C. A. PARSONS & S. S. COOK.

CONDENSING APPARATUS.

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1,102,071. Patented June 30, 1914.

Fig. 1.

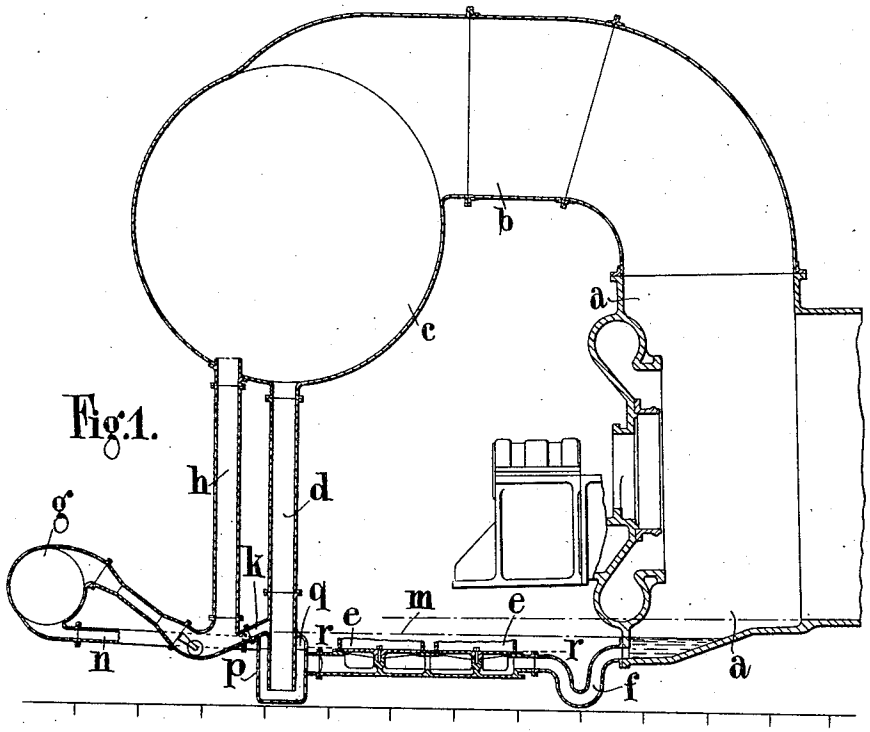
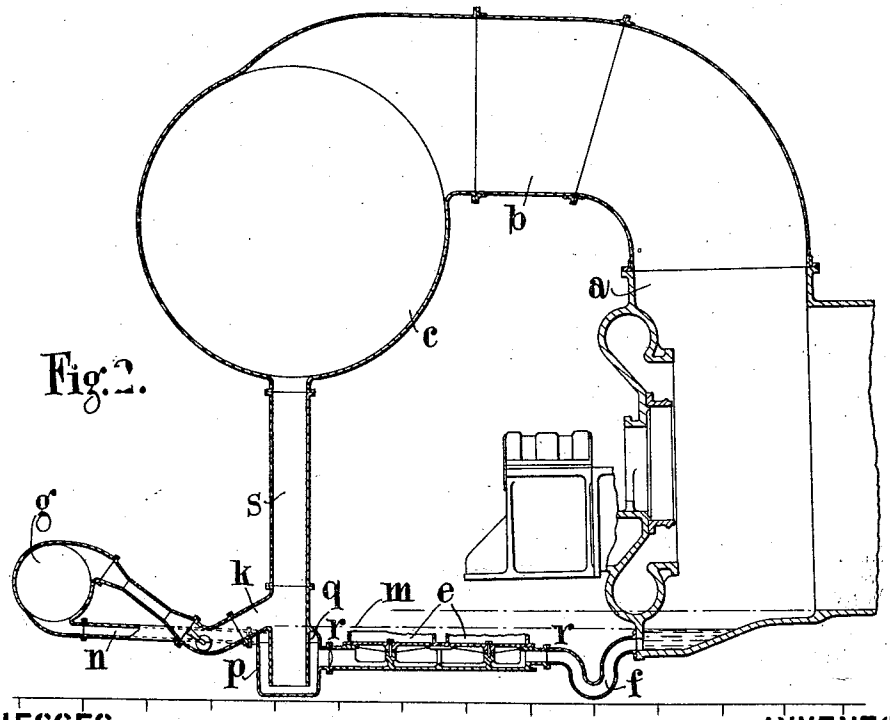


Fig. 2.



WITNESSES

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CONDENSING APPARATUS.

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To all whom it may concern:

Be it known that we, the Honorable Sir CHARLES ALGERNON PARSONS, K. C. B., a subject of the King of Great Britain and Ireland, and residing at Heaton Works, Newcastle-upon-Tyne, and STANLEY SMITH COOK, a subject of the King of Great Britain and Ireland, and residing at Turbinia Works, Wallsend-on-Tyne, both in the county of Northumberland, England, have invented certain new and useful Improvements in Condensing Apparatus, of which the following is a specification.

This invention relates to improvements in condensing apparatus of the type in which a turbine or like chamber exhausts into a condenser having ordinary exhausting means connected thereto and to said chamber, and in which augmentor means for increasing the degree of vacuum in the condenser are connected to the conduit leading from the condenser to the ordinary exhausting means at the level to which the condensed fluid is permitted to rise within the said chamber. In such an arrangement when the condensed and non-condensed vapors delivered from the augmentor means are withdrawn by the ordinary exhausting means it is found that the non-condensed vapors are liable to return to the inlet of the augmentor means instead of passing to the ordinary exhausting means, thus reducing the efficiency of the plant.

The object of the present invention is to overcome this disadvantage, and to provide an improved condensing plant of this type.

The invention consists in condensing apparatus of the above type in which a device such as a liquid seal is provided in the conduit between the outlet from the augmentor means and the inlet to the ordinary exhausting means to prevent the return of the non-condensed vapors to the inlet of the augmentor means.

Referring now to the accompanying drawing: Figure 1 is a sectional view of condensing apparatus arranged according to the present invention, while Fig. 2 is a sectional view of a modified form of the apparatus.

The invention also consists in the improved condensing apparatus hereinafter described.

One method of carrying the invention into effect is illustrated by way of example as applied to the condensing apparatus illustrated in sectional elevation in Fig. 1. In this arrangement a steam turbine *a* exhausts steam into a conduit *b* leading to a condenser *c*, from which the water of condensation is removed through a conduit *d* by ordinary exhausting means *e*, which usually consist in the ordinary type of wet air pump used in such plant, and which in addition withdraws water of condensation from the turbine chamber *a* by means of the pipe connection *f*.

The degree of vacuum thus produced in the condenser *c* is increased by augmentor means *g*, for example a jet and condenser which are connected to the condenser *c* by the conduit *h*.

For the purpose of preventing the water of condensation rising to an undesirable level within the turbine chamber *a*, a pipe connection *k* is provided between the conduits *d* and *h*, and connected to the former at the level *mm*, to which such water is to be permitted to rise within the turbine chamber. In such an arrangement, however, it has been found that if the augmentor means *g* discharge through a pipe connection *n* leading to the inlet of the ordinary exhausting means *e*, the non-condensed vapors forming part of this discharge are liable to pass upward and through the pipe connection *k* to the inlet of the augmentor means instead of passing directly to the inlet of the ordinary exhausting means *e*. In this way the efficiency of the condensing plant is considerably reduced. According to the present invention, however, this difficulty is overcome by arranging in the conduit *n* between the outlet of the augmentor means *g* and the inlet to the ordinary exhausting means *e*, a device which prevents the non-condensed vapors discharged from the augmentor means being returned to the inlet thereof. Such a device may consist, for example, in an outer closed vessel *p*, which forms part of the connection between the outlet of the augmentor means *g* and the inlet to the ordinary exhausting means *e*.

Direct communication between the main condenser *c* and the ordinary exhausting means *e* is provided by extending the vessel *p* some distance below the level *rr* of the inlet valves of the exhausting means *e*. In this way the condensed vapor discharged from the augmentor means *g* will be collected in the vessel *p*, and form a liquid seal

to prevent escape of non-condensed vapors which collect in the space *q* above said liquid and are afterward withdrawn by the exhausting means *e*. The non-condensed vapors are thus prevented from passing into the conduit *d* and pipe connection *k*, but at the same time the condensed vapors may still overflow into the connection *k* for the purpose of preventing the condensed vapor rising to an undesirable height in the turbine chamber *a*.

In the case of condensing apparatus having between the main condenser *c* and the ordinary exhausting means *e* a single conduit *s* with a branch connection *k* to the augmentor means *g* as shown in Fig. 2, the conduit *s* is extended so as to project within the vessel *p* to the required distance below the level of the condensed vapor collected therein. As in the previous arrangement any non-condensed vapors discharged from the augmentor means are delivered into the liquid sealed space *q* in the vessel *p*, from which they are withdrawn directly by the ordinary exhausting means *e*, and prevented from passing back to the inlet of the augmentor means *g* while the condensed vapors collected in the vessel *p* may still overflow into the conduit *k* for the purpose of preventing the condensed fluid within the turbine chamber *a* rising above the predetermined level *mm*.

Obviously the device for preventing the passage of non-condensed vapors from the conduit *n* to that leading to the inlet of the augmentor means *g* may take many forms, it being only essential for the purpose of the present invention that such a device allows only the condensed vapors discharged from the augmentor means to return to the inlet of the latter when required.

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

1. An apparatus for obtaining a high degree of vacuum comprising in combination a motor, a condenser receiving the fluid discharged from said motor, exhausting means, a pipe connection between the condenser and the exhausting means, a drainage pipe connection from the motor to the exhausting means, augmentor means having a connection to the connection between the condenser and exhausting means, said connection being made at the level to which condensed fluid is permitted to rise within the motor, a connection conveying fluid from the augmentor means to the exhausting means and means by which any uncondensed fluid which has already passed from the augmentor means to the exhausting means is prevented from circulating through the other pipe connections back to the augmentor means.

2. An apparatus for obtaining a high degree of vacuum comprising in combination a motor, a condenser receiving the fluid discharged from the motor, exhausting means, a pipe connection between the condenser and the exhausting means, a drainage pipe connection from the motor to the exhausting means, augmentor means, a pipe connection between said augmentor means and the condenser, an overflow pipe connection between the latter connection and the connection between the condenser and exhausting means, said overflow connection being connected to the exhausting means pipe connection at the level to which condensed fluid is permitted to rise within the motor, a connection conveying fluid from the augmentor means to the exhausting means, and means by which uncondensed fluid which has already passed from the augmentor means to the exhausting means is prevented from returning to the augmentor means by way of said overflow connection.

In testimony whereof, we affix our signatures in presence of two witnesses.

CHARLES ALGERNON PARSONS.
STANLEY SMITH COOK.

Witnesses:
WILLIAM SHEARER,
ALBERT WILLIAM POOR.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."