G. CONSTANTINESCO.

HYDRAULIC TRANSMISSION.

APPLICATION FILED OCT. 19, 1916. RENEWED OCT. 17, 1919.

1,334,280. Patented Mar. 23, 1920.

2 SHEETS—SHEET 1.

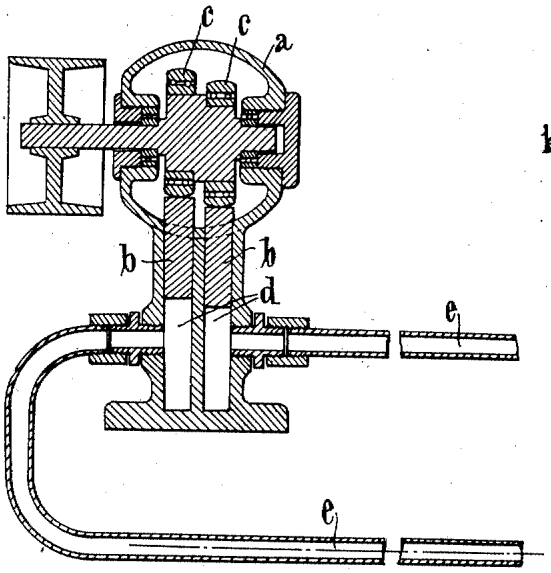

Fig. 1.

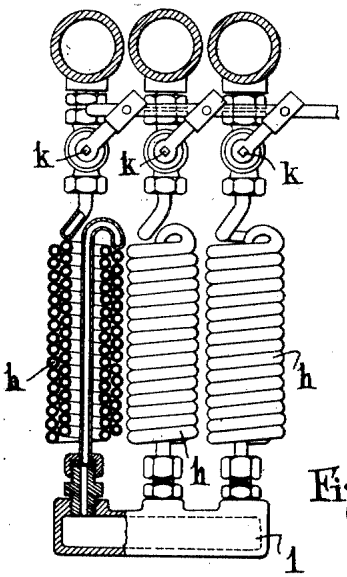

Fig. 3.

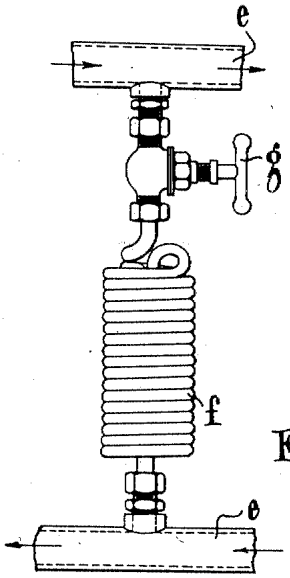

Fig. 2.

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2 SHEETS—SHEET 2.

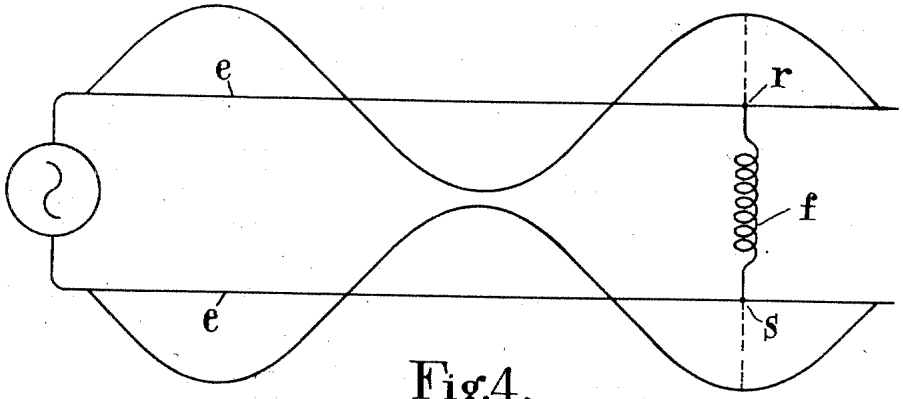

Fig.4.

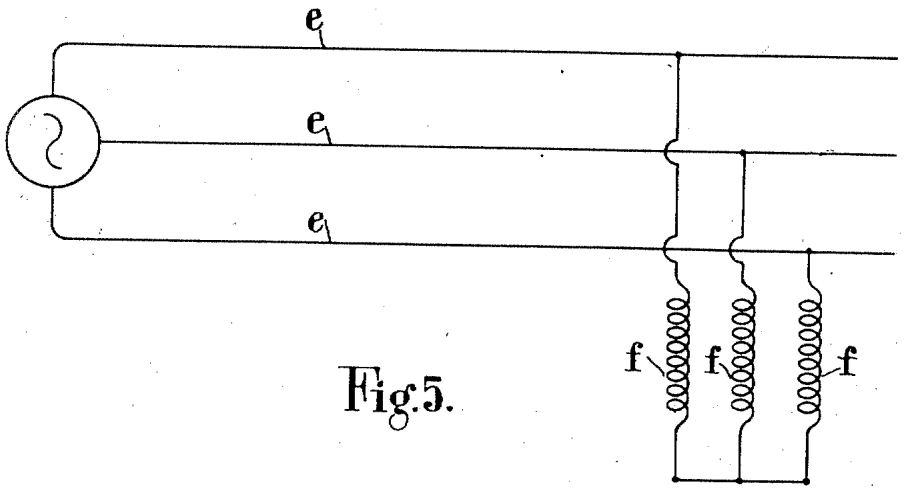

Fig.5.

Gogu Constantinesco INVENTOR

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ATTORNEY

UNITED STATES PATENT OFFICE.

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

HYDRAULIC TRANSMISSION.

1,334,280. Specification of Letters Patent. Patented Mar. 23, 1920.

Original application filed April 4, 1914, Serial No. 829,718. Divided and this application filed October 19, 1916, Serial No. 126,518. Renewed October 17, 1919. Serial No. 331,516.

To all whom it may concern:

Be it known that I, GOGU CONSTANTINESCO, a subject of the King of Great Britain and Ireland, and residing at The Haddon Engineering Works, Honeypot Lane, Alperton, in the county of Middlesex, England, have invented certain new and useful Improvements in Hydraulic Transmission, of which the following is a specification.

The present invention relates to the transmission of energy through liquids, particularly to long distance transmission as described in the specification Serial No. 829,718 of which this application is a division.

In the said specification a method and an apparatus are described in which energy is transmitted to very great distances by wave motion, a series of periodic pressure variations of small period being impressed on a liquid column and producing periodic changes of pressure and volume throughout the liquid column.

The present invention consists in obtaining heat at a distance from a source of power by means of energy caused to travel along a liquid column.

I have found by mathematical analysis that energy can be transmitted over very long distances through a liquid column or columns without excessive pressure by producing a series of periodic pressure variations which cause periodic changes of pressure and volume throughout the liquid column. The pressure variations are produced by a valveless pump reciprocating rapidly and producing an actual contraction of the liquid in the liquid column, this contraction being succeeded by an expansion and the succession of contractions and expansions travel along the pipe.

Referring to the accompanying drawings:—

Figure 1 shows a generator suitable for producing the periodic changes of pressure and volume in the pipe.

Fig. 2 shows a form of heater adapted to be placed in connection with the pipe to produce heat, while

Fig. 3 shows a modified form of heater suitable for connection to a system in which three liquid columns are employed.

Fig. 4 is a diagram showing the method of connecting up the heater illustrated in Fig. 2 and indicating, also diagrammatically, variations of pressure in the system while Fig. 5 is a diagram showing the method of connecting up the heater shown in Fig. 3.

In carrying the invention into effect according to the example illustrated in Figs. 1, 2 and 4, I provide a generator *a* in which eccentrics *c* are driven by any suitable means and reciprocate pistons *b* in cylinders *d* connected to a pipe *e* containing a liquid column which is led to a distance to the point at which the energy is required. At the receiving end of the pipe or at an intermediate point at which the heat is required there is connected across the two pipes *e*, *e*, a coil *f* of pipe of small diameter adapted to give a connection between the pipes *e* when the cock *g* is open.

According to the form of the invention shown in Figs. 3 and 5 in which three liquid columns *e*, *e*, *e*, are employed, three separate coils of piping *h*, *h*, *h*, may be employed adapted to be connected with the pipes *e* through valves *k*, *k*, *k*, and at their other ends connected to a common chamber *l*.

In the form of the invention shown in Figs. 1 and 2, mechanical energy of the oscillating liquid in the pipes *e*, *e*, is converted into heat by friction in the long coil *f* so that a continual supply of heat energy is radiated from this pipe.

It will be seen that the pipes *e* are of very considerably greater diameter than the coils *f* and very little energy will be absorbed in the transmission of the oscillations of the liquid in the pipes *e*. By this means, the coils *f* can be placed at a considerable distance from the generator with very little loss of power in the transmission of the energy from the generator to the heater.

The method of arranging the heater shown diagrammatically in Figs. 4 and 5 may be varied and any number of heaters in accordance with the size of the generator may be employed at various points on the transmission line.

It will be seen that as described in the main application, Serial No. 829,718, the generator will produce a series of periodic variations of volume and pressure which will travel along the liquid column, and in

order to obtain the necessary flow of liquid oscillating in the coils *f* it is essential that at any instant there should be a difference in pressure at the two ends of the coil *f*. At any instant the pressure along the pipe may be represented by the ordinates of a curve such as is shown in diagram, and in order to produce the necessary flow in the heating coil the ends of this pipe must be connected at two points such, for instance, as *r* and *s*, Fig. 4, where the phase of the pressure is different in the two pipes as shown by the curve.

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

A method of obtaining heat at a distance from a mechanical source of power which consists in impressing on a liquid column or columns alternating variations of pressure and volume and connecting such columns at the point at which the heat is required to a pipe of small diameter and so converting mechanical energy in such pipe into heat.

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

GOGU CONSTANTINESCO.