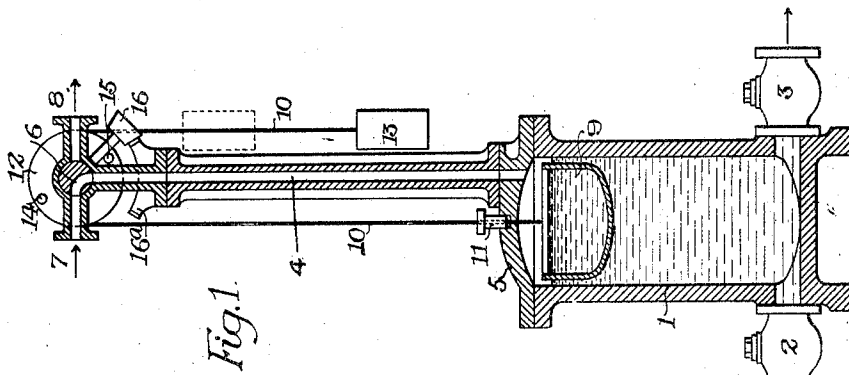
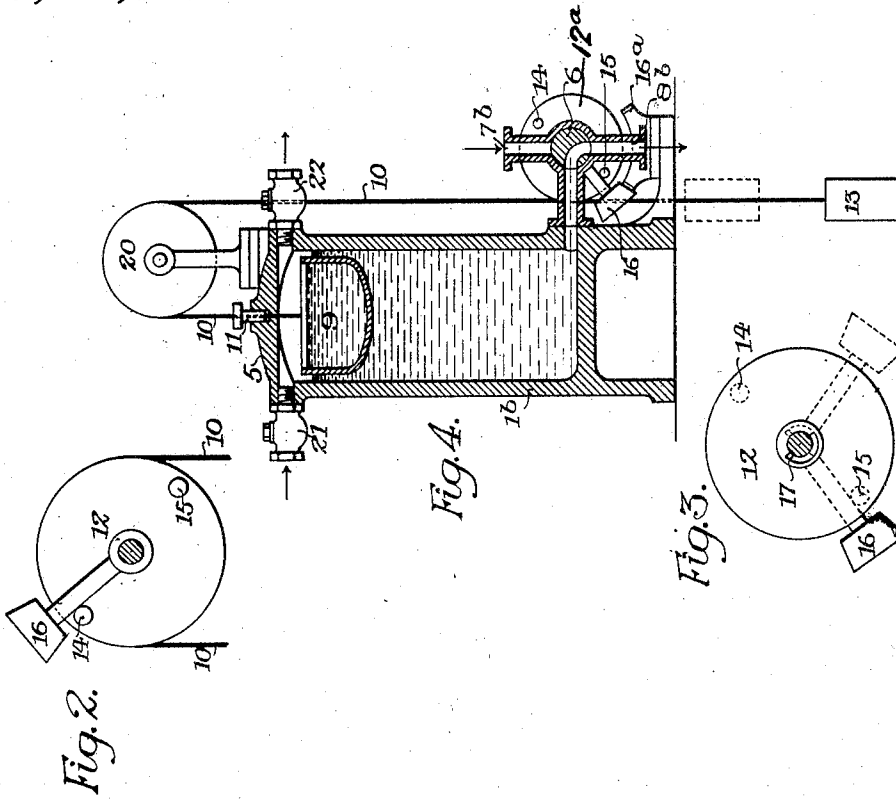


1,043,707.

Patented Nov. 5, 1912



Witnesses:
William H. Rivoir,
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by his Attorneys:
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UNITED STATES PATENT OFFICE.

PAUL KESTNER, OF LILLE, FRANCE.

PULSATION APPARATUS.

1,043,707.

Specification of Letters Patent.

Patented Nov. 5, 1912.

Application filed September 29, 1908. Serial No. 455,273.

To all whom it may concern:

Be it known that I, PAUL KESTNER, a citizen of the Republic of France, and a resident of Lille, Department of Nord, France, have invented certain Improvements in and Relating to Pulsation Apparatus, of which the following is a specification.

My invention has reference to improvements in and relating to pulsation apparatus, and it consists in improved means for bringing about the reversal of the action in pulsation apparatus of any kind in which a fluid or liquid is alternately admitted to and discharged from a closed chamber. The means in question are intended to act upon a 3-way cock or some equivalent device which is adapted, as is necessary in apparatus of this kind, to place the apparatus during the first part of the pulsation in communication with the inlet of any fluid or liquid, such as steam, air, gas, or water, &c., and during the second part of the pulsation in communication with the exhaust or outlet.

I have illustrated my invention in the accompanying drawing, in which:

Figure 1 shows an apparatus for raising a liquid by means of compressed air; Figs. 2 and 3, show details of the same on an enlarged scale, and Fig. 4 shows a variation of the apparatus arranged to act as an air-compressor.

In the drawings, 1 represents a cylinder provided at its base with a back pressure or check valve 2, through which liquid or fluid enters, and a valve 3 of similar character through which the said liquid or fluid is forced out. A pipe 4, which communicates with an opening in the cover 5 of the cylinder, places the upper end of said cylinder in communication, by means of a 3-way cock 6, either with an inlet 7 for fluid under pressure, or with an exhaust 8 through which said fluid escapes into the atmosphere. The motive medium employed to operate said valve 3 is a float—not a hollow float capable of floating of itself, but a structure which is open to receive a liquid body, or a solid member may be used; either structure being balanced by means disposed exteriorly of the cylinder. This member, which is indicated at 9, is suspended from a wire 10 extending through a stuffing box 11 in the cover 5 of the cylinder, and passing around a pulley 12; a counter-weight 13 being hung from the same on the other side of the pulley. The pulley 12, which is in the form of

a disk, carries two pins, 14 and 15, mounted diametrically opposite each other, which pins are adapted to alternately raise a hammer or weight 16 which is loosely mounted on the pulley spindle. Fig. 2 shows the pulley 12 with the pins 14 and 15 and the hammer 16, on an enlarged scale. When the member 9 rises, due to admission of liquid to the cylinder 1, the pulley rotates from left to right. The pin 14 raises the hammer, and the moment the hammer passes the center of gravity it falls on the other side, thereby shifting the valve. When the member 9 descends, the opposite effect is produced. The hammer falls alternately to the right and to the left and this changes the position of the mechanism and reverses the movement through the intermediary of a suitable device. The simplest device for this purpose is that shown in the drawings, *i. e.*, the 3-way cock indicated at 6, the axis of which is in alinement with the axis of the pulley.

The action of the apparatus is in this case as follows: Assuming the apparatus, as illustrated, to be full of liquid and the cock 6 to be open for the admission of compressed air, the air passes into the apparatus through the inlet 7 and pipe 4 and forces out the liquid. At the same time the member 9 descends and causes the pulley to rotate and raise the hammer by means of the pin 15. When the hammer reaches its highest point it falls over on the other side, in this instance to the left, Fig. 1, (or in the reverse view, Fig. 3, to the right) and, in falling, engages a projection 17 on the stem of the cock 6 and moves the latter with it, imparting a quarter of a revolution thereto. This places the apparatus in communication with the exhaust 8, and thereupon the cylinder is recharged with liquid entering by the valve 2, the member 9 rising and bringing about movements the reverse of those just described. Fig. 3, shows the projection 17 carried by the stem of the cock whereby it may be operated by the hammer or weight 16. A guard or stop 16^a serves to arrest the hammer when it falls to either side so as to maintain the cock 6 in the proper positions. A similar movement exists in the Kennedy water-counter but all the mechanism is internal. In the present case owing to the employment of the connecting wire which passes freely through the cover, I have been able to devise an external movement.

In the apparatus shown in Fig. 4, the member 9^a acts, through the intermediary of a pulley 20, on a pulley 12^a having the pins 14 and 15, which latter pulley is mounted on a spindle in alinement with the axis of the 3-way cock 6, the said cock being adapted to place the cylinder in communication at one time with the inlet 7^b for water under pressure, and at another time with the exhaust 8^b. The cylinder 1^b is provided at its upper end with two back pressure valves 21 and 22; air being drawn in through valve 21 as the water is flowing out, while the air which is compressed in the cylinder as it is being again filled with water is forced out through the valve 22.

I claim:

The combination of a chambered cylinder adapted to receive liquid, a movable weighted member within said cylinder, provision for the inlet and outlet of liquid to and from said cylinder, provision for the inlet and outlet of fluid under pressure to act on said liquid, a rotatable valve controlling the inlet and outlet of one of said bodies, a stem on said valve, a pulley mounted on the same axis as said valve, a freely movable counter-

weight exterior of the cylinder, a connection between said counterweight and the movable member within the cylinder, said connection passing over the pulley, a weighted arm having a hub journaled on the same axis as the valve, a projection on the valve stem adapted to be engaged by said hub, and pins carried by said pulley, said pins supporting the weighted arm when in one position and serving to move it to a position where it may turn under the influence of its own weight when the pulley is actuated by the connection between the counterweight and the weighted member within the cylinder, the hub of said weighted arm engaging the projection on the valve stem and shifting said valve when turned so as to change the direction of flow through the same of one of the bodies within said cylinder.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

PAUL KESTNER.

Witnesses:

HENRI CHAVIER,
J. LELEU.