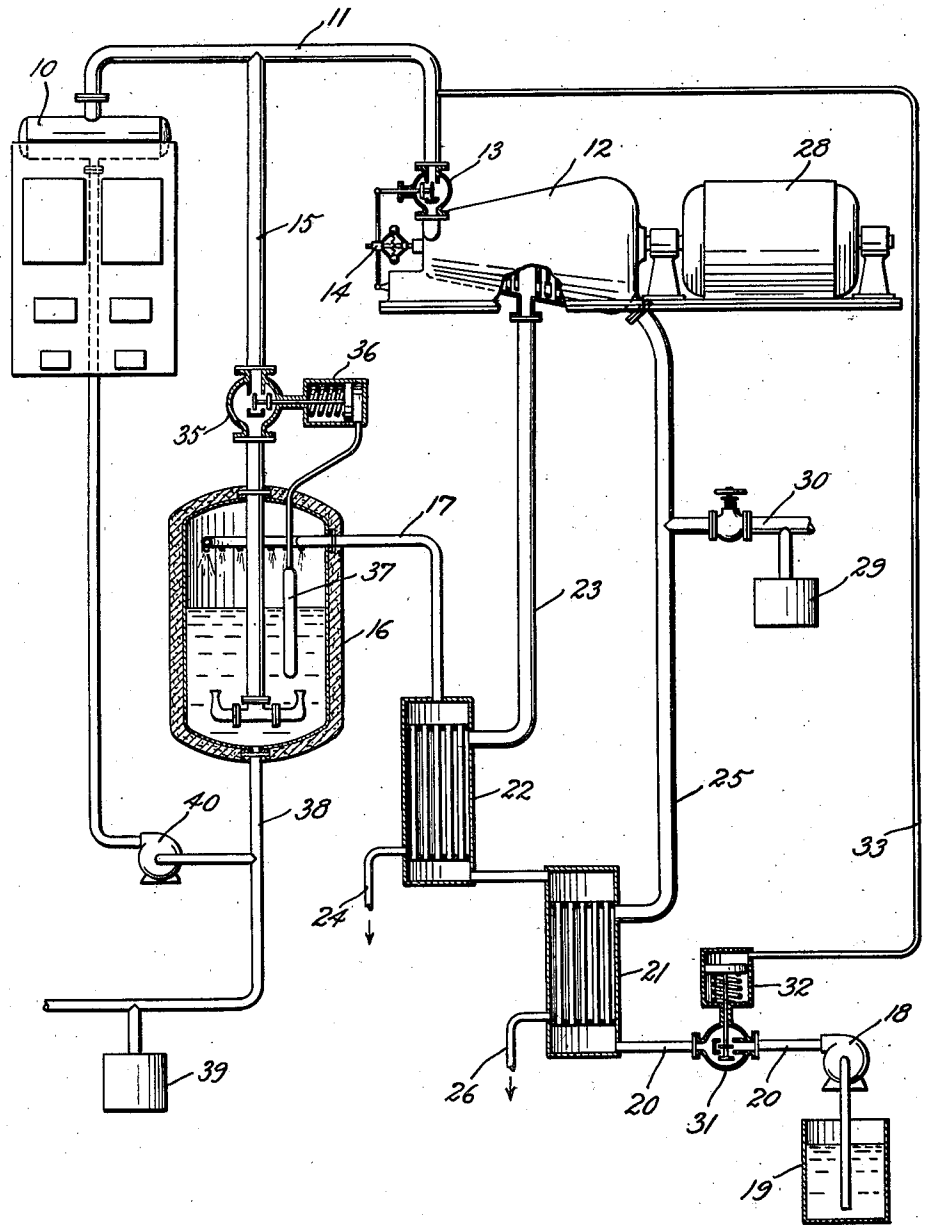
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STEAM ACCUMULATOR PLANT

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UNITED STATES PATENT OFFICE

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STEAM-ACCUMULATOR PLANT

Original application filed December 31, 1924, Serial No. 759,164, and in Germany November 9, 1923. Divided and this application filed December 16, 1929. Serial No. 414,323.

This application is a division of my copending application Serial No. 759,164, filed December 31st, 1924.

The invention relates to steam accumulator plants. The object of the invention is to provide a novel and efficient steam accumulator plant automatically controlled in a manner which will hereinafter appear and which gives efficient equalization of steam, permitting firing of boilers at will and providing hot water of uniform temperature for use in boilers or elsewhere.

One steam plant arrangement embodying the invention is disclosed on the accompanying drawing and hereinafter described, it being understood that the invention may be embodied in a variety of plant arrangements and structures.

The nature and advantages of the invention will become apparent from a consideration of the following specification taken in conjunction with the accompanying drawing.

On the accompanying drawing reference character 10 designates a steam boiler constituting a source of steam. Steam generated in the boiler 10 passes into a conduit 11. Conduit 11 supplies steam to a steam turbine 12. Supply of steam to steam turbine 12 is controlled by a valve 13, in turn controlled by a speed responsive regulator 14, responsive to variations of speed of turbine 12.

A conduit 15 conducts steam from conduit 11 to an accumulator 16. Cold water is supplied to accumulator 16 through a conduit 17. This water is termed cold because it is cold enough to condense steam in the accumulator. The cold water is supplied by a pump 18 from a suitable source of supply 19 and passes through conduit 20 and through water heaters 21 and 22 and thence into conduit 17 and into the accumulator. Heater 22 is heated by steam supplied from an intermediate stage of the turbine through conduit 23. Condensate is withdrawn at 24. Heater 21 is supplied with steam through conduit 25, which may be termed a back pressure conduit, being connected at the exhaust end of the turbine. Condensate from heater 21 is withdrawn at 26.

Turbine 12 is shown as driving an electric generator 28. A low pressure consumer 29 is supplied with steam from conduit 30, which is connected with conduit 25.

The supply of cold water to the accumulator is controlled by a valve 31 in conduit 20. Valve 31 is controlled by a regulator 32, which is connected by a tube 33 to conduit 11. The arrangement is such that the increase of pressure in conduit 11 causes an opening of valve 31 and, conversely, a decrease of pressure in conduit 11 causes a closing of valve 31.

Within conduit 15 is a valve 35, which is controlled by a regulator 36 in turn responsive to variations of temperature within the accumulator. To illustrate this, a thermostatic bulb 37 is shown projecting into the accumulator. The arrangement is such that on rise of temperature within the accumulator, valve 35 closes and on drop of temperature, valve 35 opens.

Hot water is withdrawn from the accumulator through conduit 38 and may be conducted to consumers 39 or by means of pump 40 to the boiler 10.

The operation of the plant is as follows:

Assume that there is flow of fluid through the various conduits. Assume that, for some reason, the pressure rises in conduit 11. This rise of pressure is transmitted through tube 33 and causes an opening or further opening of valve 31. This increases the flow of cold water to the accumulator. An increase of supply of cold water to the accumulator causes a condensation of steam in increased amount and a consequent lowering of the temperature. This lowering of temperature is transmitted to regulator 36 by the bulb 37 and causes an opening or further opening of valve 35 which admits more steam to the accumulator. The arrangement thus operates to maintain a constant temperature in the accumulator and to maintain a constant pressure in conduit 11. It will be seen that the boiler 10 can be fired independently of load conditions in the plant and that excess steam generated will be accumulated in the form of hot water in the accumulator. The hot water may be withdrawn from the accumulator as

desired independently of conditions of steam generation and steam consumption.

If the pressure in conduit 11 should fall, as a result, for example, of a wide opening of valve 13, the drop in pressure will be transmitted through tube 33 and will cause a closing of valve 31. This will diminish the supply of cold water to the accumulator and consequently the temperature in the accumulator will rise whereupon valve 35 will be closed more or less and the steam flow restricted, thus building up the steam pressure in conduit 11 to the normal value.

As used in the appended claim, the term "source of steam" may designate a boiler or any conduit of a steam plant capable of supplying steam.

What I claim is:

1. A steam plant comprising in combination, a source of steam, an accumulator, steam consuming means, means to conduct steam from said source to said accumulator and to said steam consuming means, means to supply cold water to said accumulator to condense steam therein, means to control the supply of cold water to the accumulator in accordance with variations of steam pressure in said source and operating to increase the supply of cold water on rise of steam pressure, means to control the supply of steam to the accumulator operating on increase of temperature in the accumulator to decrease said supply of steam and means to withdraw water from the accumulator for use.

2. A steam plant comprising, in combination, a source of steam, an accumulator, steam consuming means, means to conduct steam from said source to said accumulator and to said steam consuming means, means to supply cold water to condense steam supplied to the accumulator, means to control the supply of cold water in accordance with variations of steam pressure in said source and operating to increase the supply of cold water on rise of steam pressure, automatic means controlling the supply of the steam to the accumulator and operating to maintain a constant temperature of hot water produced in the accumulator and means to withdraw water from the accumulator for use.

3. A steam plant comprising, in combination, a source of steam, an accumulator, steam consuming means, means to conduct steam from said source to said accumulator and to said steam consuming means, means to supply cold water to condense steam supplied to the accumulator, means to control the supply of cold water in accordance with variations of steam pressure in said source and operating to increase the supply of cold water on rise of steam pressure, means operating in accordance with the variations in supply of cold water to control supply of steam to the accumulator and means to withdraw water from the accumulator for use.

4. A steam plant comprising, in combination, a source of steam, a power element supplied with steam from said source, an accumulator, water heating means, means to conduct steam from said power element to said water heating means, means to conduct relatively cold water through said water heating means and to said accumulator, means to conduct steam from said source to said accumulator, means to control the flow of said cold water in accordance with variations of steam pressure in said source and operating to increase the rate of flow of water on rise of steam pressure, means to control the supply of steam to the accumulator in accordance with variations in supply of cold water and means to withdraw water from the accumulator for use.

In testimony whereof I hereunto affix my signature.

JOSEF SMÉKAL.