

May 26, 1931.

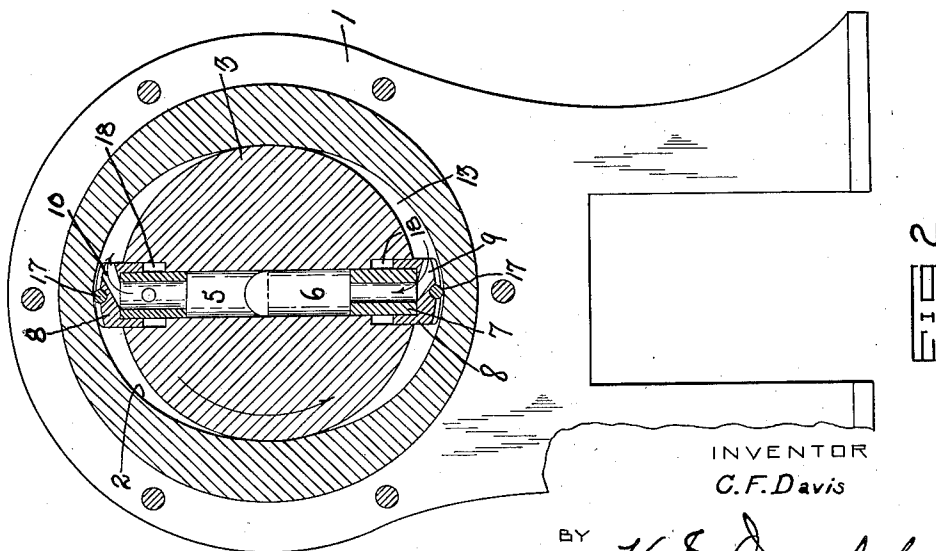
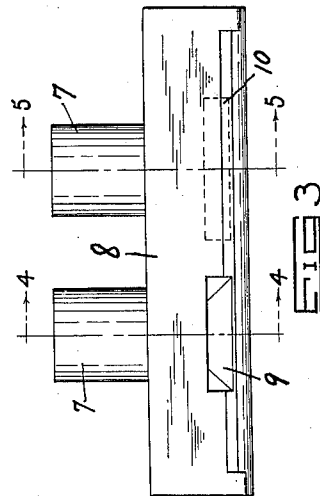
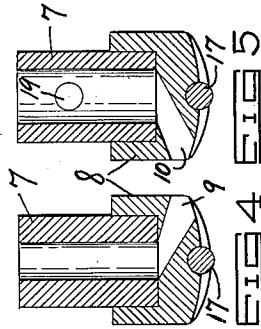
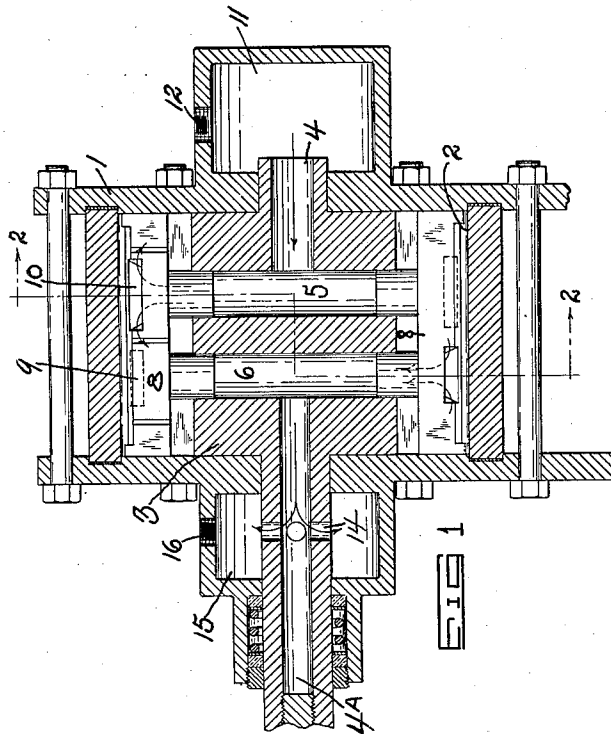
C. F. DAVIS

1,807,392

CONTINUOUS CIRCULATING PUMP

Filed May 28, 1929

2 Sheets-Sheet 1



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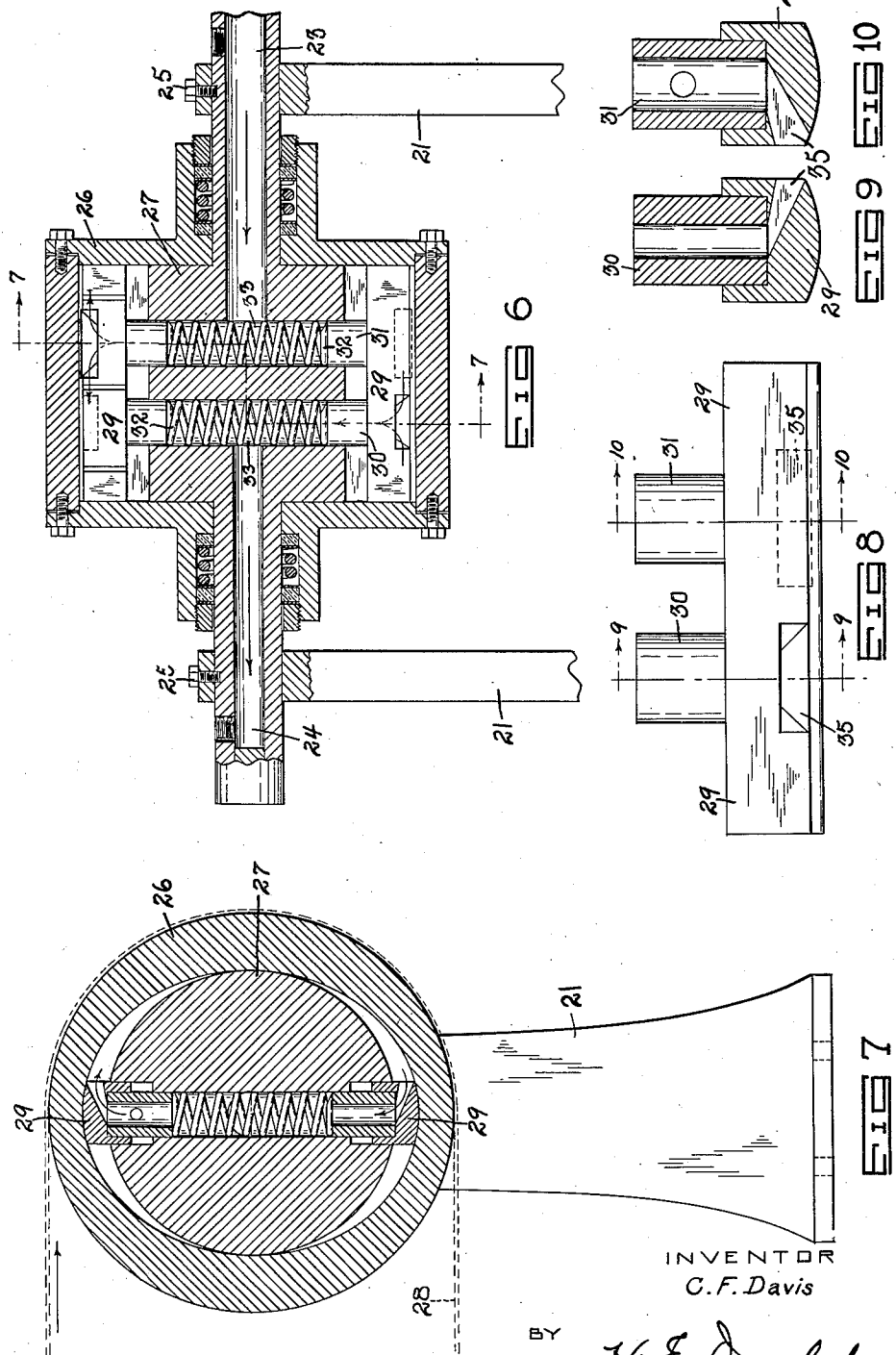
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CONTINUOUS CIRCULATING PUMP

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This invention relates to pumps, and more specifically to a continuous circulating pump of the type used in connection with electric refrigeration apparatus.

The primary object of the invention is to provide a pump of the character mentioned which possesses a minimum of moving parts and which, consequently, can be economically manufactured.

A further object of the invention is to provide a pump in which vibration during operation is effectually eliminated, thereby reducing noise to a minimum.

A further object of the invention is to provide a pump in which the parts are at all times in substantially perfect balance.

With these and other objects in view, the invention resides in the features of construction, arrangement of parts, and combinations of elements which will hereinafter be fully described, reference being had to the accompanying drawings, in which—

Figure 1 is a longitudinal sectional view of the invention;

Figure 2 is a section on line 2—2, Fig. 1;

Figure 3 is a side elevation of one of the sliding heads of the rotor;

Figures 4 and 5 are sections on lines 4—4 and 5—5, respectively, of Fig. 3.

Figure 6 is a view similar to Fig. 1 showing a modified form of the invention;

Figure 7 is a section on line 7—7, Fig. 6;

Figure 8 is a side elevation of one of the sliding ends of the rotor; and

Figures 9 and 10 are sections on lines 9—9 and 10—10, Fig. 8.

Referring to said drawings, the reference numeral 1 designates a casing having a pumping chamber formed with an elliptical inner circumferential wall 2. In the form of the invention shown in Figs. 1 to 5, inclusive, the casing 1 is stationary while a rotor 3 of circular form in cross section is rotatable in the chamber. The rotor has opposite axially disposed journals 4 and 4^a which rotate in the end walls of the casing 1, said journal 4^a being extended outwardly and being adapted for connection with a drive shaft through which power is communicated for driving said rotor. The journal 4, as also the inner end

portion of the journal 4^a, is made hollow, as shown. A pair of spaced parallel bores or passages 5 and 6 diametrically extend across the rotor, the bore 5 communicating with the interior of the journal 4, and the bore 6 communicating with the interior of the hollow journal 4^a. Tubular members 7 which are slidably disposed in the opposite ends of each of the bores or passages 5 and 6 are rigidly carried by a head 8, the latter being rotatable with the rotor and being centrifugally held in seated relation to the walls of the casing 1. Ports 9 and 10 are formed on opposite sides of each head and communicate with the bores 5 and 6, respectively, through the interiors of the tubular members 7.

As shown in Fig. 1, an inlet reservoir 11 is provided and preferably carried by the adjacent end of the pump casing. This reservoir has an inlet 12 formed for connection with the source of supply and surrounds the outer end wall of the journal 4. A reservoir 15 is secured to the opposite end wall of the pump casing and has an exhaust opening 16 therein for conveying the fluid to the point of use through any suitable connection (not shown).

In order to reduce the friction between the heads and the circumferential wall of the pump casing, the heads are provided with anti-friction rollers 17 which are journaled on the outer surfaces of the heads. The bores or passages 5 and 6 open at their outer ends into transverse channels 18 provided in the periphery of the rotor and in which the heads 8 are slidable radially. The tubular members 7, or some of them, have ports 19 therein designed to prevent the formation of vacuum in the channel 18.

In the modified form of the invention shown in Figs. 6 to 10, inclusive, the member is stationarily mounted on supports 21 and has its hollow journals 23 and 24 rigidly secured to the supports by means of set screws 25. The casing 26 encircles the member 27 and is driven by a belt 28, shown in dotted lines, said belt being engaged over the periphery of the casing.

In this form of the invention the heads 29 are connected to tubular members 30 and 31, 320

said members being tensioned by means of coil springs 32, the coil springs being disposed in the bores 33 and at their ends engage the tubular members to normally urge same outwardly thereby to hold the heads 29 in engagement with the elliptical wall of the casing 26. The heads 29 are provided with ports 35, similar to those described in the preferred form of the invention.

In the operation, which is similar in each of the two forms of the invention herein shown, the fluid to be forced by the pump enters the reservoir 11 by gravity, thence passes through the interior of the journal 4, thence in opposite directions through the passage 5 and discharges through the ports 10 of the opposite heads 8 into the pump chamber at the side of the said heads opposite that toward which said heads are being carried in the rotation of the rotor. At the same time, fluid contained by the pump chamber in front of the advancing heads enters the ports 9 and passes thence to the therewithcommunicating tubular members 7, thence through the passage 6, thence through the hollow journal 4^a to and through ports 14 formed in said journal, whence the fluid enters the outlet reservoir 15, and thence passes to the point of use through the outlet opening 16 provided in said reservoir.

From the foregoing it will be seen that a minimum of friction is had and that the circulation is continuous in that the fluid is continuously entering the pump chamber and is being pumped therefrom.

Centrifugal action is relied upon to maintain the heads 8 in their outermost position in which said heads engage the wall 2 of the casing 1, while in the modified form shown in Figs. 6 to 10, inclusive, this action is augmented by the springs 32.

What is claimed is:—

1. In a pump, a casing having an elliptical circumferential wall, a cylindrical rotor in said casing having oppositely disposed hollow journals rotatably mounted centrally in the side wall of said casing and having spaced diametrical bores opening at opposite ends into the interior of said casing and communicating intermediate their ends with the respective journal interiors, tubular members slidably mounted in the opposite ends of said bores, centrifugally-responsive heads carried by the adjacent tubular members and occupying seated relation to the circumferential wall of the casing, said heads having ports opening outwardly in opposite directions in communication with respective tubular members, reservoirs having communication with said journals, one of said reservoirs constituting a fluid inlet to its journal and the other a fluid outlet from its journal.

2. In a pump, a casing having an elliptical circumferential wall, a cylindrical rotor with-

in the casing having oppositely disposed hollow journals rotatably mounted in the side walls of said casing, said rotor having therein spaced diametrical bores having their opposite ends opening into the interior of the casing, the interior of each journal being in open communication at its inner end with the adjacent bore, centrifugally-responsive members having their inner ends slidably received in the outer ends of each bore, said members having their outer ends seated upon the circumferential wall of the casing and having ports opening outwardly in opposite directions through which communication is had between said bores and the interior of the casing at both the front and rear sides of said members.

3. In a pump of the character described, a casing having an elliptical wall, a cylindrical rotor disposed centrally within said casing, axially disposed journals for said rotor rotatably mounted in the opposite side walls of the casing, said rotor having a pair of diametrically disposed non-communicating passages extending therethrough, the journals having therein axial bores which communicate at their inner ends, respectively, with the thereto adjacent passages, one of said bores constituting a fluid inlet and the other a fluid outlet passage, centrifugally-responsive heads occupying seated relation to the circumferential wall of the casing and having radially directed portions slidably disposed with respect to the adjacent end portions of said diametrically disposed passages, each of said heads having therein ports opening outwardly therethrough in opposite directions, said ports having communication through their said radially directed portions with the said diametrically disposed passages of the rotor.

In testimony whereof, I affix my signature.

CLAUD FLEMING DAVIS.