No. 875,059. PATENTED DEC. 31, 1907.

H. E. FRY.

HYDRO ELECTRIC MACHINE.

APPLICATION FILED APR. 15, 1907.

3 SHEETS—SHEET 1.

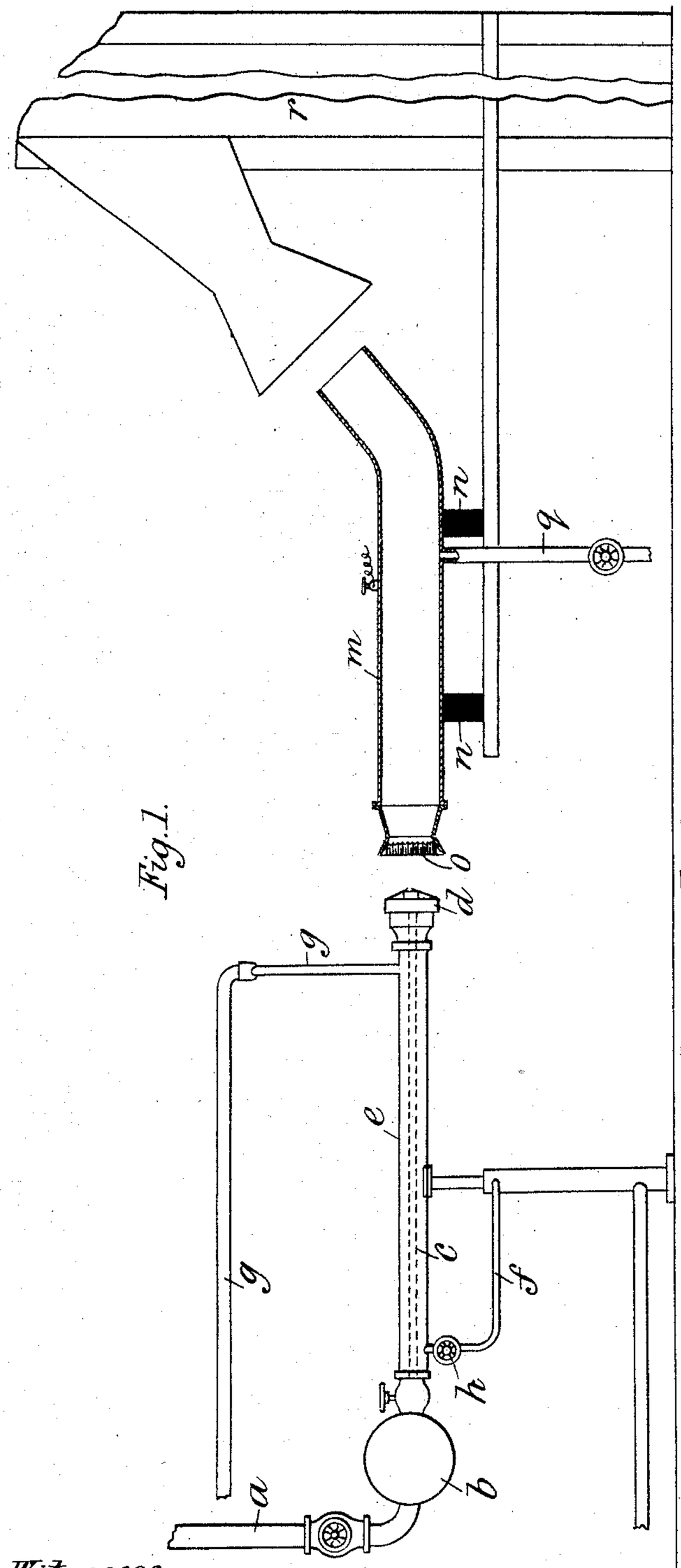

Fig. 1.

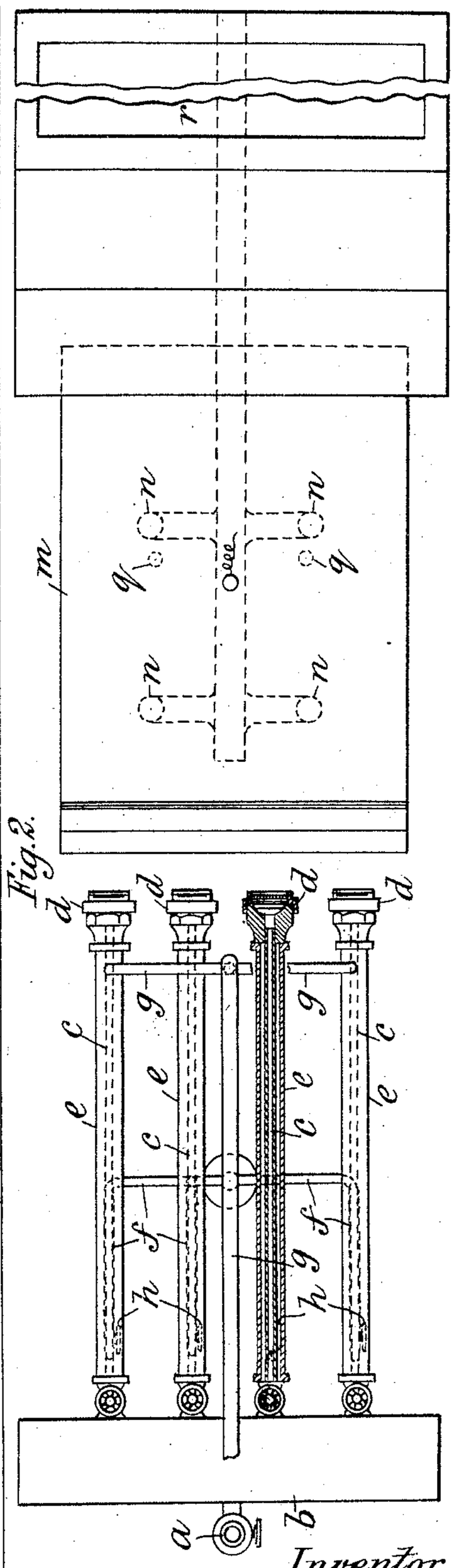

Fig. 2.

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3 SHEETS—SHEET 2.

Fig. 4.

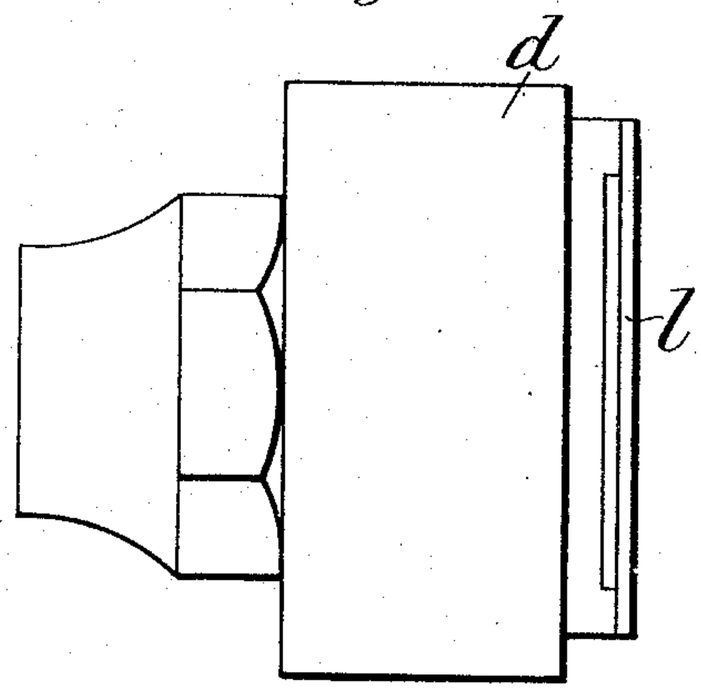


Fig. 3.

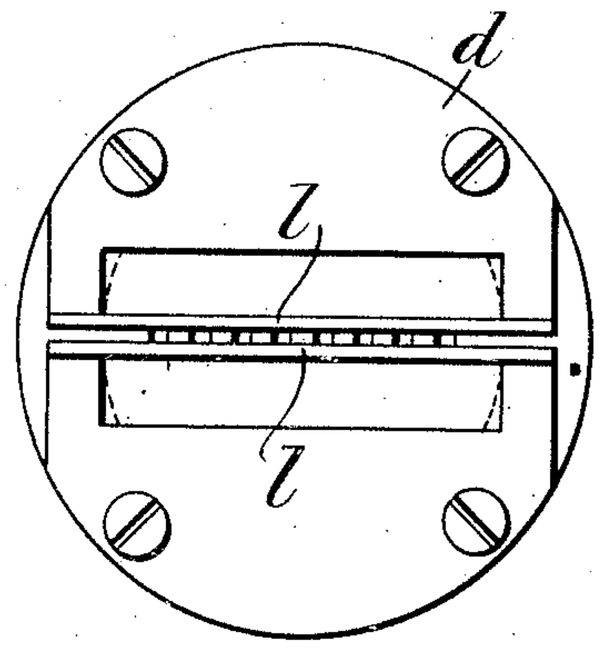


Fig. 5.

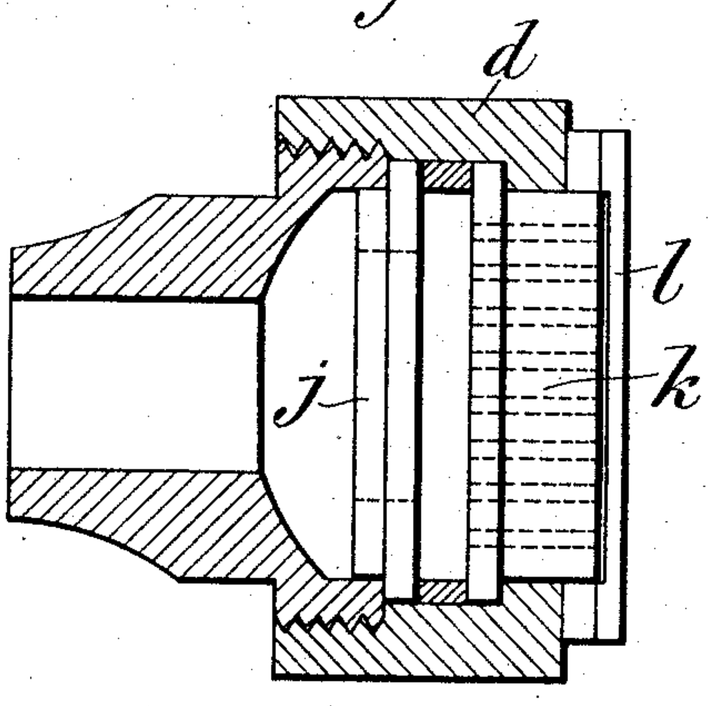
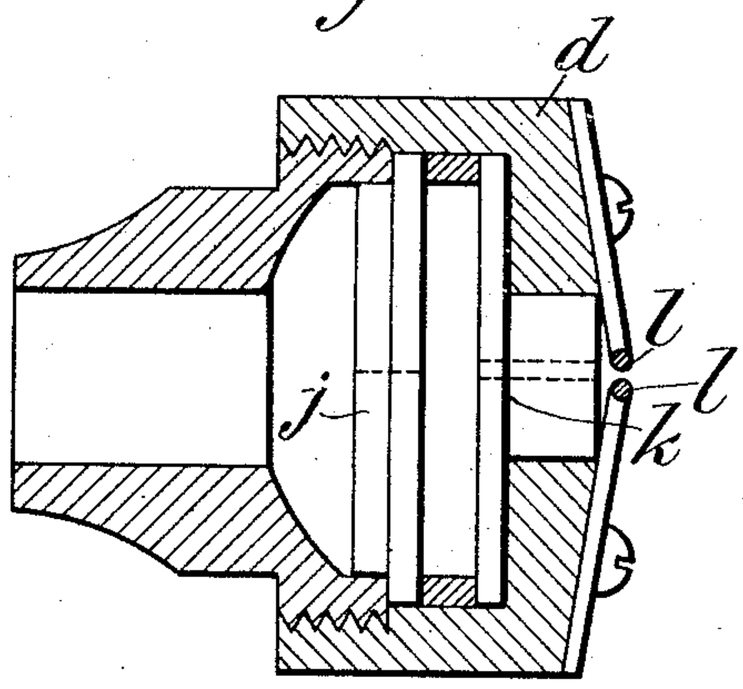


Fig. 6.



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3 SHEETS—SHEET 3.

Fig. 7.

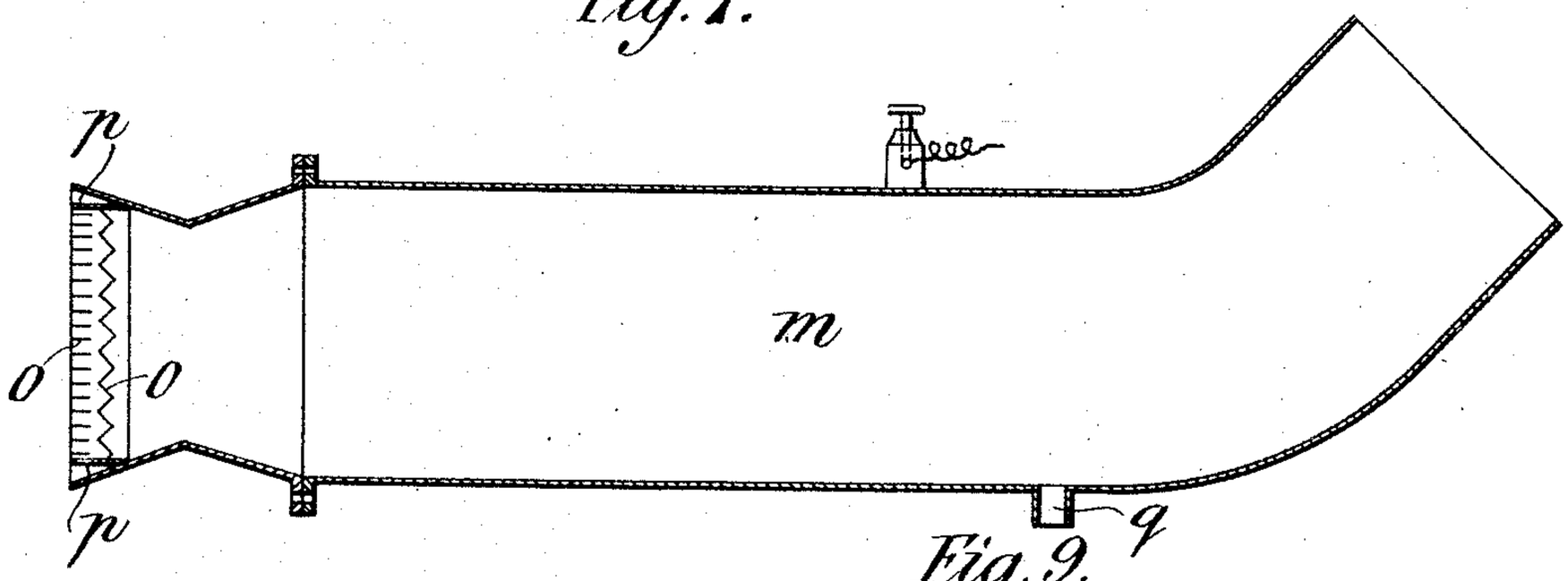


Fig. 8.

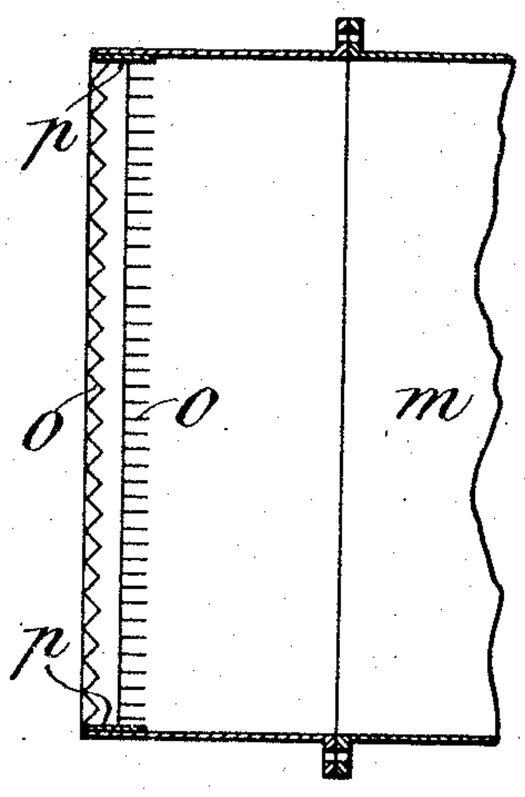


Fig. 9.

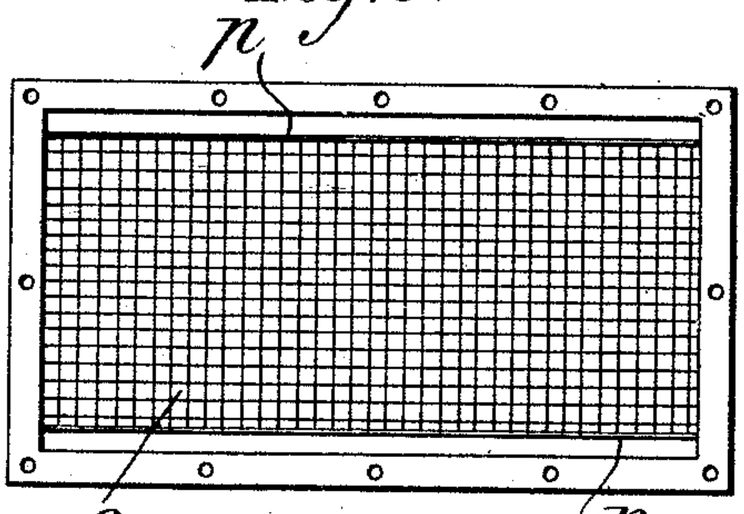
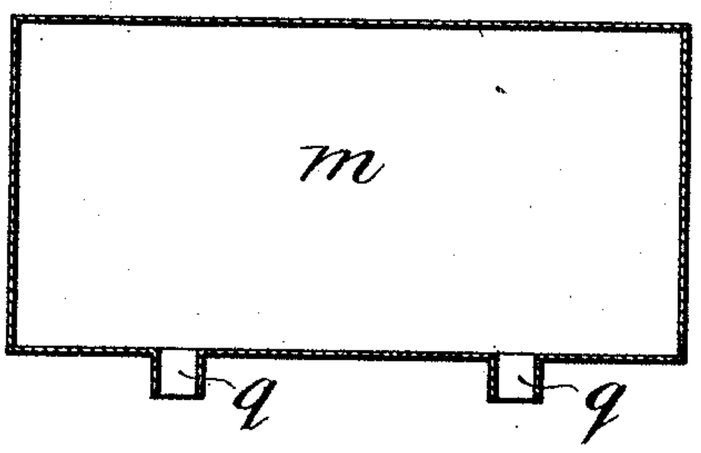


Fig. 10.



Witnesses.

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UNITED STATES PATENT OFFICE.

HENRY ERNEST FRY, OF DORCHESTER, ENGLAND.

HYDRO-ELECTRIC MACHINE.

No. 875,059. Specification of Letters Patent. Patented Dec. 31, 1907.

Application filed April 15, 1907. Serial No. 368,368.

To all whom it may concern:

Be it known that I, HENRY ERNEST FRY, gentleman, a subject of the King of Great Britain, residing at Godmanstone, Dorchester, in the county of Dorset, England, have invented new and useful Hydro-Electric Machines, of which the following is a specification.

The object of my invention is to produce electricity by steam without employing either engine or dynamo.

The fact that electricity could be produced by steam without engine or dynamo was proved by the late Lord Armstrong and Professor Faraday more than sixty years ago, but the discovery was only of scientific interest and led to no practical or useful results, because with the apparatus employed only a small quantity of electricity was produced compared with the steam power which was expended. The object of this invention is to increase the quantity.

The steam is conveyed from the boiler by means of a steam pipe to a steam chest which is placed within the building in which the electricity is produced. This steam chest is not essential, but forms a convenient receptacle from which the pipes leading to the nozzles can be branched. To the steam chest are connected one or more steam pipes each inclosed in a separate water jacket through which a constant current of cold water is kept circulating to aid in partially condensing the steam as it passes through the steam pipes it being necessary for the production of electricity that the steam shall contain a certain quantity of moisture when it passes through a nozzle or nozzles from the steam pipe or pipes as hereafter described. By employing separate water jackets the condensation in each steam pipe can be accurately adjusted. It is important that the steam should not be supplied with either an excess or insufficiency of moisture and this can be regulated by means of valves and cocks which control the water circulation in the water jackets. To the end of each steam pipe is secured a nozzle, which consists of a pipe having across it two or more diaphragms at a small distance apart perforated with slits or holes through which the steam passes in series—small expansion chambers are thus left between the diaphragms and the issuing steam is subjected to several frictions. The area of the apertures in the inner diaphragm which regulates the quantity of steam passing through the nozzle is by preference smaller than that of the second and subsequent ones. The slit or the row of holes in each diaphragm should to obtain the best results be horizontal.

I find that the best results are obtained when I use the combinations of the three baffling surfaces all arranged substantially horizontally as described though good results may be obtained by the omission of one of the inner diaphragms. The nozzle is preferably constructed wholly of metal. At a short distance from the nozzle or nozzles (thus leaving an air gap) I place a well insulated pipe or pipes or other suitable conduit or conduits to receive the now electrified moistened steam and within the pipes or conduits I place rows of pointed metallic collectors to collect the electricity which has been produced by and carried forward by the steam across the air gap. The steam passes from the insulated pipes or conduits to a chimney leading to the open air.

Figures 1 and 2 are a general elevation and plan of apparatus constructed according to this invention the boiler which may be of any ordinary construction being omitted. Figs. 3, 4, 5 and 6 are an end elevation, plan, horizontal section and vertical section of one of the nozzles. Figs. 7, 8 and 9 are a vertical section, a horizontal section and an end elevation of the mouthpiece of the conduit, and Fig. 10 is a vertical section of the conduit.

a is the steam pipe from the boiler and *b* is the steam chest.

c are pipes leading steam from the chest *b* to the nozzles *d*. Each of the pipes *c* passes through a water jacket *e* provided with an inlet pipe *f* and an outlet pipe *g*.

h are cocks on the pipes *f* by which the flow of water through the jackets *e* and consequent condensation of the steam in the pipes *c* can be separately regulated. The nozzles *d* each have in them two diaphragms *j* and *k*. The diaphragm *j* has on it a narrow horizontal slit say .008 of an inch wide and 1.125 inches long while the diaphragm *k* has in it a horizontal row of holes say $\frac{1}{16}$ inch in diameter. It is important that the slit and the row of holes should be horizontal otherwise the condensed water carried by the steam passes mainly through the lower portion and there is a consequent diminution in the quantity of electricity produced.

In front of the diaphragm *k* is a third friction surface consisting of a slit formed by a pair of horizontal wires *l*. The steam escaping from the nozzles *d* enters a conduit *m* which is preferably made of galvanized iron and is supported on insulators *n*. The mouthpiece of the conduit *m* has in it collectors *o* which consist of series of parallel, vertical and horizontal serrated strips of brass having their ends soldered to a ring *p* which in its turn is soldered in the mouthpiece. The conduit *m* is provided with drain pipes *q* to get rid of condensed water. The steam escaping from the conduit *m* passes away by the chimney *r*. As a row of holes is the mechanical equivalent of a slit in the following claims the word "slit" is used to embrace both.

What I claim is:—

1. In hydro-electric machines, the combination of a series of diaphragms having slits in them placed one in advance of the other with spaces between them, the area of the slits increasing progressively, and means for directing the steam to the slits.

2. In hydro-electric machines, the combination of a series of vertical diaphragms having horizontal slits in them placed one in advance of the other with spaces between them, and means for directing the steam to the slits.

3. In hydro-electric machines, the combination of a series of diaphragms having horizontal slits in them placed one in advance of the other with spaces between them, the area of the slits increasing progressively, and means for directing the steam to the slits.

4. In hydro-electric machines, the combination of a series of steam pipes, a separate water jacket round each pipe, means for supplying water to each jacket, and nozzles at the ends of the steam pipes.

5. In hydro-electric machines, the combination of a series of steam pipes, a separate water jacket round each pipe, means for supplying water to each jacket, and a series of friction surfaces placed one in advance of the other at the end of each steam pipe.

6. In hydro-electric machines, the combination of a series of steam pipes, a separate water jacket round each pipe, means for supplying water to each jacket, and a series of diaphragms having slits in them placed one in advance of the other at one end of each steam pipe.

7. In hydro-electric machines, the combination of a series of steam pipes, a separate water jacket round each pipe, means for supplying water to each jacket, and a series of diaphragms having horizontal slits in them placed one in advance of the other at one end of each steam pipe.

8. In hydro-electric machines, a collector consisting of an insulated pipe having across it a series of serrated strips.

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Witnesses:
J. M. Voss,
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