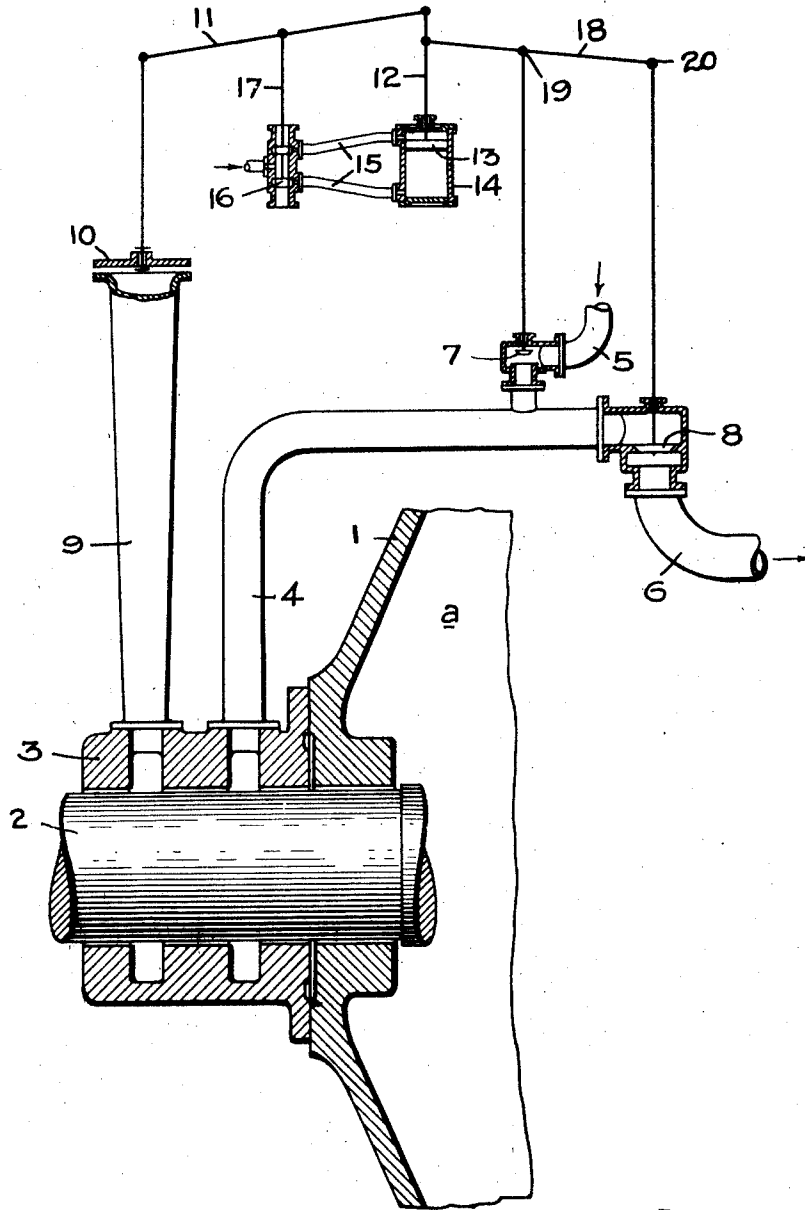


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 PACKING FOR ELASTIC FLUID TURBINES.
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Witnesses:

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UNITED STATES PATENT OFFICE.

WALTER KIESER, OF CHARLOTTENBURG, GERMANY, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

PACKING FOR ELASTIC-FLUID TURBINES.

1,022,788.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, WALTER KIESER, a citizen of Switzerland, residing at Charlottenburg, Germany, have invented certain new and useful Improvements in Packings for Elastic-Fluid Turbines, of which the following is a specification.

This invention relates to elastic fluid turbines, and its object is to provide a packing for a shaft, where it passes through the wall of the casing of such a turbine, with means for preventing the ingress of atmospheric air through said packing and also for carrying off any excess of waste steam which may leak through it. To this end the packing is provided with a regulating member which is loaded uniformly and is under the influence of the pressure prevailing in the packing, which regulating member, on the variation of the leakage steam pressure, causes the opening or closure of the conduits leading to a region of lower pressure on the one hand, and to a region of higher pressure on the other, whereby the load on the regulating member is so calculated that the lifting thereof takes place only when the leakage steam pressure exceeds the pressure of one atmosphere.

It is essential that the packing be never connected at the same time with the two regions of different pressure. This result is secured according to the invention by reason of the provision that the valves or shut-off members of the conduits connecting the packing with a region of higher and a region of lower pressure make engagement with a common lever connected with the rod of the regulating member in such a manner that the particular point of rotation thereof coincides with the point of engagement of the valve in its closed position.

The accompanying drawing is a diagrammatic representation of one form of embodiment of my invention.

1 represents the wall of the casing of a steam turbine at a point where there exists within said casing a stage *a* of lower pressure. A shaft 2 extends through said wall, and is provided with a packing or stuffing box 3 to shut off the external atmospheric pressure. From said packing or stuffing box runs a conduit 4 which has two branches, one of which, 5, is connected with a region of higher pressure, while the other branch 6 connects with a region of lower pressure.

The branch 5 is controlled by a valve 7 and the branch 6 by a valve 8.

At its outer end the packing is provided with a pipe 9 for the removal of leakage steam. Seated upon the open upper end of this pipe is a plate valve 10 which is exposed to the atmospheric pressure on its upper side, its under side being exposed to the pressure of the leakage steam escaping through the pipe 9. This valve is connected to a lever 11 whose other end is fulcrumed to the rod 12 of a motor, comprising preferably a piston 13 working in a cylinder 14. Motive fluid is admitted to the ends of said cylinder through pipes 15 controlled by a pilot valve 16 whose stem 17 is pivoted to the lever 11 between the valve 10 and the piston rod 12. A floating lever 18 is pivoted to the piston rod 12 and to it are pivoted at 19, 20 the stems of the valves 7, 8. The point of rotation or fulcrum of this lever 18 lies either at the point 19 or 20, depending upon which one of the valves 7, 8 is closed.

The operation is as follows:—It is assumed, with the parts in the position shown in the drawing, that the steam pressure in the stage *a* of the turbine has fallen below atmospheric pressure. Therefore the packing, in order to prevent the air from being sucked in, is supplied with steam of higher pressure through the conduit 5. This steam escapes through the pipe 9 after passing over the packing surfaces of the shaft. If now the steam pressure in the stage *a* rises, a higher steam pressure also is produced in the pipe 9. The plate valve 10 is therefore lifted, and with it the pilot valve 16, thereby admitting motive fluid to the upper end of the cylinder 14 which forces down the piston 13. This pulls down the lever 18 also, its fulcrum being the point 20, because the valve 8 is closed. If this movement continues far enough, the valve 7 will be closed and the supply of high pressure steam be cut off from the stuffing box. If the leakage steam continues to increase in pressure, the further lifting of the plate valve 10 will swing the lever 18 upon the point 19 as a fulcrum and thereby open the valve 8, so that said steam can escape through the pipes 4, 6 to any desired place; for example a stage of still lower pressure, so as to avoid wasting such steam. If now the pressure in the pipe 9 is lessened, the

valve 10 drops and by a reversal of the above-described operations, first the valve 8 is closed and then the live steam valve 7 is again opened.

5 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 represent the best embodiment thereof; but I desire to have it understood that the
10 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
15 by Letters Patent of the United States, is:—

1. The combination with a packing, of conduits leading respectively to regions of higher and lower pressure, valves controlling said conduits, a device responsive to
20 changes in the steam leaking through said packing, and connections between said device and said valves.

2. The combination with a packing, of conduits leading respectively to regions of higher and lower pressure, valves controlling said conduits, an escape pipe for the steam leaking through said packing, a plate responsive to the flow of steam through said pipe, and connections between said plate
30 and said valves.

3. The combination with a packing, of conduits leading respectively to regions of higher and lower pressure, valves controlling said conduits, a floating lever to which said valves are connected, a motor for actuating said lever, an escape pipe for steam
35 leaking through said stuffing box, a device

responsive to the steam flowing through said pipe, and means whereby said device controls the motor.

4. The combination with a packing, of conduits leading respectively to regions of higher and lower pressure, valves controlling said conduits, a floating lever to which said valves are connected, a motor for actuating said lever, the valve which happens to be closed acting as the fulcrum for said lever, and means responsive to the steam escaping through said packing for controlling said motor.

5. The combination of a shaft, a packing therefor through which fluid tends to escape, conduit means connected to the packing and to sources of pressure, one of which is higher than the other, and a device responsive to the pressure of the steam leaking through the packing that causes the conduit to open in alternation.

6. The combination of a shaft, a packing therefor, a regulating member which is loaded uniformly, is under the influence of the pressure existing in the packing, and moves only when the leakage pressure exceeds that of the atmosphere, conduits connected to the packing and to regions of different pressures, and valve means controlling the conduits, which of themselves are controlled by the said member.

In witness whereof, I have hereunto set my hand.

WALTER KIESER.

Witnesses:

ERICH FETERMANN,
BERNARD KUHNOW.