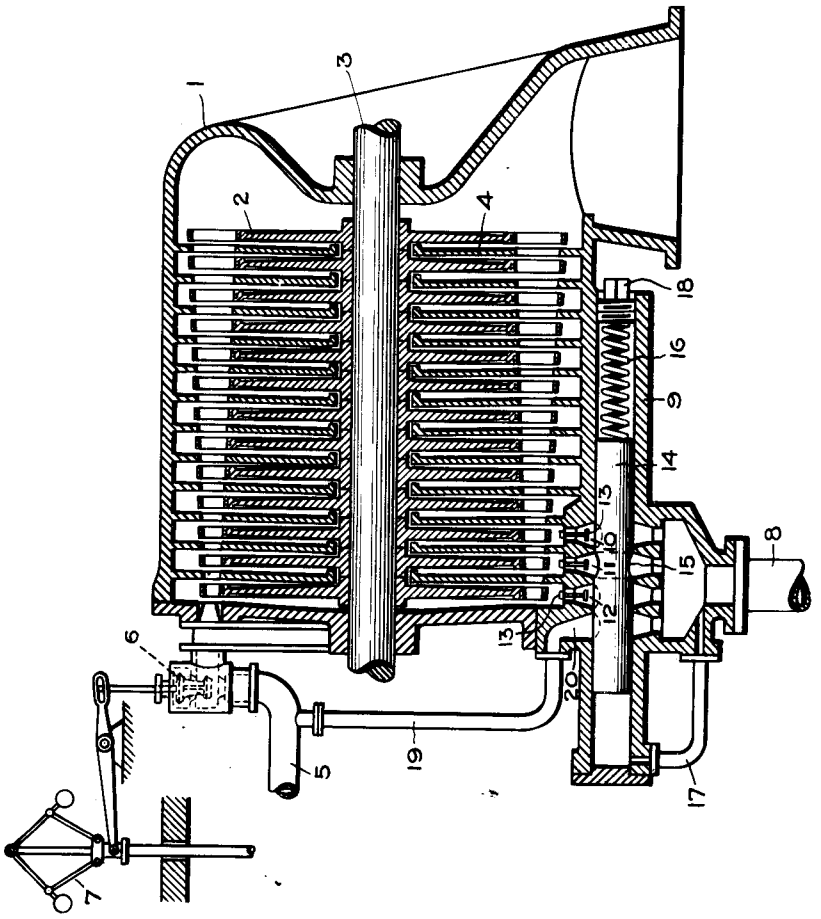
E. ÛBERLÉE.

REGULATING DEVICE FOR TAPPED TURBINES.

APPLICATION FILED MAR. 15, 1912.

1,076,335. Patented Oct. 21, 1913.



Witnesses:

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UNITED STATES PATENT OFFICE.

ERICH UBERLÉE, OF GRUNEWALD, NEAR BERLIN, GERMANY, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

REGULATING DEVICE FOR TAPPED TURBINES.

1,076,335. Specification of Letters Patent. Patented Oct. 21, 1913.

Application filed March 15, 1912. Serial No. 683,971.

To all whom it may concern:

Be it known that I, ERICH ÜBERLÉE, a subject of the King of Prussia, residing at Grunewald, near Berlin, Germany, have invented certain new and useful Improvements in Regulating Devices for Tapped Turbines, of which the following is a specification.

This invention relates to apparatus for maintaining a uniform pressure in a pipe leading off steam from a steam turbine or engine for industrial purposes after the steam has had its pressure reduced by doing work in a preceding portion of the turbine by driving the load. This object is attained by providing means whereby the pressure in said pipe can control a valve which in turn governs ports opening from several stages or regions of the turbine or from the live steam supply, so that steam may be drawn from one or another as may be required. The shifting of the valve is automatically effected, and check valves are arranged to prevent the leakage of steam from one stage to the next when the regulating valve is in an intermediate position.

The accompanying drawing is a diagrammatic section of a multistage turbine equipped with my invention.

In a suitable casing 1 are grouped a plurality of bucket carrying wheels 2 mounted on a shaft 3 with intervening diaphragms 4 separating the several stages of the machine. High pressure steam is supplied to the machine through a main 5 controlled by a valve 6 which is governed by a speed-responsive device 7.

For the purpose of supplying steam to heating, cooking or other industrial apparatus, a pipe 8 is provided, leading from a casing 9 which communicates with the turbine casing 1 by a plurality of ports 10, 11, 12. Each port has an outwardly opening check valve 13. Within the casing 9 is located a regulating valve 14, preferably consisting of a piston fitting said casing and containing a transverse passage 15 adapted to register with the several ports 10, 11, 12, successively, when the valve is moved to and fro in its casing, and thus put the heating pipe 8 in connection with one or another of said ports. The valve is biased by a helical spring 16 toward a position in which the passage 15 will take steam from the stage of highest pressure. A branch pipe 17 connects the pipe 8 with the casing 9 at the end opposite the spring, so that the fluid pressure in the pipe 8 can act against the tension of the spring. When this fluid pressure rises to a sufficient value it will move the valve 14 to a position in which the passage 15 will register with another port, and thus take steam from a stage of lower pressure: thereby tending to prevent any further rise of pressure in the heating pipe. The tension of the spring can be set by means of an adjusting screw 18 so that it will yield when the fluid pressure in the pipe reaches a predetermined maximum. In case the valve 14 shifts only far enough to cause the passage 15 to register with two of the ports at once, the steam of higher pressure flowing into the passage will act upon and close the check valve in the port from the stage of lower pressure and thus prevent any leakage of the high pressure steam into the next lower stage of the turbine.

If the high pressure stage of the turbine is unable to furnish sufficient steam to supply the heating apparatus, live steam may be taken from a pipe 19 leading from the main 5 to a port 20 in the casing 9 at a point where it can coöperate with the passage 15 in the valve 14 when the spring forces said valve far enough to effect the registration of said passage with this port 20.

Inasmuch as the valve 14 moves rather slowly, the full cross-section of the passage 15 is opened only gradually with a rising consumption of hot steam, so that great variations of pressure in the heating pipe are avoided. If the number of tap points is small, and the pressure difference between them is great, so that there is liability in changing from one to another that the throttling effect of the valve 14 will not succeed in keeping a uniform pressure in the heating pipe, a pressure reducing valve may be inserted in the heating pipe, which will adjust itself to uniform pressure.

In place of the spring 16 any equivalent device may be employed which will produce a similar result, such as a weight, or a variable counter-pressure.

I have shown my invention in connection with an impulse turbine but it is to be understood that it is applicable also to turbines

of the so called reaction type, the principle of operation of my invention in both cases being the same.

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 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 by Letters Patent of the United States, is:—

1. The combination with a multi-stage turbine, of a pipe for drawing off steam for heating purposes, and means responsive to the fluid pressure in said pipe for effecting the withdrawal of steam from one or another of the stages of said turbine.

2. The combination with a multi-stage turbine, of a pipe for drawing off steam for heating purposes, ports connecting said pipe with several of the stages of said turbine, and a valve means controlling said ports and responsive to variations of fluid pressure in said pipe.

3. The combination with a multi-stage turbine, of a pipe for drawing off steam for heating purposes, ports connecting said pipe with several of the stages of said turbine, a valve controlling said ports, means biasing said valve in one direction, and means for causing the fluid pressure in said heating pipe to force said valve in the opposite direction.

4. The combination with a multi-stage turbine, of a pipe for drawing off steam for heating purposes, ports connecting said pipe with several stages of said turbine, a valve controlling said ports and responsive to variations in fluid pressure in said heating pipe, and means for preventing leakage of steam between stages of the turbine when said valve is in intermediate positions.

5. The combination with a multi-stage turbine, of a pipe for drawing off steam for heating purposes, a casing having ports communicating respectively with several stages of said turbine, a valve in said casing controlling said ports and responsive to variations in fluid pressure in said heating pipe, and outwardly opening check valves controlling said ports.

6. The combination with a multi-stage turbine, of a pipe for drawing off steam for heating purposes, a casing having ports communicating respectively with several stages of said turbine and with the high pressure steam main, and a valve in said casing controlling said ports and responsive to variations of fluid pressure in the heating pipe.

7. The combination with a multi-stage turbine, of a conduit for drawing off steam from different stages for industrial purposes, and a valve means which controls the admission of steam from two or more stages to said conduit, said valve means being arranged to connect a stage of lower pressure to the conduit as the demand for industrial steam decreases and to connect a stage of high pressure to said conduit as the demand increases.

8. The combination with a multi-stage turbine, of a conduit for drawing off steam from different stages for industrial purposes, a valve means which controls the admission of steam from two or more stages to said conduit, said valve means being arranged to connect a stage of lower pressure to the conduit as the demand for industrial steam decreases and to connect a stage of high pressure to said conduit as the demand increases, and pressure responsive means for adjusting the position of the valve means.

9. The combination with a turbine in which the pressure decreases from point to point therein, a conduit supplying steam for industrial purposes, a plurality of ports communicating with regions of different pressure in the turbine and discharging into said conduit, valve means controlling said ports, and means for automatically adjusting said valve in response to the demand for industrial purposes.

In witness whereof, I have hereunto set my hand this 17th day of February, 1912.

ERICH ÜBERLÉE.

Witnesses:
OSCAR OBERTH,
G. HÜLBROCK.