

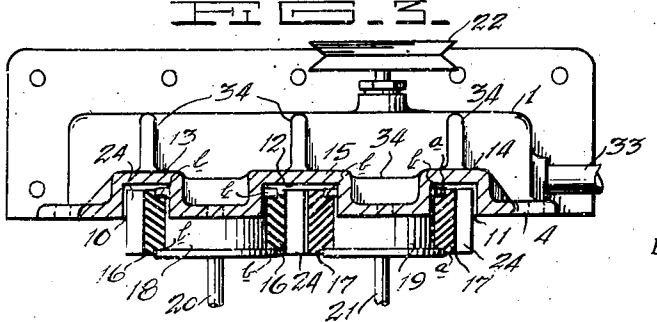
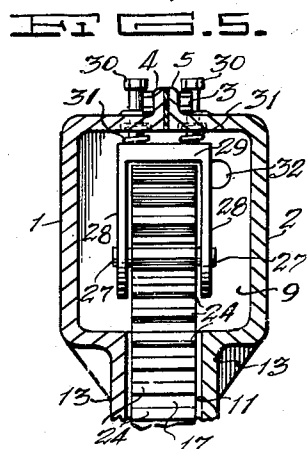
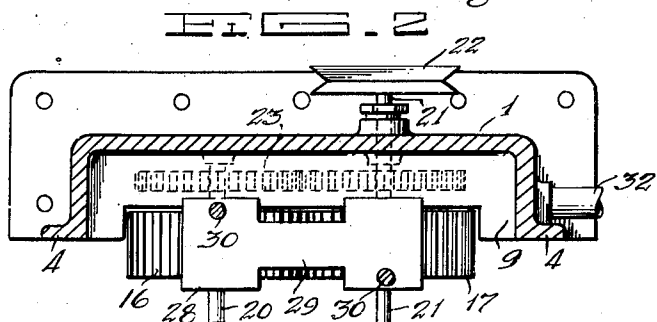
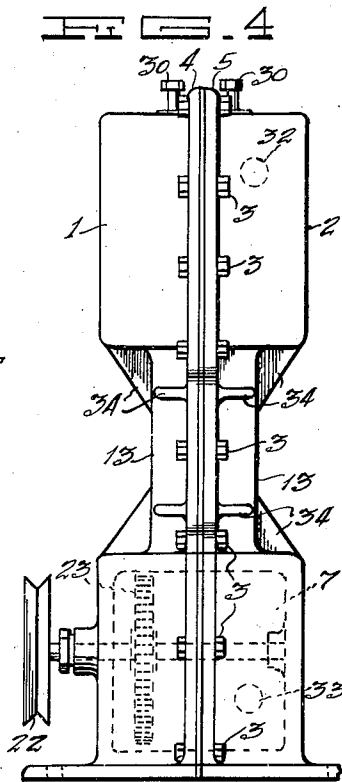
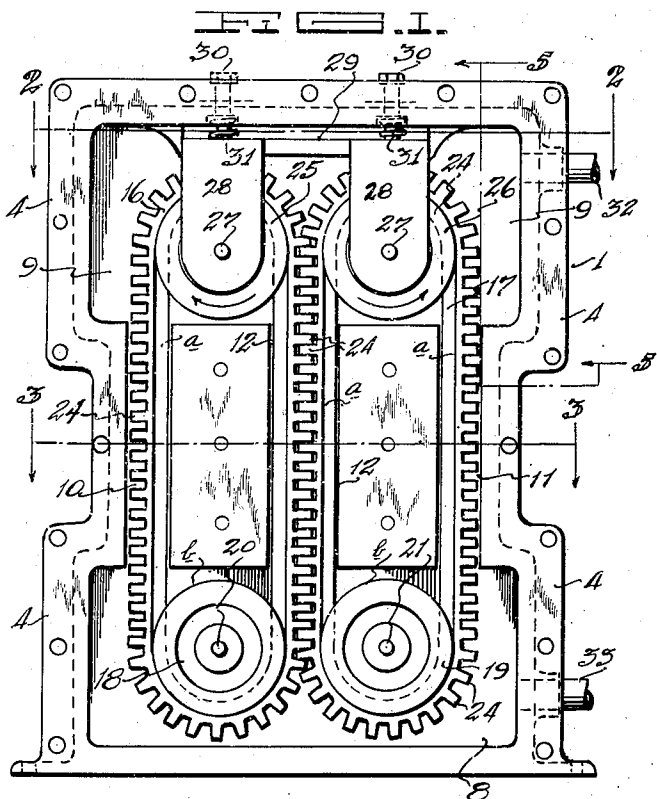
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FLUID PUMP

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FLUID PUMP

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This invention relates to pumps for fluids, such as water, oil, air, and the like, and has particular reference to the type usually referred to as rotary pumps; and its primary object resides in the provision of a pump which is capable of moving fluids by an arrangement of belts having teeth thereon operating in fluid channels whereby the fluids can be moved more rapidly and in greater volume than the conventional types of pumps and with greater economy in operation.

Another object of the invention resides in the provision of a fluid pump which is simple in design and embodying few working parts yet capable of use wherever the necessary for pumping various type of fluids, including air, or the like, either singly or in multiples, depending upon the volume required, and in varying sizes.

Still another object of the invention is that of providing a pump capable of operation in either vertical or horizontal position thereby affording a desirable unit for various pumping requirements.

Broadly, the invention seeks to comprehend the provision of a low cost pumping unit suitable for use in pumping air, or other fluids; where an even flow is desired and possessing advantages uncommon to other types of pumps.

While the foregoing objects are paramount, other and lesser objects will become manifest as the description proceeds, taken in connection with the appended drawings wherein:

Figure 1 illustrates the preferred form of the invention in elevation with one section of the housing removed.

Figure 2 is a lateral cross-sectional view of the invention, also with a section of the housing removed, taken on lines 2-2 of Figure 1, and shows the adjustment for the belts.

Figure 3 shows another lateral cross-sectional view, taken on lines 3-3 of Figure 1, and also shows a section of the housing removed.

Figure 4 is a side elevational view of the assembled invention illustrating one form of the housing, and.

Figure 5 is a fragmentary vertical cross-sectional view, taken on lines 5-5 of Figure 1, showing the belt adjustment from one end.

The invention, therefore, in its preferred form, comprises a housing which is in two sections 1 and 2, capable of being joined by bolts 3, or the like, arranged through flanges 4 and 5, as shown in Figures 1 and 4. Each section 1 and 2 has embodied therein a box-like receptacle 6 in its upper end and a similar receptacle 7 in its lower end, which, when the housing sections are joined,

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as in Figure 4, form an intake chamber 8 at the bottom and a discharge chamber 9 at the top shown more particularly in Figure 1.

When the housing sections 1 and 2 are joined the chambers 8 and 9 are entirely separate but have passages 10, 11 and 12 therebetween providing communication. These passages are formed by channels 13, 14 and 15 formed in each section 1 and 2, in the manner shown in cross-section in Figure 3. As will presently become manifest, the channels or passages 10 and 11 are fluid passages although all three passages 10, 11 and 12 operatively receive the belts 16 and 17, shown in detail in Figure 1.

A pair of equi-distantly spaced pulleys 18 and 19 are arranged on shafts 20 and 21 in the intake chamber 8 in the bottom of the housing and pulley 19 has a driven pulley 22 on its shaft 21 by which the pulleys are rotated. A pair of gears 23, shown in dotted lines in Figures 2 and 4, provide a driven connection between the shafts 20 and 21 in addition to the belts 16 and 17, previously referred to, which have teeth 24 on their outer faces and which are adapted to intermesh in the channel or passage 12, between the fluid channels 10 and 11, in operation, as shown in Figure 1.

Another equi-distantly spaced pair of pulleys 25 and 26 are adjustably arranged in the upper or discharge chamber 9, shown in Figures 1 and 2, but these pulleys are not fixed on shafts journaled in the housing, in the manner in which the shafts 20 and 21 are arranged, but are mounted for free rotation on stub shafts 27 whose ends are journaled in depending plates 28 integral with an adjustable bar 29 which is supported on the lower ends of adjusting bolts 30 threaded into the top of each housing section 1 and 2 and rotatably connected to the bar 29 so that the latter can be adjusted vertically in the chamber 9 exteriorly thereof to increase or lessen the tension on the belts 16 and 17 and take up slack therein when desirable. Springs 31 are provided on each of the bolts 30 to insure an even tension on the belts.

In operation, the driven shaft 21 is rotated by a motor, or other prime mover (not shown) and the pulley 19 upon which the belt 17 is arranged is rotated. Through the gears 23 the shaft 20 is rotated in the opposite direction as indicated by the arrows on pulleys 25 and 26 in Figure 1. The belts 16 and 17, being in mesh, as shown also in Figure 1, also move in opposite directions, their respective teeth 24 intermeshing in the channel or passage 12 in close relationship to squeeze or

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press out all fluids therebetween. As the teeth 24 move upwardly through the channels or passages 10 and 11 fluid from the intake chamber 8 is carried in an even flow into the discharge chamber 9 where it is discharged through the passage 32 into storage. The fluid enters the intake chamber 8 through the inlet passage 33 which, when air is pumped, may remain open to the atmosphere.

As the belts 16 and 17 are rotated very rapidly by the pulleys 18 and 19 fluid in the intake chamber 8 is moved into the discharge chamber 9 by the belts in an even flow. It will be observed that the passages 10, 11 and 12 are of such dimensions as to cause the belts 16 and 17 to fit relatively close therein and thus minimize the leakage therethrough past the belts 16 and 17. The close intermeshing of the teeth 24 in the passage 12 during the downward movement of the belts 16 and 17 shuts out the fluids already in the discharge chamber 9 thus insuring maximum efficiency in operation.

The pulleys 18 and 19 are shown in Figure 3 as being channeled or flanged and the edges *a* of the belts 16 and 17 are recessed so as to embrace the flanges *b* thereof. This arrangement allows the sides of the belts 16 and 17 to move closer to the walls of the passages 10 and 11, as well as the passage 12, to provide a better seal. Obviously, the belts 16 and 17 may have their pulley surfaces beveled to conform to V-pulleys 18, 19, 25 and 26 or may have their faces milled and the belts 16 and 17 formed accordingly so as to afford a more positive contact therewith.

Any arrangement, such as stuffing boxes, packing glands, or the like, can be provided for the shaft 21 or the bolts 30 where these members enter the chambers 8 or 9 to prevent leakage.

The housing sections 1 and 2, being preferably cast in the manner previously described and shown in the drawings, may be provided with suitable webbing or ribs 34 to properly strengthen the same. Guide members 35 are also provided integrally of the top of the section 1 of the housing for the tensioning bar 29. These guides are arranged on each end of the member 29 and serve to retain the same in proper alignment with the belts in cooperation with the bolts 30.

Manifestly certain changes and modifications in structure may be resorted to from time to time by persons skilled in the art without departing from the spirit and intent of the invention, and such changes and modifications may be considered as falling within the scope of the appended claims.

What is claimed is:

1. In a fluid pump of the rotary type having a housing and intake and discharge chambers in the said housing, a plurality of belts, having toothed outer intermeshing surfaces, operating vertically in the said housing, fluid channels providing communication between the said intake and discharge chambers, the said belts being arranged for vertical upward movement in the said channels to convey fluid therethrough, pulleys operating the said belts, and driven gears driving said pulleys.

2. In a fluid pump of the rotary type having a housing, intake and discharge chambers in the said housing, channels in said housing providing communications between the said chambers, belts

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having toothed intermeshing outer surfaces operating in one of the said channels and conveying fluid through others of the said channels, pulleys arranged in each of the said chambers for operating the said belts, driven gears operating said pulleys, and means providing for adjustment of tension on the said belts.

3. In a fluid pump, a housing having an intake and a discharge chamber therein, means comprising a plurality of vertical channels providing communication between the said chambers, pulleys operatively arranged in said chambers, belts arranged over the said pulleys in the said chambers and operating in the said channels, the said belts having intermeshing teeth in its outer face and cooperating in one of the said channels and conveying fluid through the others of the said channels from the intake chamber to said discharge chamber, driven gears in said housing operating said pulleys, and means for adjusting the tension on the said belts.

4. In a fluid pump, a housing having intake and discharge chambers therein and passages forming communications therebetween, flanged pulleys operatively arranged in each of said chambers, belts having teeth arranged on their outer faces operatively disposed in the said housing and operating on said pulleys in the said channels, the said teeth on each belt intermeshing with the other in one channel and raising fluid from the intake chamber to the discharge chamber in others of the said channels, driven gears in said housing operating one of said pulleys, and means for adjusting the tension on the said belts.

5. In a rotary fluid pump having a housing and inlet and discharge chambers, vertical channels connecting the said chambers and a pair of toothed belts having intermeshing association in one of the said channels and capable of moving fluid through the other channels from the said intake chamber to the said discharge chamber, means comprising pulleys for operating the said belts, driven gears operating said pulleys, and means for adjusting the belt tension associated with certain of the said pulleys.

6. In a fluid pump of the rotary type having a housing and intake and discharge chambers in the said housing, flanged pulleys operatively arranged in said chambers, a plurality of endless belts operating over said pulleys arranged in the said housing, the said belts having intermeshing teeth arranged on their outer faces, vertical channels in the said housing for the said belts and forming communications between the said chambers whereby the said belts transfer fluids from the said intake chamber to the said discharge chamber, intermeshed driven gears operating said pulleys, and means for adjusting the tension on said belts.

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The following references are of record in the file of this patent:

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