 in which it is centered.

The operation of the compressor above described is the following:

The shaft 270 during rotation, turns the cheeks 263—264 and the toothed wheels 261 and 262 meshing with the fixed crown 272, are rotated so that these toothed wheels also rotate about their axes. This rotation determines the displacement of the eccentrics and, consequently, the relative displacement of the shafts 254 and 258 as well as of the blades carried by the latter. The links always operate in the region of the maximum moment relatively to the axis of rotation of the blades.

The latter are so operated that the suction and delivery ports are never in communication and that the relative movements of the blades effect the desired suction and delivery.

Moreover, it will be noted that the shaft 258 can be provided with an axial bore constituting a housing for the crank shaft which might directly engage the shaft 270—271, or reversely, the latter can be extended within the shaft 258 and can be started by means of a crank or of a suitable driving device.

The shaft 258 is journaled at 308 in the casing 250, and 309 and 310 in the opposite ends of the hollow shaft 254 and at 311 in the cheek 264. Friction reducing bearings 312 and 313 are also provided at the ends of the links 254^b and 258^b while additional friction reducing bearings 314 and 315 are provided between the gears 261 and 262, on the one hand, and the cheek plates 263 and 264, on the other hand. Suitable packings 316, 317 and 318 are also provided for preventing leakage of fluid.

The outer shaft 254 has a flange 319 extending in a corresponding groove 320 formed in a member 321 rigidly secured on the cheek 302 which can be made in two parts. This arrangement avoids any axial displacement

of the shaft 254, the shaft 258 being abutted in a similar manner at its other end.

It will be moreover noted, in accordance with one of the important points of the invention, that the links of the epicyclic system are not overhanging in this latter form of construction and are provided with balancing masses, furthermore, the fixed and internally toothed gear 272 has two toothed crowns, which can be of any suitable type in order to eliminate axial stresses.

In the form of construction illustrated, the movable casing, carrying a part of the epicyclic device, is directly centered on an annular part 326 rigid with the cheek 302.

What I claim as my invention and desire to secure by Letters Patent is:

1. In a compressor or pump comprising a cylindrical body provided with suction and delivery ports, shafts coaxial with the cylindrical bodies for receiving radial blades and which have at their ends cranks and means for entraining the said cranks and consequently the coaxial shafts and the blades in rotation with a variable movement for varying the volume of the chambers limited by the said cylindrical body and the said blades for effecting the desired suction and delivery, the combination of links designed as a fork at one of their ends for engaging on the said cranks so as to prevent the overhanging of the link axles, eccentric journals or crank pins for constituting link axles for the other ends of the said links, externally toothed wheel strengthened by cheeks through the said eccentric journals or crank pins, a movable casing or support bearing the said externally toothed wheels, the said movable casing being united with the driving shaft of a fixed and internally toothed crown for engaging with the said cheeked externally toothed wheels so that the said latter wheels are entrained in gyration by the said casing and in rotation by the said internally toothed double crown.

2. In a compressor or pump comprising a cylindrical body provided with suction and delivery ports, shafts coaxial with the cylindrical bodies for receiving radial blades and which have at their ends cranks and means for entraining the said cranks and consequently the coaxial shafts and the blades in rotation with a variable movement for varying the volume of the chambers limited by the said cylindrical body and the said blades for effecting the desired suction and delivery, the combination of links designed as a fork at one of their ends for engaging on the said cranks so as to prevent the overhanging of the link axles, eccentric journals or crank pins for constituting link axles for the other ends of the said links, externally toothed wheels strengthened by cheeks through the said eccentric journals or crank pins, the said externally toothed wheels strengthened by

cheeks being provided on their external faces with grooves for constituting bearings for axles, a movable casing or support bearing the said link axles and united with the driving shaft, a fixed and internally toothed double crown for engaging with the said externally toothed wheels strengthened by cheeks so that the said latter wheels are entrained in gyration by the said casing and in rotation by the said internally toothed double crown.

3. In a compressor or pump comprising a cylindrical body provided with suction and delivery ports, shafts coaxial with the cylindrical body for receiving radial blades and which have at their ends cranks and means for entraining the said cranks and consequently the coaxial shafts and the blades in rotation with a variable movement for varying the volume of the chambers limited by the said cylindrical body and the said blades for effecting the desired suction and delivery, the combination of links designed as a fork at one of their ends for engaging on the said cranks so as to prevent the overhanging of the link axles, eccentric journals or crank pins for constituting link axles for the other ends of the said links, externally toothed wheels strengthened by cheeks through the said eccentric journals or crank pins, the said externally toothed wheels strengthened by cheeks being provided on their external faces with grooves for constituting bearings for axles, a movable casing or support bearing the said link axles and united with the driving shaft, a fixed and internally double crown for engaging with the said externally toothed wheels strengthened by cheeks so that the said latter wheels are entrained in gyration by the said casing and in rotation by the said internally toothed double crown, the said driving shaft coaxial with the said coaxial shafts and bearing the hollow blades at one of its ends for forming a bearing for the end of the internal coaxial shaft bearing a series of blades.

4. In a compressor or pump comprising a cylindrical body provided with suction and delivery ports, shafts coaxial with the cylindrical bodies for receiving radial blades and which have at their ends cranks and means for entraining the said cranks and consequently the coaxial shafts and the blades in rotation with a variable movement for varying the volume of the chambers limited by the said cylindrical body and the said blades for effecting the desired suction and delivery, the combination of links designed as a fork at one of their ends for engaging on the said cranks so as to prevent the overhanging of the link axles, eccentric journals or crank pins for constituting link axles for the other ends of the said links, externally toothed wheels strengthened by cheeks through the said eccentric journals or crank pins, the said externally

toothed wheels strengthened by cheeks being provided on their external faces with grooves for constituting bearings for axles, first and second circular cheeks for bearing the said latter axles, the said first cheek being united with the driving shaft, a cylindrical portion forming a stay for the two cheeks and being grooved for the passage of the teeth of the said externally toothed gears strengthened by cheeks, the said second cheek being journalled on a lateral extension of the said pump body and the said driving shaft coaxial with the said coaxial shafts bearing the hollow blades at one of its ends for forming a bearing for the end of the internal coaxial shaft bearing a series of blades.

In testimony whereof I have signed this specification.

PIERRE ZENS.