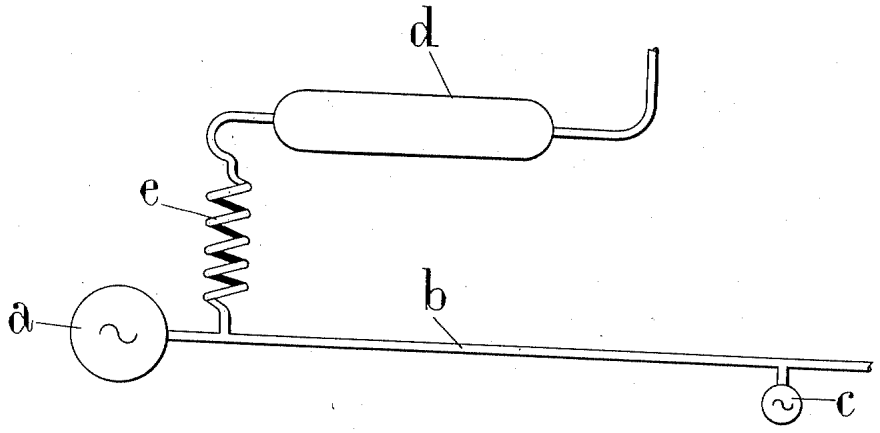
G. CONSTANTINESCO.
LIQUID WAVE TRANSMISSION.
APPLICATION FILED JULY 23, 1918.

1,334,289.

Patented Mar. 23, 1920.



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GOGU CONSTANTINESCO, OF ALPERTON, ENGLAND, ASSIGNOR OF ONE-HALF TO WALTER HADDON, OF LONDON, ENGLAND.

LIQUID WAVE TRANSMISSION.

1,334,289. Specification of Letters Patent. Patented Mar. 23, 1920.

Original application filed November 18, 1916, Serial No. 132,027. Divided and this application filed July 23, 1918. Serial No. 246,396.

To all whom it may concern:

Be it known that I, GOGU CONSTANTINESCO, a subject of the King of Great Britain and Ireland, formerly residing at The Haddon Engineering Works, Honeypot Lane, Alperton, in the county of Middlesex, England, now residing at "Westoe," Stanley avenue, Alperton, in the county of Middlesex, England, have invented certain new and useful Improvements in and Relating to Liquid Wave Transmission, of which the following is a specification.

The present invention relates to wave transmission through liquids, that is, transmission of energy by a series of periodic variations of pressure and volume traveling along a liquid column or columns as described in the specification Serial No. 63762, filed 27th November, 1915.

The object of the invention is to provide means whereby the line can be fed with fresh liquid without interfering with the wave motion, or with the operation of generators and receivers on the line.

The invention consists in feeding a wave transmission line by means of a pump, pumping into a capacity, which communicates with the line through a pipe whose length is a quarter of the wave length of the waves in the transmission line at the periodicity used.

The invention also consists in connecting the feeding quarter wave length pipe to the line at a point at which the pressures vary from maximum to minimum values.

The invention also consists in the improved means for feeding a wave transmission line hereinafter described.

Referring to the accompanying drawings:—

The figure is a diagrammatic drawing showing the application of the invention to a single phase wave transmission line.

In carrying the invention into effect as shown in the figure, a single phase generator *a* produces a series of periodic variations of pressure and volume which travel along the transmission line *b* and actuate single phase motors or other apparatus one of which is shown at *c*. Fresh liquid is pumped into the strong vessel *d* by a suitable pump, the vessel *d* being connected to the main transmission line *b* by a pipe *e* which is of such length that the phase difference between its ends at the periodicity employed is

$$\frac{\pi}{2}=90°$$

Such a pipe is termed a quarter wave length pipe. From the analogy of sound waves passing along a body of liquid it will be understood that a phase difference of $\frac{\pi}{2}$ is a phase difference of 90°, that is to say, a quarter of 360° which is the full wave length.

According to one example, as applied for instance to a high frequency line in which the wave length is of about 2 meters, we provide a pump pumping oil into a capacity of say 10 liters, from any suitable supply. The capacity is connected through a pipe which may be of any diameter, with the transmission line, connecting with this line at a point close to the generator. The length of pipe in the case considered will be half a meter. In order with this arrangement to supply additional oil to the line, it is merely necessary to keep the pump working, pumping into the capacity which is in communication with the line. If it is desired to feed the line at points remote from the generator, all that is necessary is to connect a pump, capacity and quarter wave length pipe to the line, at points at which the pressure in the line rises to the maximum and falls to the minimum values.

The points at which the pressure rises to a maximum and falls to a minimum are points situated at distances equal to the wave length and all multiples of the wave length from the generator. The wave length is determined when the elasticity of the liquid employed and the period of the impulses are known, the transmission of energy being analogous to the transmission of sound through a body of liquid.

It will be seen that with such an arrangement, at the point where the quarter wave length connects with the capacity, there will be no pressure variation, so that the pumping of the oil into the capacity, and the passing of this oil from the capacity to the line will take place under a constant pressure.

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

1. Apparatus for feeding a wave transmission line comprising in combination a capacity or strong vessel filled with liquid, means for introducing liquid into said capacity, and a pipe connecting said capacity to said wave transmission line, the length of the pipe being such that with respect to the wave in the transmission line the phase difference between its ends is $\frac{\pi}{2}$, as set forth.

2. Apparatus for feeding a wave transmission line comprising in combination a capacity or strong vessel filled with liquid, means for introducing liquid into said capacity, and a pipe connecting said capacity to said wave transmission line, the length of the pipe being such that with respect to the wave in the transmission line the phase difference between its ends is $\frac{\pi}{2}$, said pipe being connected to said wave transmission line at a point at which the pressures vary from maximum to minimum values, as set forth.

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

GOGU CONSTANTINESCO.