

F. STROHBACH.
CENTRIFUGAL PUMP OR COMPRESSOR.
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1,013,329.

Patented Jan. 2, 1912.

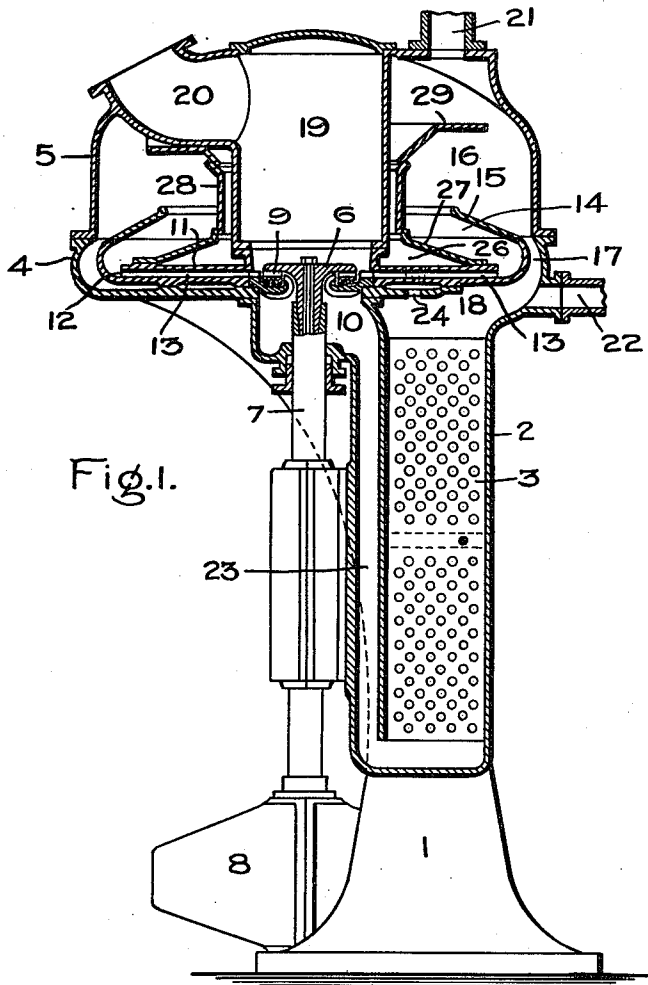


Fig. 1.

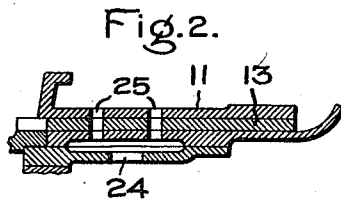


Fig. 2.

Witnesses:

Marcus L. Byung.
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Inventor,
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by *Alfred Davis*
Att'y.

UNITED STATES PATENT OFFICE.

FRITZ STROHBACH, OF CHARLOTTENBURG, GERMANY, ASSIGNOR TO GENERAL
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CENTRIFUGAL PUMP OR COMPRESSOR.

1,013,329.

Specification of Letters Patent.

Patented Jan. 2, 1912.

Application filed June 19, 1911. Serial No. 634,066.

To all whom it may concern:

Be it known that I, FRITZ STROHBACH, a subject of the King of Prussia, residing at Charlottenburg, Germany, have invented certain new and useful Improvements in Centrifugal Pumps or Compressors, of which the following is a specification.

The present invention relates to centrifugal pumps or compressors of the so-called "throwing type," and has for its object to improve their construction and operation, particular reference being made to the means for separating air and other gases from the throwing water after it leaves the pump proper and before it enters and is acted upon by the cooler.

In the accompanying drawing, which illustrates one of the embodiments of my invention, Figure 1 is a vertical section of a centrifugal pump or compressor, and Fig. 2 is a detailed view showing the arrangement of certain of the passages for permitting air and other gases to pass from the cooler to the separating chamber.

1 indicates the base of the apparatus which is provided with a vertically disposed hollow column 2 that contains the cooler 3, the latter being composed of a plurality of pipes or conduits through which circulating water or other cooling medium flows. The upper end of the column is enlarged to form a support 4 for the casing or top part 5 of the pump.

6 indicates the pump impeller which is mounted on a vertical shaft 7 that is driven by an elastic fluid turbine or other motor 8.

The impeller is provided with vanes 9 that receive throwing water from the suction chamber 10 and discharge it outwardly through a stationary directing wheel or annulus 11, the latter comprising a plurality of passages 12 through which the throwing water and air and gases flow. Between these passages are fixed vanes 13. The mixture of throwing water and gases discharged by the annulus is received in the receptacle 14, the latter being provided with an inwardly inclined wall 15 to change the direction of flow of the fluid thereby causing the water and air to separate as fully as possible.

Between the receptacle 14 and the cover 15 is a chamber 16 that communicates with a conduit 17 leading to the receiving chamber 18 above the cooler. In this chamber

the water and air separate. The cover is provided with a supply chamber 19 that has an inlet conduit 20, the latter receiving air and other gases from a condenser or other vessel to be evacuated. The lower end of chamber 19 is open and is in direct communication with the inlet side of the annulus 11. The separating chamber 16 is provided with an outlet conduit 21 for the escape of air and other gases. This conduit may be controlled by a valve in the ordinary manner.

22 indicates an outlet for the excess water due to the condensation of steam and may be controlled by a valve in the ordinary manner.

As the throwing water is discharged from the annulus 11 its direction of flow is changed by the wall 15. It then enters the separating chamber 16 where the principal portion of the air escapes. The water then passes by the conduit 17 into the receiving chamber 18, and thence flows to the bottom of the cooler 3 and rises by the passage 23 to the suction chamber 10 of the impeller. The throwing water leaving the separating chamber 16 and entering the receiving chamber 18 carries more or less air and uncondensed gases which must be removed if the best results are to be obtained from the cooler and pump. To separate this air or other gases from the throwing water, I provide one or more passages or conduits that convey said air and gases from the receiving chamber 18 into the separating chamber 16 at a point above the level of the throwing water. In the present illustration of this invention, the following arrangement is provided for this purpose: 24, Fig. 2, indicates an opening in the wall that supports the annulus and which communicates with conduits or passages 25 that extend through the top and bottom walls of the annulus, and also through the fixed vanes 13 thereof. These conduits or passages communicate with a chamber 26 that is formed between the wall of the supply chamber 19 and an annular shield. The said shield comprises an annular inclined wall 27 which at its lower end rests on the top of the annulus and at its upper end supports the cylinder 28. The upper end of the cylinder is provided with an outwardly extending flanged member 29 which is located above the level of the water in the

separating chamber. This means that there is a direct escape for any air or other gas that may be carried through the conduit 17 into the chamber 18 with the throwing
 5 liquid. The air from the chamber 18 flows upwardly between the shield and the wall of the chamber 19 into the separating chamber and escapes through the outlet pipe 21, together with the air which is separated from
 10 the liquid in the chamber 16.

In accordance with the provisions of the patent statutes, I have described the principle of operation of my invention together with the apparatus which I now consider to
 15 represent the best embodiment thereof; but I desire to have it understood that the apparatus shown is only illustrative, and that the invention can be carried out by other means.

What I claim as new and desire to secure
 20 by Letters Patent of the United States, is,—

1. In a pump of the character described, the combination of a casing, an impeller located therein, an annulus surrounding the impeller and receiving the fluid discharged
 25 thereby, a chamber communicating with the inlet side of the annulus, a separating chamber in which the gas is separated from the mixture discharged by the annulus, a cooler that receives liquid mixed with some gas
 30 from said chamber and after cooling the liquid delivers it to the suction side of the impeller, and conduit means which receive gas from the liquid after it enters the cooler and conveys it to said separating chamber.

35 2. In a pump of the character described, the combination of a casing, an impeller located therein, an annulus surrounding the impeller and receiving the fluid discharged thereby, a chamber communicating with the
 40 inlet side of the annulus, a separating chamber in which gas is separated from the mixture discharged by the annulus, a cooler that receives liquid mixed with some gas from the chamber and after cooling the liquid delivers
 45 it to the suction side of the impeller, and a conduit which extends through the annulus and establishes communication between the cooler and said separating chamber.

3. In a pump of the character described,
 50 the combination of a casing, an impeller located therein and occupying a horizontal plane, an annulus surrounding the impeller and receiving the fluid discharged thereby, a chamber located above the impeller and communicating with the inlet side of the annu-
 55 lus, a separating chamber located above the

annulus in which gas separates from the mixture discharged by the annulus, a cooler located below the impeller and annulus which receives the liquid mixed with some
 60 gas and after cooling the liquid delivers it to the suction side of the impeller, and conduit means that extend through the annulus and establish communication between a chamber in the upper end of the said cooler and said
 65 separating chamber.

4. In a pump of the character described, the combination of an upright column, a cooler therein, an impeller that is horizontally disposed above the cooler and receives
 70 liquid therefrom, a casing for the impeller supported by the column, an annulus that surrounds the impeller and receives a mixture of liquid and gas therefrom, a gas containing chamber which communicates with
 75 the inlet side of the annulus, a separating chamber that receives the fluid mixture from the annulus, a conduit conveying liquid from the chamber to the cooler, a passage extending through the annulus from the cooler for
 80 conveying gas, and a shield located above the annulus and extending above the level of the fluid mixture in the separating chamber for preventing gas from the cooler mixing with the liquid in the separating chamber.
 85

5. In a pump of the character described, the combination of an upright column, a cooler therein, an impeller that is horizontally disposed above the cooler and receives
 90 liquid therefrom, a casing for the impeller supported by the column, an annulus that surrounds the impeller and receives a mixture of liquid and gas therefrom, an annular gas containing chamber which communicates
 95 with the inlet side of the annulus, a separating chamber that receives a fluid mixture from the annulus, a conduit conveying liquid from the chamber to the cooler, a passage that extends through the annulus for establishing communication between a chamber
 100 at the top of the cooler and the separating chamber, and an annular shield mounted above the annulus and surrounding the gas chamber for conveying air from said passage to a point above the level of the liquid
 105 in the separating chamber.

In witness whereof, I have hereunto set my hand this 31st day of May, 1911.

* FRITZ STROHBACH.

Witnesses:

ERIC WIERLEC,
 OSCAR EBERTH.