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ROTARY IMPELLER MECHANISM

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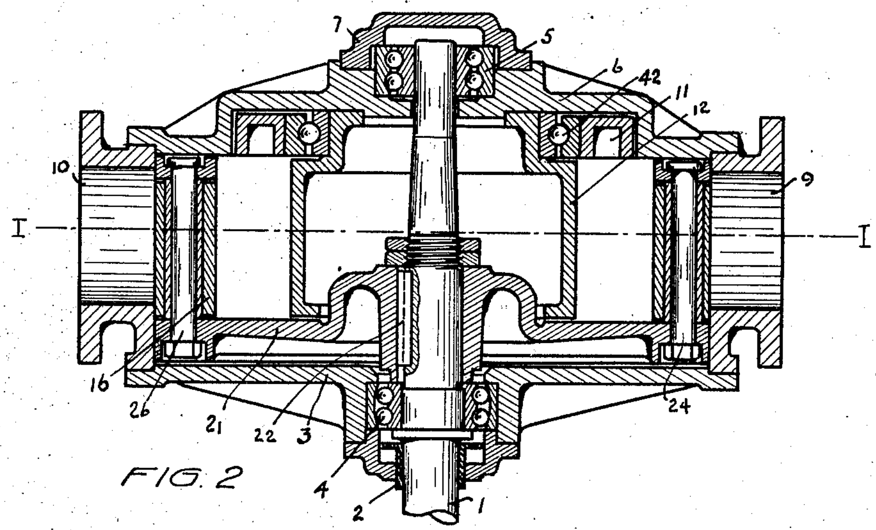

FIG. 2

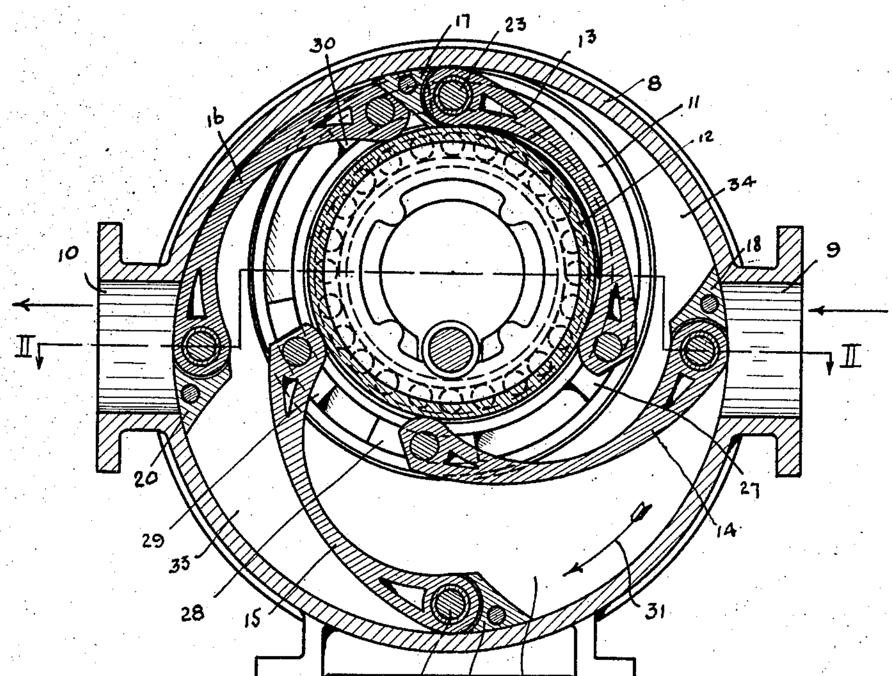

FIG. 1

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ROTARY IMPELLER MECHANISM

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My invention has for one of its objects a rotary pump of simple and efficient construction suitable for pumping or circulating, and/or compressing fluids and is also adapted to use in circulating vapor mixtures such as those employed in internal explosion engines.

Another object of my invention is a rotary device adapted to receive fluid under pressure and discharging the expended fluid and utilizing the force derived from said fluid to rotate a shaft.

My invention is particularly suitable for the compression and/or forcing the circulation of an explosive vapor mixture, in combination with the intake manifold of an internal explosion engine.

Other objects will appear from the drawings and specification which follows:

By referring to the accompanying drawing my invention will be made clear.

In the drawing Fig. 1 is a cross section at right angles to the shaft and taken on the line I—I of Fig. 2.

Fig. 2 is a section of Fig. 1 on the line II—II thereof.

Throughout the figures similar numerals refer to identical parts.

A main driving shaft adapted to be driven by any suitable power means, well-known but not shown, is indicated by the numeral 1, passing through the conventional gland 2, in the cover 3 and carried on the bearing 4.

The opposite end of the shaft is carried on the bearing 5 in the plate 6, the shaft and bearing 5 being closed by the retainer 7.

A circular casing at 8 is provided with a nain driving shaft at 1 and an inlet 9 and outlet 10, a cover 3 and side plate 6, all providing an annular chamber within which is assembled the moving parts mentioned below.

At 11, is an annular track eccentrically positioned with respect to the shaft 1 and within the chamber and in the construction here shown this track is rotatable and is carried upon ball bearings at 42 mounted rigidly with the plate 6, and held associated therewith by the fixed annular member 12 against whose outer surface the inner ends of the impeller blades 13, 14, 15, 16 form a running joint.

At 17, 18, 19 and 20 are blocks supporting the said impeller blades respectively, the blades and blocks being rotatively carried upon the disc 21 by the bolts 23, 24, 25, 26 and conventionally mounted at 22 upon the shaft 1.

The opposite ends of the blades 13, 14, 15, 16 are pivoted to sliding blocks 27, 28, 29, 30 respectively, and these blocks are free to slide in the track 11. While the track 11 is rotatable upon the bearing 12 there would of course be a differential movement of these blocks within the track, but there will be a large component track movement in the direction of rotation as indicated by the arrow 31 so that the friction developed between the blocks and the track because of the rotation of the track, will be reduced to a minimum.

Although I have shown the annular member 12 as fixed to the plate 6, it may be made integral with the track 11, and likewise rotate therewith, if preferred.

The operation is as follows:

As the disc 21 rotates in the direction of the arrow 31 compressible fluid will be drawn in at the inlet 9 completely filling the compartment space 32, at such time as the blade 14 has advanced beyond the position shown in Fig. 2 and closed the inlet 9. There will then be trapped within the space 32 the maximum volume of fluid to be compressed.

This compression will occur due to the travel of the blocks as 28 in the track 11 causing a pivoting of the blade 14 outwardly until it has arrived in the position of the blade 16.

During this travel it will have passed through the position of blade 15 at which time the fluid will have been partially compressed as shown in space 33.

However, as the blade is advancing from the position 15 and just after the block 20 has uncovered the outlet port 10 this partially compressed fluid now in the space 33 will commence to discharge through the outlet 10, and during the next 90° of rotation of the disc 21 the blade will advance from the position 15 into the positon 16, at which time it will be seen that the entire volume of partially compressed fluid in the space 33 will have been forced through the outlet 10.

The outside curvature of the blades, 13, 16 inclusive corresponds with the circumference of the casing 8 and the curvature of their inner faces corresponds with the curvature of the annular member 12.

When the blade is in the position 16 the entire volume of fluid previously entrapped between blades 15 and 16 will have been expelled through the outlet 10. There will be a space 34 between blades 13 and 14 within which a partial vacuum is created until such time as the block at 18 uncovers the inlet port 9 at which time the vapor to be compressed will rush in filling the space 34 and this latter space is constantly enlarging as the blades proceed to the position 14, and in fact slightly in advance thereof and until the block 18 has passed and cut off the inlet 9 when the cycle of compression, expulsion, vacuum and intake will be repeated.

If preferred the inlet port 9 may be enlarged by widening it in the direction opposite to the arrow 31 and towards the approaching blades and thereby partially reducing, or entirely eliminating the vacuum stage without departing from the spirit of my invention.

While I have described my rotary device employed as a compressor, it will now be apparent that it may also be employed as a prime mover by the reversing of the flow and delivering pressure fluid into the port 10 and discharging said fluid from the port 9 and abstracting power developed from the pressure expended by the fluid passing through the device from the shaft 1.

I claim:

1. Rotary impeller mechanism comprising an annular casing having an inlet and an outlet port therein, a cylindrical member eccentrically positioned within and spaced from said casing, a shaft passing through said member and said casing and central with said casing, a plurality of impeller blades, the outer ends of said blades mounted to rotate with said shaft and in continual substantial contact with the inner periphery of said casing, guide means concentric with said member engaging the inner ends of said blades and compelling their continual substantial contact with said member.

2. Rotary impeller mechanism comprising an annular casing having an inlet and an outlet port therein, a cylindrical member eccentrically positioned within and spaced from said casing, forming an eccentric chamber therebetween, a shaft passing through said member and said casing and central with said casing, a plurality of impeller blades, the outer ends of said blades mounted to rotate with said shaft and in continual substantial contact with the inner periphery of said casing, guide means concentric with said member engaging the inner ends of said blades and compelling their continual substantial contact with said member and wherein the outer surfaces of said blades are of the same curvature as the inner periphery of said casing and the inner surfaces of said blades are of the same curvature as the said member.

3. Rotary impeller mechanism comprising an annular casing having an inlet and an outlet port therein, a cylindrical member eccentrically positioned within and spaced from said casing, a shaft passing through said member and said casing and central with said casing, a plurality of impeller blades, the outer ends of said blades mounted to rotate with said shaft and in continual substantial contact with the inner periphery of said casing, guide means concentric with said member engaging the inner ends of said blades and compelling their continual substantial contact with said member and a bearing mounted on said casing on which said guide means is rotatable.

4. Rotary impeller mechanism comprising an annular casing having an inlet and an outlet port therein, a cylindrical member eccentrically positioned within and spaced from said casing, a shaft passing through said member and said casing and central with said casing, a plurality of impeller blades, the outer ends of said blades mounted to rotate with said shaft and in continual substantial contact with the inner periphery of said casing, guide means concentric with said member engaging the inner ends of said blades and compelling their continual substantial contact with said member and wherein the outer surfaces of said blades are of the same curvature as the inner periphery of said casing and the inner surfaces of said blades are of the same curvature as the said member.

5. Rotary impeller mechanism comprising an annular casing having an inlet and an outlet port therein, a cylindrical member eccentrically positioned within and spaced from said casing, a shaft passing through said member and said casing and central with said casing, a plurality of impeller blades, the outer ends of said blades mounted to rotate with said shaft and in continual substantial contact with the inner periphery of said casing, guide means concentric with said member engaging the inner ends of said blades and compelling their continual substantial contact with said member and wherein the ends of adjacent blades when in their outer positions are closed together.

6. Rotary impeller mechanism comprising an annular casing having an inlet and an outlet port therein, a cylindrical member eccentrically positioned within and spaced from said casing, forming an eccentric chamber therebetween, a shaft passing through said member and said casing and central with said casing, a plurality of impeller blades, the

outer ends of said blades mounted to rotate with said shaft and in continual substantial contact with the inner periphery of said casing, guide means concentric with said member engaging the inner ends of said blades and compelling their continual substantial contact with said member and wherein the outer surfaces of said blades are of the same curvature as the inner periphery of said casing and the inner surfaces of said blades are of the same curvature as the said member and wherein the ends of adjacent blades when in their outer positions are closed together.

7. Rotary impeller mechanism comprising an annular casing having an inlet and an outlet port therein, a cylindrical member eccentrically positioned within and spaced from said casing, a shaft passing through said member and said casing and central with said casing, a plurality of impeller blades, the outer ends of said blades mounted to rotate with said shaft and in continual substantial contact with the inner periphery of said casing, guide means concentric with said member engaging the inner ends of said blades and compelling their continual substantial contact with said member and a bearing mounted on said casing on which said guide means is rotatable and wherein the ends of adjacent blades when in their outer positions are closed together.

8. Rotary impeller mechanism comprising an annular casing having an inlet and an outlet port therein, a cylindrical member eccentrically positioned within and spaced from said casing, a shaft passing through said member and said casing and central with said casing, a plurality of impeller blades, the outer ends of said blades mounted to rotate with said shaft and in continual substantial contact with the inner periphery of said casing, guide means concentric with said member engaging the inner ends of said blades and compelling their continual substantial contact with said member and wherein the outer surfaces of said blades are of the same curvature as the inner periphery of said casing and the inner surfaces of said blades are of the same curvature as the said member and wherein the ends of adjacent blades when in their outer positions are closed together.

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