May 26, 1942. B. T. FITZPATRICK 2,284,139

ROTARY POWER UNIT INCLUDING MEANS AND METHOD FOR CONTROLLING SAME

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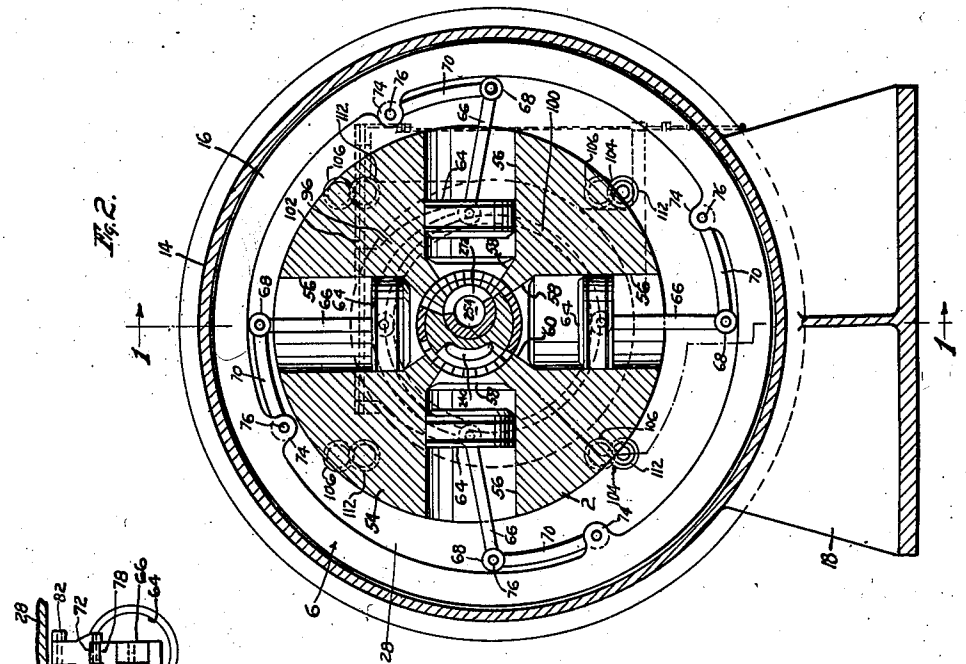


Fig. 2.

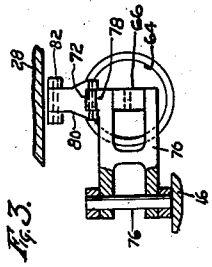


Fig. 3.

Fig. 1.

INVENTOR.

Bernhardt T. Fitzpatrick

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Fig. 4.

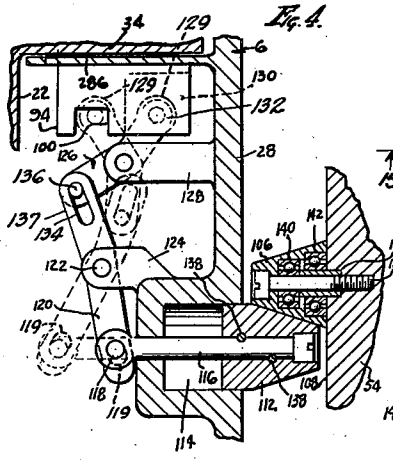


Fig. 14.

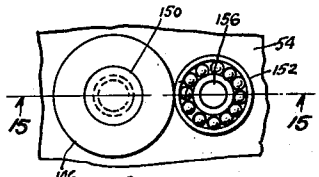


Fig. 15.

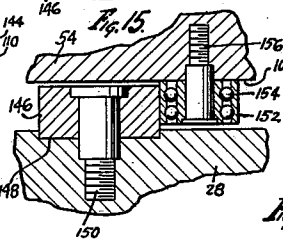


Fig. 8.

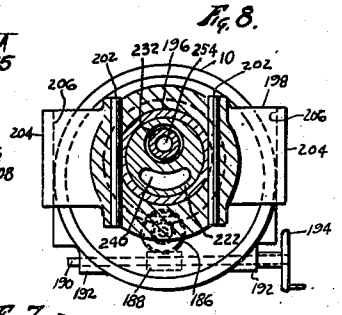


Fig. 7.

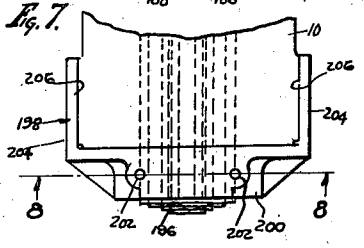


Fig. 5.

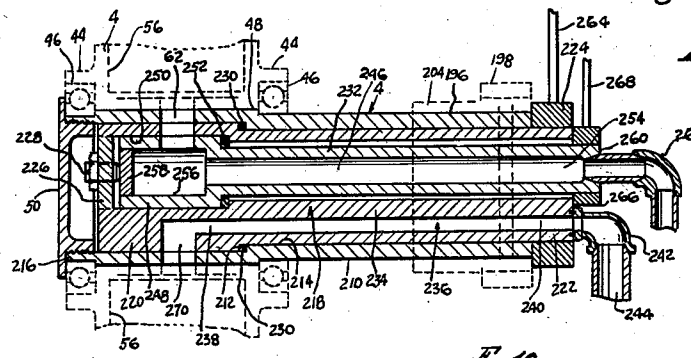


Fig. 6.

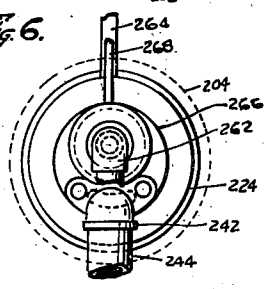


Fig. 11.

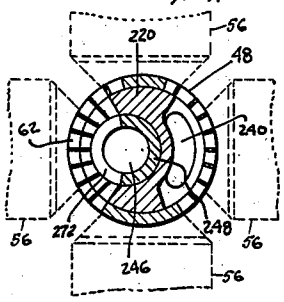


Fig. 10.

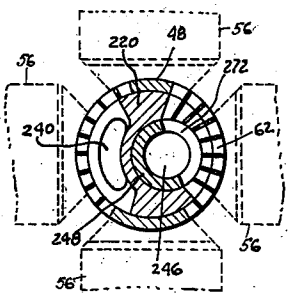
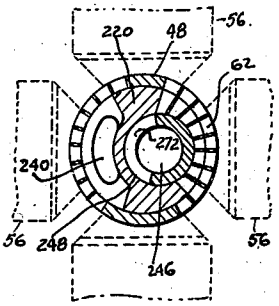


Fig. 9.



INVENTOR
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Fig. 13.

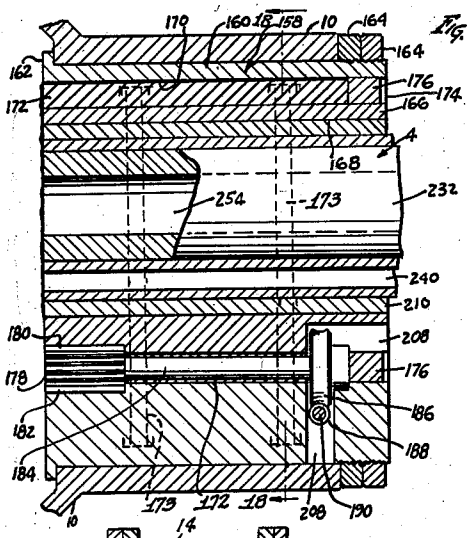


Fig. 12.

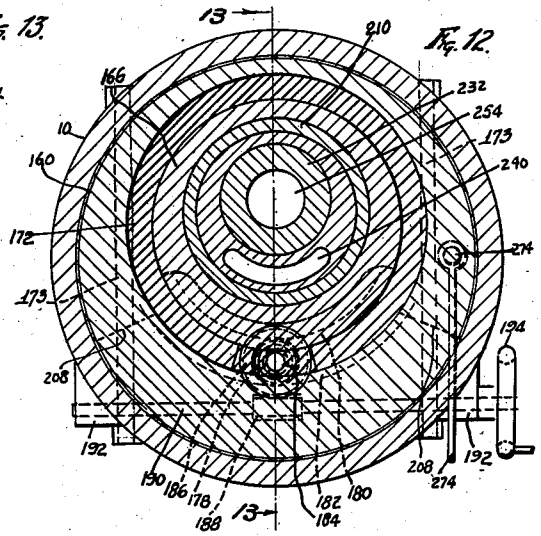


Fig. 16.

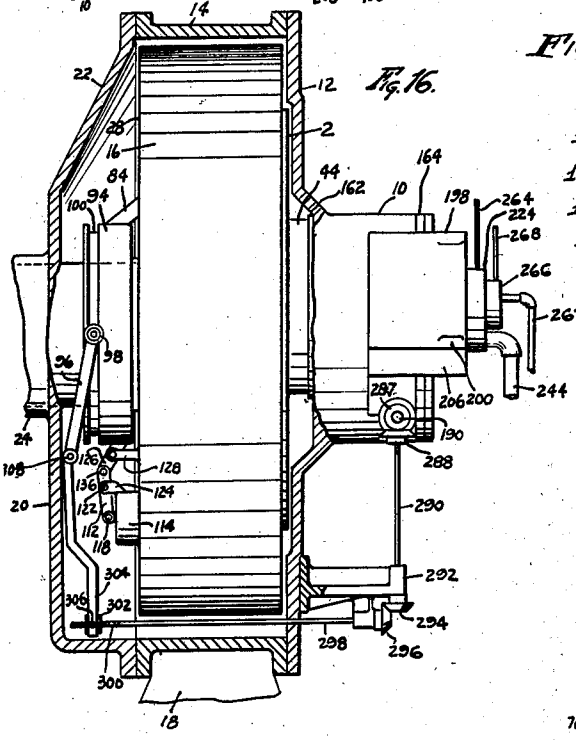


Fig. 18.

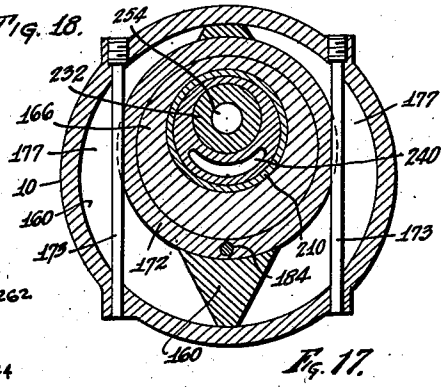
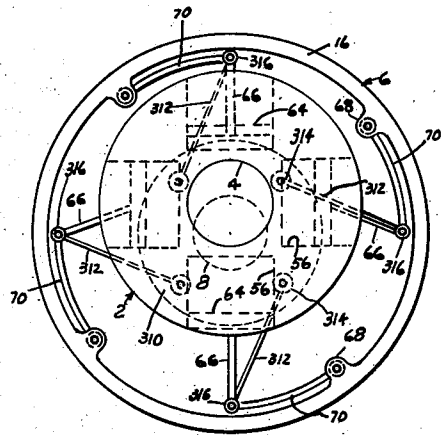


Fig. 17.



Inventor
Bernhardt T. Fitzpatrick

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2,284,139

UNITED STATES PATENT OFFICE

2,284,139

ROTARY POWER UNIT INCLUDING MEANS AND METHOD FOR CONTROLLING SAME

Bernhardt T. Fitzpatrick, Long Beach, Calif.

Application November 21, 1938, Serial No. 241,650

5 Claims. (Cl. 121—60)

My invention relates to power engines, compressors and pumps and more particularly to the special and novel construction of the piston stroke controlling apparatus including the means for adjusting said piston stroke during the operation of the engine.

Manifestly, an object of my invention is to provide a power unit which comprises a rotary type principle and which is adapted for the uses of expansible fluid mediums, such as steam or hydro-carbons, or which may be readily adapted for uses as a fluid pump or compressor without resorting to any alteration of its essential parts and its control units, also, which may be adapted for controlling the fluid flow therethrough and which, when in operation, may be so arranged that the fluid flow may be diminished or increased and thereby decreasing or increasing the horse-power of the unit and co-relatively controlling the fluid consumption.

Accordingly an object of my invention is to provide said power unit with suitable rotor means which is adapted for housing a plurality of cylinders therein, said cylinders being centripetally arranged in said rotor means, each of which is provided with a piston member and each of said pistons having a suitable connecting rod which extends outwardly therefrom, the end of which connects with a suitable link member at one end while its other end is connected to an offset eyelet which is disposed at the inner side of the fly-wheel member of the apparatus, so that during the operation of said unit the dead center of said rotor means is entirely eliminated.

Another object of my invention is to provide said unit with suitable stroke adjusting means, adapted for simultaneously controlling and adjusting the piston stroke of said unit during its revolution.

Another object of my invention is to provide a suitably arranged pair of bearing means, one of which is stationary wherein the fly-wheel shaft is mounted, while the other is adjustably arranged and adapted for holding the cylinder rotor of said unit in place and during the operation of said unit.

Further object of my invention is to provide the fly-wheel of said unit with a plurality of hingedly adjustable piston means, which extend inwardly, each having a piston head attached thereto and positioned within its respective cylinder of the rotor and which, in combination, are adapted for inter-connecting and for holding said fly-wheel and said rotor in correct relative positions and in addition for controlling and regulating the piston position within the cylinders of said rotor and during the operation of the unit.

Another object of my invention is to provide said fly-wheel and the rotor of said unit with a set or a plurality of sets of contact rollers, which are arranged in pairs and which are for the purpose to control the relative planetary movement of said rotor, whether in a fixed or adjustable position, by means of which the relative position of said fly-wheel and said rotor is held and controlled during the revolution of said fly-wheel and during the operation of said unit.

Another object of my invention is to provide said rotor of said unit with a suitable shaft member which is adapted for holding said rotor in place and in addition said shaft member having suitable adjusting means for adjusting and controlling the rotor position co-relatively to the piston stroke adjusting means of said unit, so that a variable stroke may be had at a constant speed during the revolution and operation thereof.

Another object of my invention is to provide said rotor shaft with a suitable fluid admitting and fluid exhaust means adapted for controlling the fluid passage into and from the cylinders of the rotor and during the operation of the unit.

Another object of my invention is to provide the inlet and exhaust port means with suitable control levers which are adapted for controlling the fluid flow therethrough and in addition to control the reverse movement and rotation of the rotor and during the operation of the unit.

A further object of my invention is to provide said unit with suitable means which are for interconnecting the rotor shaft adjusting means with the piston stroke regulating means which are associated with said fly-wheel, so that a complete cooperation and at all times a positive interconnection of the unit controlling and the power delivery members may be had while the power unit is operating under stress or a load or during its idling movement and in addition, providing means for adjusting the power stroke of the pistons for the required load and re-adjusting it for lesser loads during the operation of said unit.

Further objects and advantages of my invention as will hereinafter more fully appear, I attain by the construction herein shown on the drawings and described in the specification forming a part of my application.

Reference is had to the accompanying draw-

ings in which the similar reference characters denote the similar parts.

In the drawings:

Fig. 1 is the vertical cross-sectional view of my invention taken substantially on the line 1—1 of the Fig. 2.

Fig. 2 is the vertical cross-sectional view of my invention taken on the line 2—2 of the Fig. 1.

Fig. 3 shows the top elevational view of the controlling lever showing a partly cross-sectional view of the lever bearing, taken from the top of the Fig. 2.

Fig. 4 shows an enlarged cross-sectional view of contact rollers and the controlling means associated therewith, taken from Fig. 1.

Fig. 5 shows the transverse cross-sectional view of the rotor shaft, showing the position of the fluid controlling means and the fluid inlet and exhaust passages.

Fig. 6 is the end elevational view of the shaft member, taken from the Fig. 5.

Fig. 7 is the fragmentary top view of the shaft showing the stabilizer in position.

Fig. 8 is the elevational and cross-sectional view of the stabilizer, taken on the line 8—8 of the Fig. 7.

Fig. 9 is the cross-sectional view of the fluid control shaft showing the inlet and exhaust ports in stop position and in relation to the cylinders in the rotor.

Fig. 10 is the cross-sectional view of the fluid control shaft showing the inlet and exhaust ports in position and adapted for the forward, clock-wise rotation of the cylinders.

Fig. 11 is the cross-sectional view of the fluid control shaft showing the inlet and the exhaust ports in position and in relation to the cylinders in the rotor and adapted for the reverse, anti-clockwise rotation of said cylinders.

Fig. 12 is the transverse cross-sectional view of the rotor shaft adjusting means, taken on the line 12—12 of the Fig. 1.

Fig. 13 is the fragmentary vertical cross-sectional view of the rotor shaft, taken on the line 13—13 of the Fig. 12.

Fig. 14 shows the front elevational view of the contact rollers, in modified form.

Fig. 15 shows the transverse cross-sectional view of the contact rollers, taken on the line 15—15 of the Fig. 14.

Fig. 16 shows the fragmentary cross-sectional view of the engine unit, showing the position of the speed controls, in modified form.

Fig. 17 shows the variable stroke control for the pistons in the rotor of the engine, shown in modified form.

Fig. 18 is the vertical cross-sectional view of the rotor shaft, showing the stabilizing pins in place, taken on the line 18—18 of the Fig. 13.

Describing my invention more in detail, said invention comprises a rotor, generally designated by numeral 2 which is rotatably mounted upon a rotor shaft 4, also, having a fly-wheel 6 which is mounted upon the fly wheel shaft 8.

Said rotor 2 with said rotor shaft 4 is mounted within the bearing housing 10 of the front housing cover member 12 to which the center housing 14 is attached and which is adapted for encompassing the rim 16 of said fly-wheel 6, while its side section is provided with a suitable extension bracket member 18 adapted for fastening same in position.

The rear section of said center housing 14 is provided with the rear housing cover member 20, its center being provided with a central outward extension 22, while the center is provided with a bearing member 24 extending in its preferred position inwardly and outwardly, as shown, which is adapted for mounting in place said fly-wheel shaft member 8.

Said shaft member 8 is provided at one end with a suitable flange 26 to which the fly-wheel web 28 is fastened in any suitable manner most adaptable in practice, while the opposite end 30 of said shaft 8 is provided with a suitable shaft coupling 32, as shown.

In order to provide uniform stability of said shaft 8, the bearing member 24 at the inward extension 34, is provided with suitable frictionless bearing member 36, while the outward extension bearing section 38 is equipped with a frictionless bearing member 40 held in place by means of a suitable bearing cap 42 by reason of which said shaft 8 will revolve freely without any of the side or radial thrust and under constant or variable load, about its center axis.

The rotor 2 is also provided with suitable bearing retaining flanges 44 positioned one at each side, which are for the purpose to hold suitable frictionless bearings 46 is place; said bearings 46 being mounted against the shaft shoulder section 48, of which, one end bearing is held in place by means of the shaft end flange cap 50 while the other bearing is held in place by means of the upper section of the retaining flange, the purpose and operation of which will be presently described.

The center bore 52 of said rotor 2, is revolubly mounted upon the shoulder section 48 of said shaft 4, for allowing its revolving movement thereabout without undue surface friction, supported therein by means of the bearings 46, and, the rotor body section 54 is provided with a plurality of cylinders 56 which are centripetally positioned in respect to the rotor center, as shown in Fig. 2, having the cylinder head section 58 in close proximity to said shaft shoulder section 48 and terminating with an opening or a passage 60, of which, the side section commensurates the width of the fluid passage 62 of the said shaft 4, while the face section thereof is tapered toward the center, as shown in Fig. 2.

Said cylinders 56 are provided with suitable pistons 64, each having a connecting rod member 66 which is hingedly connected to the piston and having the outer end 68 hingedly connected to the cross link member 70, thus allowing said cross link member 70 to extend transversely and inside of the fly-wheel rim 16 where it is hingedly attached to a suitable eyelet 74 by means of a hinge pin 76, see Figs. 2 and 3.

Said cross link member 70 is provided with an eyelet 78 extending transversely to the link center axis, to which the link extension 80 is connected, see Fig. 1, having its extended end 82 hingedly connected to one end of the pivot bar member 84 which is pivotally mounted as at 86, while the extending end thereof is provided with the piston stroke controlling slot 88 held in place by means of a suitable pin member 90 and mounted within the recess 92 of the stroke controlling collar member 94, the position of which is controlled by means of a suitable yoke member 96 having one end thereof provided with suitable roller members 98 adapted to engage the collar groove 100 while its other end is pivotally connected, as at 102, to the outward extension housing 22 and therein controlled by

the control lever 103, see Fig. 1, the operation of which will be presently described.

In order to provide a positive cooperative relationship between the fly-wheel 6 and the rotor 2 during their revolution, suitable contact rollers, generally designated by numeral 104 are provided, see Figs. 1, 2, 4, 14 and 15, of which the roller 106 is revolubly mounted upon the rotor exterior surface 108 and held in place by means of a stud member 110, while the other roller 112 is stationary at a set point however it is slideably mounted within the roller socket 114 and held therein by means of the roller control stud 116, having the extending end provided with an eyelet 118, as shown in Figs. 1 and 4.

In order to control the relative position of the rotor 2 in respect to the adjustable stroke, as in practice may be most desirable, said rollers 106 and 112 respectively, are provided with suitable conical body structures and to identical diametrical pitch, notwithstanding, that when the piston stroke is fixed at any desired stroke movement and to a positive rotor eccentricity, said rollers need not be conical and consequently diametrically cylindrical rollers of suitable diameter will suffice, see Figs. 14 and 15, however, for the purpose of control of said conical rollers, a suitable linkage is provided therein, comprising a pair of cross links of which, the link 120 is pivotally engaged as at 122 to the bracket member 124 having one end hingedly connected to the eyelet 118 of the control stud 116 and also provided with an elongated slot 119 for eliminating possible binding, while the other link 126 is pivotally mounted upon a bracket member 128, having the end 129 engaging the recess 130 and held therein in place by means of a suitable pin 132 to the control collar member 94, while the free end of said link 120 is provided with a slot 134 and adapted for slidably engaging the pin member 136 disposed at the free end 137 of said link 126, as shown in Fig. 4.

In order to prevent said roller 112 from rotating a suitable cross pin or a number of them as at 138, are provided for holding said roller in place and further, to allow said roller 106 to rotate freely about its center, its internal section is provided with a pair of frictionless bearings 140 and 142 respectively, of which, one is mounted upon the stud member 110 while the other is mounted upon the bushing member 144 having its end set firmly within the body section 54 and supported in place by means of said stud member 110, as shown in Fig. 4.

It may be noted, that as previously mentioned, said rollers 106 and 112 may, in construction, be diametrically cylindrical, see Figs. 14 and 15 and therefore said fly-wheel web 28 is provided with a roller 146 of required diameter and commensurating to the piston stroke, said roller 146 being positioned within a suitable recess 148 and held in place by means of the stud member 150, while the roller 152 is provided with frictionless bearing 154 and revolubly mounted upon a suitable stud member 156 which is secured to the exterior surface 108 of said body section 54 of said rotor 2.

In order to change the position of the rotor center, or provide an adjustable movement to the rotor 2, said rotor shaft 4 is mounted within a pair of eccentrical bushings, generally designated by numeral 158, comprising an outside eccentric member 160, of which one end is provided with a suitable flange 162 adapted for abutting the interior surface of the bearing housing 10 and also for holding the bearing member 46 in place, while the other end protrudes therethrough and is held in place by means of a pair of lock nuts 164, see Figs. 12 and 13.

Internally within said eccentric member 160 an eccentric bushing 166 is positioned having an off-center bore 168 wherein the rotor shaft 4 is held, and, in order to provide a reasonably free sliding movement of said eccentric bushing 166 within the bore 170, the outside section of said eccentric member 160 is provided with a suitable stabilizing bushing 172 and is held in place by means of suitable stabilizing studs 173, which are screwed into the suitable boss of the bearing 10 having the end 174 enclosed with a retaining ring member 176 in Figs. 12, 13, and 18, respectively as shown.

In order to allow a free rotative movement of the outside eccentric member 160, which may be in either direction as may be required to control the center position of the rotor shaft 4, said eccentric member 160, at the adjacent sections of said stabilizing studs 173 is provided with suitable recesses 177, see Fig. 18, thus allowing the stabilizing bushing 172 to traverse downwardly or upwardly upon the center line, while the eccentric bushing 166 turning in opposite direction will maintain the center for the said rotor shaft 4.

In the bottom section of the bushing member 172 preferably at the structurally heaviest section of said eccentric member 160 is mounted a pinion shaft having a suitable pinion gear 178 the teeth of which are adapted to engage and inter-mesh with the corresponding gear teeth 180 upon the outer surface of the eccentric bushing 166 and also at the interior surface of the bore 170 of said eccentric bushing member 160 previously mentioned, wherein suitable cut gear teeth 182 are provided. Said pinion gear 178 provided with a pinion shaft 184 at one end, having a suitable worm gear 186 at the other end attached thereto and which is rendered operative by means of a worm member 188 mounted upon a suitable worm shaft 190 the ends of which are mounted within the bearing members 192, and at the one end thereof having a suitable control wheel 194, connected thereto, as shown.

It may be noted, that the gear teeth 180 and 182, are cut in radial proportion corresponding to the eccentrical movement of the eccentric member 160 and the eccentric bushing 166, so that, in engagement, the pinion gear 178 turns said eccentrics in opposite directions, thus causing the respective centers to follow a straight vertical line and therefore allowing the rotor shaft 4 to change its center position accordingly, further, in order to prevent said rotor shaft 4 from rotating, which may be caused by the frictional resistance imposed thereupon by the rotor center bore 52, the extending shaft end 196 is held in a fixed position by means of the stabilizer member 198 which comprises a collar member 200 encompassing said shaft end 196 having a pair of stabilizing pins 202 provided therein, for holding it in position, also, having a pair of side guiding plates 204 which are positioned one at each side of said bearing housing 10 which engage the bearing surface section 206, as shown and thus allow said rotor shaft 4 to change its central position in with the rotor 2 without possibility of sideward twist or torque which may be imposed thereunto by the action of said rotor 2 during its revolution.

It may also be noted, that in order to provide

free movement of the outside eccentric member 160, the body section within the immediate proximity to said worm gear 186 and the worm shaft member 190 is provided with a suitable cut out section 208, permitting said eccentric member 160 to revolve freely in any direction as may be allowed to secure proper position of the center, as in practice may be most desirable.

Said shaft 4, as shown in Fig. 5, comprises a shell member 210 which is provided with a recess 212 at its inside section, having its bore 214 diametrically smaller as shown, and having its outside diameter correspondingly engaging the bore 168, as previously described, including said pair of shoulder sections 48 against which the bearings 46 are set at the rotor end 216 and provided with suitable enclosing cap 50, see Figs. 1 and 5.

Within said bore 214 and the recess 212 is placed a fluid passage control member 218, which is concentric in its structure and which comprises a rotor end 220 adapted to slidably engage said recess 212, while the control end 222 is positioned within said bore 214 of the shaft 4, also having its end provided with a suitable locking collar 224, while the rotor end 220 is enclosed with a suitable plug member 226 having an adjusting screw 228 and at the recess section 212 having a suitable packing or gasket member 230 provided therein for preventing the fluid passage or leakage therethrough.

Said control member 218 is provided with the fluid inlet passage 232, which is positioned at a suitable eccentricity, as shown in Figs. 2, 5, 8 and 12, having the heavy portion at the section 234 thereof provided with the fluid passage 236, of which, the passage end 238 is leading to the rotor section while the other end 240 is enclosed with a suitable exhaust fitting 242, to which the exhaust pipe 244 is connected.

The fluid inlet passage control 232 is provided with the fluid flow control member 246, comprising a tubular structure, having a suitable expansion head 248 which is rotatably positioned within the inlet passage recess 250 and which is provided with a suitable gasket 252 for preventing the fluid escape or passage therethrough, also, the center thereof is provided with the fluid inlet opening 254 of which, one end is leading to the expansion chamber 256 wherein the plug member is positioned, as shown at 258, and the other end 260 terminating with a pipe and extension 262, as shown.

It may be noted, that the control end 222 of the fluid passage control member 218 is provided with a collar, which is equipped with a suitable lever 264 and which is for the purpose to control the forward or reverse movement of the rotor 2, while the end 260 of said fluid inlet passage control 232 is provided with a suitable collar member 266 which is also equipped with a lever member 268, which is adapted for regulating the volume of the fluid passing through the expansion chamber 256 and through the ports 62 previously mentioned.

Said fluid passage ports 62 and the exhaust ports 270, see Figs. 1, 5, 9, 10 and 11, are directly in line of fluid flow passing into and out of the cylinders 56, connecting the cylinder ports or passages 60 which are so positioned, so that the fluid flow is at all times unobstructed during the revolution of said cylinders around the said shoulder section 48 of the rotor shaft 4, however, in order to provide variable fluid flow control, said ports 62 are segregated into a plurality of openings, as shown, so that the passage of said fluid may be controlled while passing therethrough and which is accomplished by means of the cut out section 272 which is provided in the expansion head 246, its opening leading from the fluid expansion chamber 256 and which, in operation, when turning it in a clockwise direction by means of said lever 268, see Fig. 9, it will allow a gradual increase of the flow of said fluid through said plurality of ports 62 and consequently gaging the fluid flow in proportion as the opening becomes greater and a greater number of ports become uncovered, thus causing said cylinders to revolve in the clockwise direction and at the same time acquire greater amount of power, while the exhaust ports 270 will allow completely free fluid passage and therefore eliminating entirely any and all back pressures in the cylinders, see Fig. 10.

Also, in order to reverse the rotation of said rotor 2 and said cylinders 56, the lever 264 is turned around and approximately 180 degrees, which reverses the inlet and the exhaust ports which correspondingly lead to the said cylinders, then by advancing the opening passage 272 of said expansion chamber 256 by means of the controlling lever 268 directing it in the direction it is required to revolve said rotor 2 wherein the identical and same fluid flow movement and the control of the fluid passage may be accomplished, as previously described, as shown in Fig. 11.

In order to control the stroke of said pistons 66 within said cylinders 56 the control wheel 194 is turned in the required direction as in practice may be desirable, that is clockwise for the forward movement and anticlockwise for the reverse, which causes the outside eccentric 160 to revolve accordingly, having a suitable control rod 274 attached thereto, see Fig. 12, thus adjusting the position of the bell-crank member 276 causing it to pivot, see Fig. 1, which in turn will actuate correspondingly the cross rod member 278 of which the connecting end is engaging the bell-crank member 280 while the opposite arm 282 having a drift rod member 284 attached thereto which connects with the control lever 103 of the yoke member 96.

The yoke member 96 in controlling the position of the collar 94 causes said pivot bar member 84 and the link extension member 80 to change their position accordingly, which regulates the transverse position of the cross link member 70, consequently a full control of said pistons, in respect to their strokes is accomplished and in addition, such control is in its entirety in conformity to the center location of said rotor 2, also, the rearward movement of the collar 94 causes the linkage 120 and 126 to actuate accordingly which will recede the position of said roller 112, thus causing the diametrical change of roller surface contact, which is also in accordance to the center position of said rotor 2 and which will at all times control the planetary movement or rotation of said rotor 2 in relation to the rotation of said fly-wheel 6.

Further, in order to prevent an undue friction of said collar 94 particularly at its bore section, said fly-wheel web 28 is provided with a cylindrical extension 286 which is an integral part thereof, see Figs. 1 and 4 upon which said collar 94 is slidably positioned and revolving thereon together with said fly-wheel 6, while the internal surface of said extension 286 is free from any contact with the outside diameter of the bearing

extension 34 and thus eliminating the surface friction entirely, otherwise unavoidable.

In the Fig. 16 I have provided a novel form of synchronized control means, comprising a pair of bevel gears 287 and 288, of which, the gear 287 is connected to the shaft 190 while the gear 288 is provided with a driven shaft member 290, having its end supported by means of a suitable bracket member 292 and also having a suitable bevel gear 294 which is adapted to inter-mesh with the bevel gear 296, as shown.

Said gear 296 is provided with a cross shaft member 298 leading rearwardly, the end of which is threaded as at 300 and adapted for engaging a suitable nut member 302.

The nut 302 is placed in floating position within the end of the frame member 304 and held in place by means of a pin 306, while said frame 304 is extending upwardly and connecting the yoke shaft 308 to which said yoke member 96 is attached, as previously mentioned.

In operation, when turning the wheel 194 said bevel gears 287 and 288 together with the bevel gears 294 and 296 will revolve causing the cross shaft member 298 to turn allowing the threaded end 300 to engage the nut member 302, therefore causing said lever member 304 and the yoke member 96 to pivot in the direction desired, thus allowing the piston connecting rods to become adjusted for long or short stroke and co-relatively changing the center position of said rotor 2, as previously mentioned.

In the Fig. 17 I have shown the piston stroke adjusting means in modified form, comprising a suitable control plate 310 which is concentrically mounted upon the fly-wheel shaft, having the stroke adjusting control rods 312 connected as at 314 at one end, while the other end 316 is connected at the swivel point to the cross link member 70 to which the piston connecting rod 66 is attached, thus, by turning said control plate 310 in one direction said cross link members 70 will assume a co-relative position and in conformity to the center position of said rotor 2, and, since the operation of the essential parts of the apparatus is identical in function as previously described therefore further explanation is not deemed necessary.

It may be noted, however, that the adjustment of the rotor center in relation to the center position of the fly-wheel, including the stroke adjustment of the piston connecting rods 66, will cause said piston members 64 to follow the cylinder head section 58, notwithstanding, that the planetary motion of the rotor member is at all times controlled and supported by the contact rollers and therefore, decreasing or increasing the piston stroke within said cylinders and correspondingly decreasing or increasing the fluid consumption, further, as in case of a pump and compressor, such change of the functional parts of the apparatus will decrease or increase the volumetric efficiency thereof.

While I have thus described my invention with great particularity it will be clear that the same may be modified throughout a wide range. I accordingly do not propose to be limited to the exact details of construction herein shown on the drawings and described in the specification, but reserve the rights in practice to make the necessary changes and modifications therein, which may come within the scope of the appended claims.

I claim as my invention:

1. An apparatus of the class described operable by expansible fluids comprising a housing, a center chamber in said housing, a front and rear cover attached at each side of said housing, a bearing disposed in the offset center in each of said front and rear covers, a shaft member revolubly mounted within the bearing of said rear cover, a fly wheel mounted upon said shaft member, a rotor shaft adjusting means mounted in the bearing of said front cover, a rotor shaft mounted within said rotor shaft adjusting means at one end having its other end extending interiorly of said center chamber, a shoulder section disposed at the extended end of said rotor shaft, a rotor means revolubly mounted upon said shoulder section of said rotor shaft, a plurality of cylinders disposed in said rotor means each of which extends centripetally toward the center of said rotor shaft shoulder section, a plurality of fluid passages in said shoulder section of said rotor shaft in juxtaposition to said cylinders in said rotor means, a piston disposed in each of said cylinders and each having a connecting rod pivotally mounted therein and extending outwardly therefrom, a cross link member pivotally connected to each connecting rod at one end having the other end pivotally connected to the rim of said fly wheel, means associated with said rotor shaft adjusting means for controlling the off-center position of said rotor means and said rotor shaft, means associated with said rotor shaft adjusting means including each cross link member for variably controlling the piston strokes in said cylinders, and fluid flow control means connected to said rotor shaft for controlling the fluid flow through said apparatus and also for controlling the forward and the reverse rotation of said rotor means and said fly wheel, substantially as described.

2. A power unit of the class described and operable by a suitable expansible fluid means comprising, a housing having a center chamber, a front and a rear cover each connected to the respective side of said housing, a rear bearing positioned in the offset center section of said rear cover, a front bearing positioned in the offset center and at the front section of said front cover, a shaft revolubly mounted in said rear bearing of said rear cover, a fly wheel mounted upon the end of said shaft means and positioned within said center chamber of said housing having the fly wheel rim section extending the entire width thereof, a rotor shaft adjustably mounted within said front bearing having its end extending internally of said housing, a rotor revolubly mounted upon the extended end of said rotor shaft and positioned entirely within said fly wheel rim section, a plurality of cylinder means positioned within said rotor and disposed centripetally therein and extending toward the center of said rotor, a piston slidably disposed within each of said cylinders, connecting rod means hingedly connected to said piston at one end having its other end extending outwardly from said cylinder, a cross link hingedly connected to the extended end of said connecting rod at one end having its opposite end pivotally attached to said rim section of said fly wheel, means connected to each cross link for controlling and regulating the position of said pistons within said cylinders, an adjusting means disposed in said front bearing for adjusting and controlling the position of each of said cross links and also for variably regulating the center position of said rotor and the length of the piston stroke within said cylinders, and fluid

passage means disposed within said rotor shaft and said rotor for interconnecting said cylinders and for directing the fluid flow into and out of said cylinders during the revolution of said rotor.

3. In a power unit of the class described, a housing having a center chamber, a front and rear cover member connected to the respective sides of said housing, a rear bearing position in the offset center of the rear cover member, a front bearing positioned in the offset center of the front cover member, a shaft revolubly mounted in said rear bearing having one end extending into said center chamber, a fly wheel mounted upon said internally extended end of said shaft having the fly wheel rim section extending the entire width of said center chamber, a rotor shaft means adjustably mounted within said front bearing having its end extending internally of said housing and within said fly wheel rim section, a rotor revolubly mounted upon said extended end of said rotor shaft means and positioned internally within said fly wheel rim section of said fly wheel, a plurality of cylinders centripetally positioned within said rotor, a piston slidably disposed within each of said cylinders, connecting rod hingedly connected at one end to said piston having its other end extending outwardly from said cylinder, piston control means hingedly connected to said extended end of said connecting rod at one end having its opposite end pivotally attached to an eyelet in said rim section of said fly wheel for controlling the piston position within said cylinder, means associated with said rotor shaft means and connecting to the last mentioned means for regulating the center position of said rotor including the piston stroke within said cylinder, fluid passage means disposed within said rotor shaft means and said rotor for inter-connecting said cylinders, a fluid passage regulating means disposed in said rotor shaft means and associated with said fluid passage of said rotor and said cylinders for regulating the fluid flow at variable volume and pressure into and out of said cylinders during the revolution of said rotor.

4. The combination of elements as described in claim 2, including a plurality of roller control means connected to said fly wheel and said rotor and operatively connected with said cross link for supporting and for maintaining the proper relative position of said rotor and said fly wheel during their revolving movement.

5. The combination of elements as described in claim 3, including a fluid flow control means connected to and associated with said rotor shaft means for controlling the fluid flow at variable volume and pressure through the inlet and exhaust passages and adapted to control the forward and the reverse rotation of said rotor during the operation of said power unit.

BERNHARDT T. FITZPATRICK.