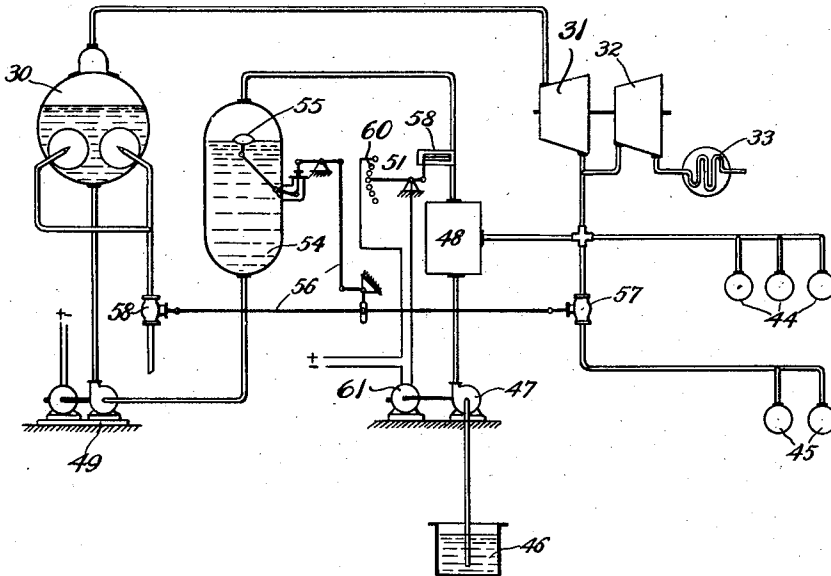


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H. GLEICHMANN
STEAM GENERATING PLANT
Filed Feb. 14, 1925



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UNITED STATES PATENT OFFICE.

HANS GLEICHMANN, OF BERLIN-SIEMENSSTADT, GERMANY, ASSIGNOR TO SIEMENS-SCHUCKERTWERKE GESELLSCHAFT MIT BESCHRANKTER HAFTUNG, OF SIEMENSSTADT, NEAR BERLIN AND ELSEWHERE, GERMANY, A CORPORATION OF GERMANY.

STEAM-GENERATING PLANT.

Application filed February 14, 1925. Serial No. 9,267, and in Germany February 16, 1924.

My invention relates to improvements in steam generating plants of that type in which a regulating or control device for compensating or equalizing the fluctuations in the steam consumption is provided. The equalization is brought about by means of a feed water storage vessel while the firing of the steam generator is continued uniformly.

During periods of low steam consumption the surplus steam, which may for instance be withdrawn from a suitable stage of a turbine, is conducted through a heater in which it heats the feed water. The hot feed water is conducted into a feed water storage vessel from which it is conducted into the boiler during periods of increased steam consumption.

If there are very great fluctuations in the steam consumption the feed water storage vessel must be made very large if it is to be capable of equalizing the differences in the load perfectly and the economy of the plant is then greatly reduced by this very large and expensive feed water storage vessel.

My invention consists of a regulating or control device which compensates or equalizes great fluctuations in the steam consumption by the aid of a relatively small feed water storage vessel. For this purpose regulating means are provided which reduce the further steam generation and relieve the storage vessel to the extent of its state of charge. The reduction of the steam generation may take place in such a way, for instance, that the quantity of the fuel introduced into the furnace of the boiler is diminished. The relief of the storage vessel may be effected by conducting the surplus steam developed from the boiler or from any stage of a power engine fed by said boiler not into the feed heater but to other consumers.

An embodiment of my invention is diagrammatically represented in the drawing affixed to my specification and forming part thereof.

Referring to the illustrated example 30 is a steam boiler which feeds the high-pressure turbine 31 and the low-pressure turbine 32. 33 is a condenser and 44 and 45 represent other steam consumers. The cold feed water 46 is conveyed into the feed water storage vessel 54 by the pump 47, through the steam

heater 48 heated with surplus steam and is forced from the storage vessel 54 into the boiler by the pump 49. When the feed storage vessel is completely charged with water which may for instance be indicated by a float 55, the valve 57 is opened by a system of linked rods 56 so that steam flows to the consumers 45 and thus less steam enters the heater 48. The pump 47 now raises less water as it is automatically controlled in dependence from the temperature behind the steam heater. The deflections of a temperature meter 48, for instance of a compound strip of two metals of different expansion coefficients, are transmitted by a lever mechanism 51 to the regulator 60 of the motor 61 driving pump 47.

The float 55 acts through an extension of the same mechanism 56 simultaneously upon the boiler furnace, by slightly closing the fuel supply valve 58 in a liquid fuel furnace, for instance, as indicated in the drawing and thus reducing the supply of heat. It will be understood that this particular arrangement is by no means essential and that my invention extends to any suitable means for limiting the supply of fuel to a boiler during periods of low steam demand in dependence upon the state of the feed storage vessel.

If now the level of the water in the feed storage vessel 54 as dropped down to near the bottom of said vessel, the valve 57 is closed again by the float 55 in accordance with the low level of the water, more steam again enters the steam heater 48 and the pump 47 supplies more water so that the storage vessel 54 is filled up again with water. Simultaneously the valve 58 controlling the supply of fuel to the boiler furnace is opened again fully so that the supply of heat to the boiler and thus the generation of steam is increased again.

It will be understood that the mechanism illustrated and the other modifications mentioned are examples only and that my invention may be carried out within the scope of the claims in many other ways which will readily suggest themselves to those skilled in the art.

What I claim as my invention is:—

1. In a steam power plant consisting of a steam generator, a power engine supplied by said steam generator and a plurality of

steam consumers supplied with steam from
any suitable stage of said power engine, the
combination of a feed water storage vessel,
a steam heater for said feed water supplied
5 with surplus steam from said power engine,
a pump for forcing cool feed water through
said heater into said feed water storage ves-
sel, a regulating device adapted to control the
quantity of the cold feed water supplied in
10 accordance with the temperature of the heat-
ed feed water, a measuring device adapted
to supervise the state of charge of said stor-
age vessel and a mechanism responsive to the
state of charge of the storage vessel for con-
15 trolling the fuel supply to the steam gener-
ator to vary the steam generation and for
directing surplus steam to other consumers.

2. In a steam power plant consisting of a
steam generator, a power engine supplied by
20 said steam generator and a plurality of steam
consumers supplied with steam from any
suitable stage of said power engine, the com-

bination of a feed water storage vessel, a
steam heater for said feed water supplied
with surplus steam from said power engine, 25
a pump for forcing cool feed water through
said heater into said feed water storage ves-
sel, a regulating device adapted to control
the quantity of the cold feed water supplied
in accordance with the temperature of the 30
heated feed water, a float device in the feed
storage vessel, a valve connected with the
steam conduits associated with said power
engine and adapted to control the steam sup-
ply to a consumer, gearing adapted to trans- 35
mit the motion of said float to said valve, a
control device adapted to regulate the sup-
ply of fuel to the steam generator and a
linkwork also geared to said float and
adapted to transmit the motion of said float 40
to said fuel control device.

In testimony whereof I affix my signature.

HANS GLEICHMANN.