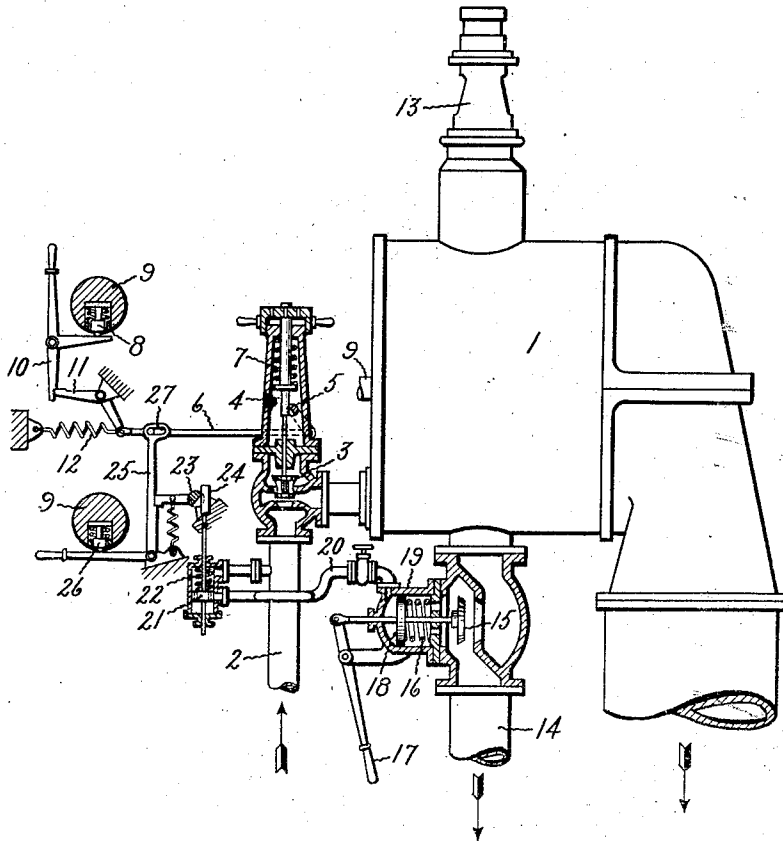


L. CUBELIC.
SAFETY DEVICE FOR TAPPED TURBINES.
APPLICATION FILED JAN. 20, 1913.

1,063,512.

Patented June 3, 1913.



Witnesses:

J. Ellis Klen.
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Att'y.

UNITED STATES PATENT OFFICE.

LUDWIG CUBELIC, OF CHARLOTTENBURG, GERMANY, ASSIGNOR TO GENERAL ELECTRIC COMPANY, A CORPORATION OF NEW YORK.

SAFETY DEVICE FOR TAPPED TURBINES.

1,063,512.

Specification of Letters Patent.

Patented June 3, 1913.

Application filed January 20, 1913. Serial No. 743,097.

To all whom it may concern:

Be it known that I, LUDWIG CUBELIC, a subject of the King of Prussia, residing at Charlottenburg, Germany, have invented certain new and useful Improvements in Safety Devices for Tapped Turbines, of which the following is a specification.

This invention relates to elastic fluid turbines, and especially to those in which provision is made for the extraction of a portion of the steam after it has passed the high pressure stage, for the purpose of supplying heating or cooking or other industrial systems.

The object of the present invention is to provide automatic means for shutting the heating pipe in case the engine exceeds its normal speed.

The purpose and operation of the invention will be apparent from the following detailed description, taken in connection with the accompanying drawing, which is a diagrammatic elevation, partly in section, of a horizontal tapped turbine embodying my invention.

The turbine 1 is supplied with high pressure steam through a main 2, controlled by a throttle valve 3 which is provided with a self closing arrangement consisting preferably of a notched stem 4, engaged by a catch 5 which can be tripped by a rod 6. A spring 7 forces the throttle shut when the catch is tripped. The rod is controlled by an emergency governor 8 on the shaft 9 of the turbine, acting preferably through the elbow levers 10, 11 and tension spring 12, in a manner apparent from an inspection of the drawing.

Between the high and low pressure stages of the turbine is a pressure regulator 13, of well known construction, which is responsive to the pressure prevailing at the point of extraction and regulates the access of steam to the low pressure stage or stages. The pipe 14 for the extraction of steam, leads off from the region between the stages, that is to say, it takes the steam after it has passed the high pressure wheel or wheels. In this pipe is inserted an automatic stop valve 15 which is kept normally open by a spring 16. The valve can be closed by hand if desired, by means of the lever 17. Its stem is also provided with a piston 18 working in a cylinder 19. The outer side of this

piston can be subjected to high steam pressure by means of a pipe 20 connected to the main 2 and controlled by a regulator 21 which keeps it normally closed. A spring 22 tends to open this regulator, but is held in check by a spring catch 23, which is kept engaged with the stem 24 of the regulator by a detent lever 25.

An emergency governor 26 on the turbine shaft is arranged to operate this lever and trip the regulator when the speed of the engine exceeds a normal value. If, however, the governor 26 should fail to act, and the engine should begin to race, by reason of the flowing back of the heating steam to the low pressure stage of the turbine, the emergency governor 8 will close the main throttle valve 3. In so doing it will also act upon the tripping lever 25 by reason of the slotted link connection 27 between said lever and the rod 6. With this system of regulation, it follows that when the permissible number of revolutions of the engine is exceeded, the first effect will be to close the extraction pipe by the automatic tripping of the regulator in the pipe 20. If, now, the speed of the engine still increases, then the safety governor 8 operates, and by shutting off the supply of live steam, causes the engine to stop. Moreover, if the governor 26 fails to act when it should, then the closing of the throttle valve by the governor 8 will at the same time cause the shutting of the valve 15 in the extraction pipe.

It will be understood that the springs in the two emergency governors are so adjusted that governor 26 will always tend to operate upon its lever 25 before the governor 8 acts upon its levers 10 and 11.

The use of high pressure steam for operating the valve 15 is advantageous because the leakage steam can flow off through the extraction pipe without depositing impurities therein, as would be the case if the valve were actuated by oil under pressure.

It is self-evident that the invention may be equally well used with piston engines exhausting into a receiver from which steam is withdrawn for industrial purposes.

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.

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

1. The combination with a tapped turbine, of two governors timed to act in succession, 10 a valve in the extraction pipe, means for closing said valve controlled by the earlier acting governor, and connections whereby the later acting governor will effect the closing of said valve in case the earlier acting governor fails to operate. 15

2. The combination with a tapped turbine, of two governors timed to act in succession, a valve in the extraction pipe, means for closing said valve controlled by the earlier acting governor, a throttle valve for the turbine, means for enabling the later acting governor to close said throttle valve, and connections whereby it will also at the same

time effect the closing of the valve in the extraction pipe. 25

3. The combination with a tapped turbine, of two governors timed to act in succession, a valve in the extraction pipe, means for closing said valve by fluid pressure including a pipe conveying steam to said valve 30 from the high pressure main and a regulator in said pipe, means for tripping said regulator by the earlier acting governor, a throttle valve in the high pressure main controlled by the later acting governor, and 35 a connection between the operative connections of said governors whereby the later acting one will at the same time trip the regulator of the pipe conveying steam to the valve in the extraction pipe. 40

In witness whereof, I have hereunto set my hand this 21st day of December, 1912.

LUDWIG CUBELIC.

Witnesses:

FRIEDRICH GANZERT,
OTTO SCHMIDT.

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