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FLUID WAVE TRANSMISSION.

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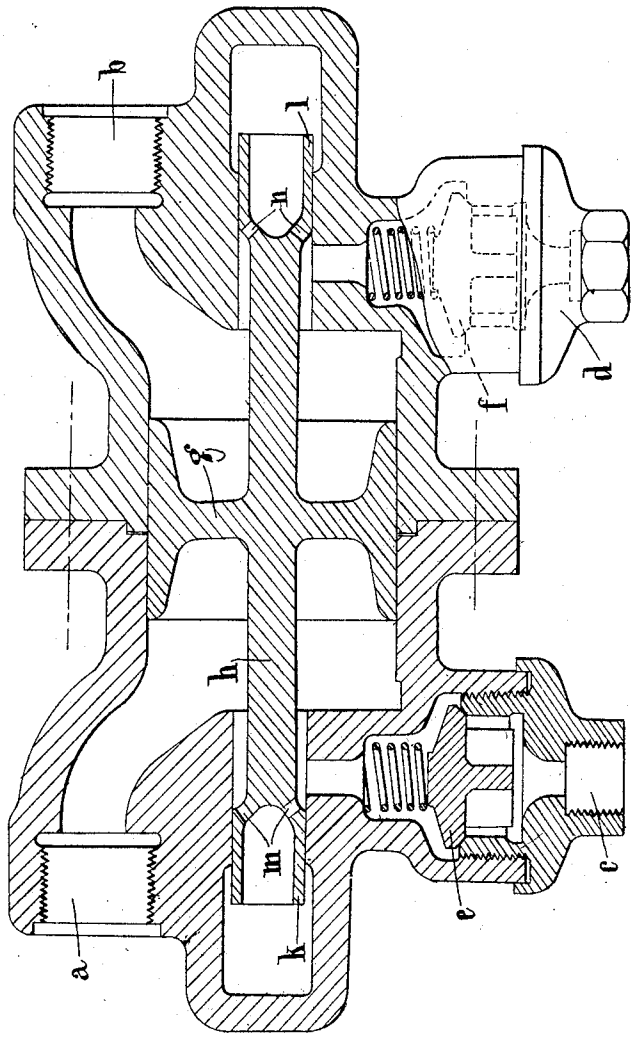
1,334,286. Patented Mar. 23, 1920.



Witnesses.

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FLUID WAVE TRANSMISSION.

1,334,286. Specification of Letters Patent. Patented Mar. 23, 1920.

Application filed January 5, 1916, Serial No. 70,552. Renewed June 14, 1919. Serial No. 304,277.

To all whom it may concern:

Be it known that I, GOGU CONSTANTINESCO, a subject of the King of Roumania, and residing at The Haddon Engineering Works, Honeypot Lane, Alperton, Middlesex, England, have invented certain new and useful Improvements in and Relating to Fluid Wave Transmission, of which the following is a specification.

In British Patents Nos. 9029 of 1913 and 12438 of 1914, a method and apparatus are described for transmitting energy by wave motion from a generator, which causes periodic changes of pressure and volume in the liquid column, thus transmitting power by wave motion.

It is convenient in some cases that the line connecting the generator with the receiver or working apparatus should contain different kinds of fluid at different parts. If the leakage from the pipe is zero, the ordinary diaphragm, or even the surface of the two liquids, may be sufficient to secure the separation of the two fluids; but if leakages have to be taken into account, it will be seen that this method will not be sufficient.

The object of the present invention is, in a system of wave transmission of energy, to utilize different fluids in different parts of the system, and to provide means for separating the fluid columns at any given point, so that for instance oil may be used in the generator, and water in the pipes between the generator and the receiver or receivers.

The invention consists in the use of a separator comprising a floating piston or diaphragm, controlling the supply of the liquid to the columns on its two sides, in such a way that when the leakage is greater on one side than the other, causing the pressure on one side to be greater than on the other, the movement of the piston or diaphragm toward the side on which the pressure is lower diminishes the oil supply, and eventually cuts it off, while if the leakage occurs on the oil side, the movement of the piston toward this side controls and ultimately cuts off the water supply.

In the accompanying diagrammatic drawing, which represents a separator, used on a wave transmission line intended to operate rock drills, in which there is considerable leakage of water, for the purpose of flushing out the hole, the water line is connected to the separator at *a*, and the oil line at *b*, the oil line being connected to a wave generator working with oil, and having a leaky piston. The water is supplied through the pipe *c*, and the oil is supplied through the pipe *d*, from constant pressure devices. As the pulsations in the wave transmission line vary from a minimum to a maximum, each time the pressure drops below a certain value on account of leakage, the check valves *e*, *f*, open inward, and some water or oil would enter the line, making up the leak.

The oil and water are constantly separated by the floating piston *g*, which is fixed to a central rod *h*, having at its ends machined surfaces *k*, *l*, moving in the ends of the chamber of the separator. Apertures *m*, *n*, are provided, connecting the central portion of the chamber on each side with the end spaces.

The operation of the above described device is as follows:—Assuming that the leakage on the water side is excessive, compared with the leakage on the oil side, the natural tendency of the floating piston *g* will be to move toward the water side, that is, to the left. During this movement, the piston valve *l* will gradually cut off the oil supply from the check valve *f*, to the right hand chamber of the separator. The oil supply through the valve *f* is thus gradually stopped, and the mean position of the piston is prevented from moving farther in the direction of the water line. The constant leakage on the oil side has a tendency to bring the piston back, as the mean pressure on the oil side would decrease.

The apertures *m*, *n*, are provided in order to secure a permanent communication between the separator chambers and the end spaces, and so avoid pressures which might occur in these end spaces, due to leakage around the pistons *k*, *l*. The piston valves *k*, *l*, should be so proportioned that the normal stroke of the floating piston about its mean position, due to the pulsations in the pipe line, is still secured, even when the piston *g* is in the position in which the check valves *e* or *f* are completely closed.

The outlet from the separator may be in any required direction, and the main piston may if desired be provided with leather cups

or other packing, in order to prevent filtration of water to the oil, or vice versa.

It will be seen that in certain conditions it may occur that the water leakage is always in excess of the leakage of oil, and in such cases it is possible to dispense with one end of the controlling piston. In this case, however, care must be taken that the separator is fitted with the right ends toward the oil and water, respectively.

If the water line is connected to other generators working parallel, it is necessary that both piston valves should be provided in order to prevent the piston reaching the end of the casting.

If desired, the inertia effects of the oscillating piston may be annulled by balancing it by means of springs. The separator will thus perform the functions of a condenser. If, however, the section of the piston *g* is made sufficiently large, oscillations of small amplitude will be obtained, and the effects of inertia become negligible. Springs, however, would be required for very high frequencies.

It will be seen also that the separator may be used to separate gases, or to separate gases from liquids, in cases where power is transmitted by a wave motion in air or other gases.

Having now described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. In a fluid wave transmission system a separator comprising in combination a chamber, a piston in said chamber, connections to a fluid wave transmission line at each end of said chamber, a passage for the supply of fluid at one end of said chamber, a valve controlling said passage, an axial extension on said piston having a cylindrical valve also controlling said supply passage, said cylindrical valve being adapted to close said supply passage when the piston is at the end of the chamber remote from said passage, as set forth.

2. In a fluid wave transmission system a separator comprising in combination a chamber, a piston in said chamber, connections to a fluid wave transmission line at each end of said chamber, passages for supply of fluid opening into each end of said chamber, valves controlling said passages, axial extensions from said piston, cylindrical valves on said extensions controlling said supply passages and adapted to close one of said passages when the piston is toward the other end of said chamber, as set forth.

In testimony whereof I have signed my name to this specification.

GOGU CONSTANTINESCO.