

T. MOHN.
CONDENSING APPARATUS.
APPLICATION FILED SEPT. 29, 1909.

1,005,997.

Patented Oct. 17, 1911.

2 SHEETS—SHEET 1.

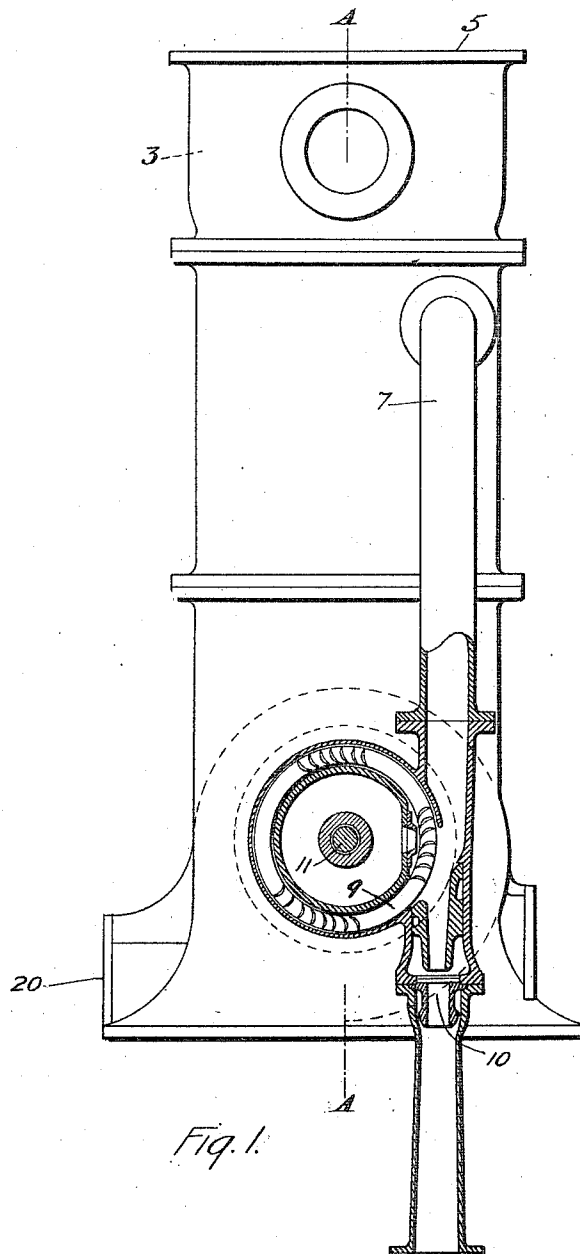


Fig. 1.

Witnesses.

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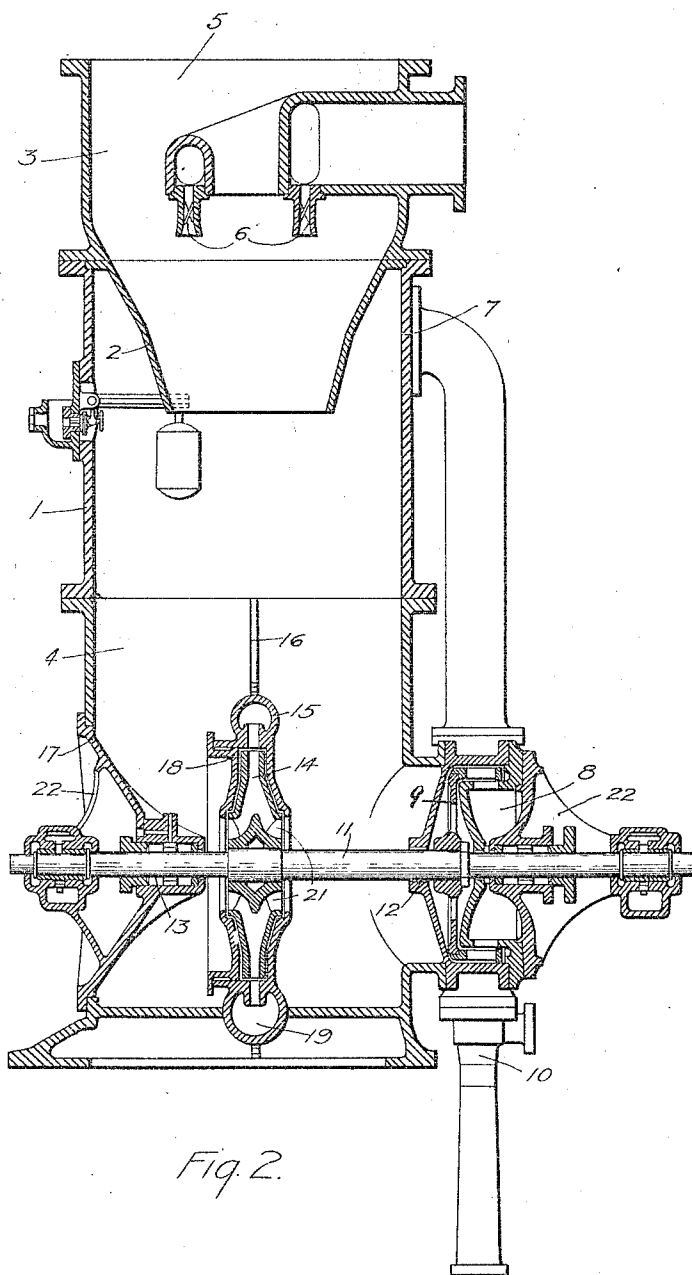


Fig. 2.

Witnesses.

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UNITED STATES PATENT OFFICE.

TRYGVE MOHN, OF MANCHESTER, ENGLAND, ASSIGNOR, BY MESNE ASSIGNMENTS, TO THE COLONIAL TRUST COMPANY, TRUSTEE, OF PITTSBURGH, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

CONDENSING APPARATUS.

1,005,997.

Specification of Letters Patent.

Patented Oct. 17, 1911.

Application filed September 29, 1909. Serial No. 520,196.

To all whom it may concern:

Be it known that I, TRYGVE MOHN, a subject of the King of Great Britain, and a resident of Trafford Park, Manchester, in the county of Lancaster, England, have made a new and useful Invention in Condensing Apparatus, of which the following is a specification.

My invention relates to condensing apparatus and particularly to apparatus of this description in which a centrifugal pump and an air pump are employed for discharging the water and air mixture from the condenser.

In the form of condenser known as the Westinghouse Leblanc and in certain other types to which my invention is applicable, the condenser is divided into two compartments, one compartment constituting a mixing chamber for the cooling water and the steam to be condensed, and the other compartment constituting a hot well for the products of condensation and the condensing water. For the purpose of removing the water a centrifugal pump is provided and an air pump connected to the top of this compartment effects the removal of the air and exhaust gases. Under these circumstances, the centrifugal pump and the air pump are located adjacent to the casing of the condenser forming the hot well and connected together on the same shaft so that both pumps are rotated at the same speed and may be driven by the same mechanism.

The object of the present invention is to improve upon the construction hitherto adopted in the arrangement of the pumps and to so locate the centrifugal pump that a material saving of space may be effected without interfering with the satisfactory operation of the apparatus. According to the present invention to attain these ends the centrifugal pump is located within the hot well formed by the condenser casing and is carried upon a shaft, one end of which is supported in a bearing formed in the casing and the other end of which projects through said casing and carries the air pump upon its outer extremity.

In the accompanying drawings: Figure 1 is a view shown partially in sectional elevation of the invention as applied to a condenser of the parallel flow type; and Fig.

2 is a similar view on the line A—A of Fig. 1.

Referring to the drawings: the condenser, which is of the usual construction apart from the modifications necessary for the particular arrangement of the pumps, is contained in an outer casing 1 and comprises a cone 2 concentrically arranged therewith dividing the condenser into two portions, the upper portion 3 constituting the mixing chamber for the condensing water and the steam to be condensed, the lower portion 4 constituting the hot well for the condensing water and the uncondensed steam and gases. The steam to be condensed is admitted to the condenser at 5 and the condensing water is drawn into the condenser through nozzles 6, 6 arranged vertically above the cone 2. The air outlet 7 leading to the air pump is located underneath and adjacent to the cone 2. The air pump 8 which comprises a reversely driven turbine wheel 9 adapted to project liquid through a nozzle 10 and to so withdraw the air from the condenser is shown carried upon the outer extremity of a shaft 11 supported in bearings 12 formed in the stationary part of the air pump, said shaft projecting through the condenser and being supported on the opposite side thereof in bearings 13 formed in the condenser casing.

Located within the condenser casing and keyed to the shaft 11 is the rotatable member 14 of the centrifugal pump, surrounded by an outer casing 15 secured to webs 16 formed on the inside of the condenser casing. Under some circumstances the casing 15 of the centrifugal pump may be formed integral either with the condenser casing or with angle irons or channel irons to be secured thereto. The bearing 13 surrounding the shaft 11 of the centrifugal pump is formed in a removable portion 17 of the condenser casing in order to provide free access to the interior of the condenser casing and to the centrifugal pump for repairs or other purposes. The casing 15 of the centrifugal pump is preferably formed in two parts, a stationary portion 15 which may or may not be formed integral with the webs 16, and a removable portion 18 surrounding the shaft 11 and bolted or otherwise secured to the portion 15 of the centrifugal

pump. Under these circumstances, free access to the interior of the centrifugal pump is provided without disturbing the rotatable member 14 and without rendering it necessary to remove the air pump from the shaft. It will be understood that the centrifugal pump will be located in all cases at the bottom of the hot well and will be entirely surrounded by water, consequently a tight joint is made between a pipe 19 leading from the periphery of the centrifugal pump to an outlet 20 formed in the condenser casing, but the water will be allowed free access to the suction port or ports 21 of the centrifugal pump.

The centrifugal pump and the air pump may be driven by any suitable means and in order to avoid undue strain upon the bearings formed in the condenser casing thereby causing wear and as a result leakage of water from the condenser, additional outer bearings are provided, one at each end of the shaft 11 which maintain the shaft in perfect alinement, said outer bearings being supported by webs 22 formed integral with the removable portion of the condenser casing supporting the inner bearing and with the stationary part of the air pump respectively.

Although the invention is particularly applicable to cases in which the water and air are withdrawn by a centrifugal pump and by a rotary air pump, it is not limited to this particular application, but may be equally well applied to apparatus in which a centrifugal pump is employed for discharging the water, the air being withdrawn by other means, for instance, under some circumstances it might be advisable to withdraw the air from the condenser by means of a simple steam ejector discharging directly to the atmosphere. In this case, however, the centrifugal pump might still with

advantage be located in the interior of the condenser casing in the manner which I have illustrated.

Since the construction of the air pump or the centrifugal pump does not form a part of the present invention, and since the operation of pumps of this description are now well understood, I have not considered it necessary to fully describe the same but it will be evident that the invention is not limited in its application to a condenser of the parallel flow type, but may be equally well applied to any type in which the hot well is contained in the condenser casing.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is:—

1. In a condensing apparatus, a vertically arranged hot well provided with oppositely arranged removable covers near its bottom, a shaft extending through said covers, a water delivery pump mounted on said shaft within said hot well and an air pump mounted on said shaft outside of said hot well.

2. In a condensing apparatus, a vertically arranged hot well provided with oppositely arranged removable covers near its bottom, a shaft extending through said covers, a water delivery pump mounted on said shaft between said covers and an air pump mounted on said shaft outside of said hot well and having its housing partially formed by one of said covers.

In testimony whereof, I have hereunto subscribed my name this 16th day of September 1909.

TRYGVE MOHN.

Witnesses:

J. S. PECK,
G. W. PIMAR.