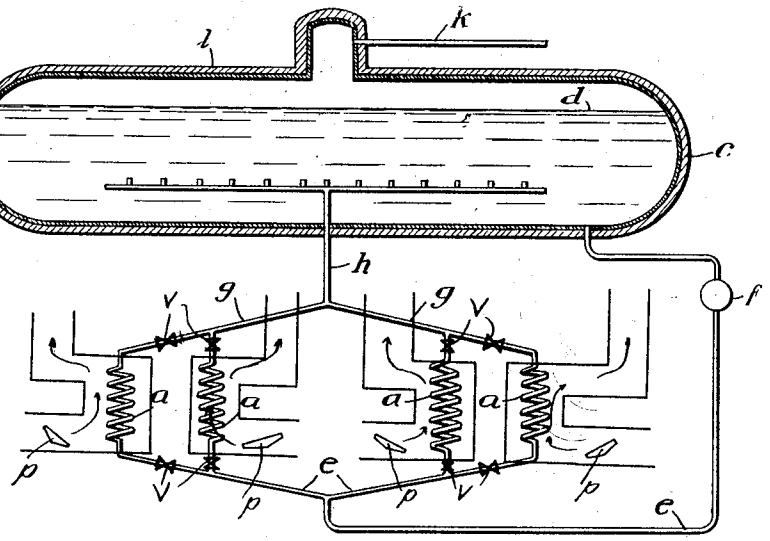
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STEAM PLANT

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UNITED STATES PATENT OFFICE.

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STEAM PLANT.

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Boilers without a special water reservoir and comprising for instance one or more pipe-coils are previously known. Such boilers have a number of great advantages. On account of the fact that they contain only a very small quantity of water they are capable of being fired up quickly. Owing to the small quantity of energy stored in such boilers they involve little or no danger of explosion even at high pressures. Moreover, they are cheap in manufacture, occupy very little room, and have other advantages.

Notwithstanding these advantages such boilers have found no extensive use on account of their operation also incurring great inconveniences. On account of the small content of water they can not be subjected to any appreciable variations of load. The pressure varies very considerably also on the slightest variations in steam consumption as well as in the supply of fuel, which often has a detrimental effect on the consumers supplied with steam from such boilers. On a sudden discharge of steam, dry boiling may easily occur, and on the whole it is very difficult to maintain the water level within allowable limits. Consequently, the management of such boilers is very difficult, in that the fire as well as the feeding must be altered even on the slightest variations, by reason of which the combustion will always be very incomplete. Moreover, as the said boilers lack surface of evaporation, the steam is always very wet, and it may easily happen on sudden rises in the discharge of steam that water is entrained into the steam piping where it may cause great damage. In order to remove these drawbacks to some extent such boilers are subjected to only a small load, but the costs of installation will then, on the other hand, become too high, without the inconveniences being entirely removed for all that, and therefore such boilers are seldom found in practice.

The present invention has for its object to remove these drawbacks in such a way that the advantages connected with such boilers may be fully utilized.

The invention consists in connecting a plurality of such boilers to a common well insulated steam storer (water collector and steam separator) separated from the boilers in such a way that the water content of the storer is caused to pass through said boilers to be heated therein, whereupon the heated water mixed with steam is returned to the storer from which steam is drawn off to steam consumers, the storer being preferably arranged above said boilers.

This storer is preferably constructed as a receptacle which is filled for the most part with water and is well insulated for protection against radiation of heat.

The invention will be more fully described with reference to the accompanying drawing which illustrates diagrammatically a plant according to the invention.

In this drawing *a* designates the boilers formed as pipe-coils. *c* is the storer filled with water up to the level *d*. The boilers *a* are connected with one another by means of a piping *e* through which water is supplied from the storer. In said piping, a pump *f* may be inserted, thereby ensuring a rapid circulation of the water through the coils. Moreover, by means of pipes *g*, the boilers *a* are all connected to a piping *h* through which the water heated in the boilers is returned to the storer. This piping opens preferably in a series of nozzles considerably below the lowest water level of the storer so that the steam bubbles entrained are condensed in the water of the storer. From the storer, steam is drawn off to the steam consumers through the piping *k*. The storer is further provided with an insulation *l*.

Thus, it is not steam but water, or water mixed with steam, that is principally discharged from the boilers. The boilers are therefore always under water and all danger of dry boiling is eliminated. Further, the regulation of the water level, which in boilers of this kind is particularly difficult to effect, and thus the risks involved thereby, are also entirely eliminated. The steam drawn off from the steam space of the storer can always be obtained in dry condition owing to the surface of evaporation in the storer being very great. On account of the great water content of the storer extremely great variations in the steam consumption and the fuel supply may also be equalized. Whether variations in the steam consumption are present or not, it will thus be possible to operate the firing in such a way that the best possible economy of combustion is attained.

The boilers *a* shown in the drawing in the form of pipe-coils are preferably provided

with grate areas p separated from each other so that one or more boilers may be shut down or started respectively, if required, this being accomplished by means of valves v.

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

1. A steam generator comprising a plurality of water tube boilers, conduits connecting said boilers for parallel operation, a common supply pipe and a common discharge pipe for said boilers connected to said conduits, independent fires for each of said boilers for separately generating steam therein, a well-insulated storer comprising a large receptacle having a water content of sufficient capacity to permit firing of the boilers independently of variations of steam demand and to permit storing of surplus steam by rise of pressure, said storer being in open unrestricted communication with said common supply and discharge pipes, a discharge device in the water space of said storer connected to said common discharge pipe, means to conduct water from said storer to said common supply pipe, and means for taking out dry steam from said storer.

2. A steam generator comprising a plurality of pipe coil water tube boilers, conduits at the ends of the coils connecting said boilers for parallel operation, a common supply pipe and a common discharge pipe for said boilers, connected to said conduits, independent fires for each of said boilers for separately generating steam therein, a well-insulated storer comprising a large receptacle having a water content of sufficient capacity to permit firing of the boilers independently of variations of steam demand and to permit storing of surplus steam by rise of pressure, said storer being in open unrestricted communication with said common supply and discharge pipes, a discharge device in the water space of said storer connected to said common discharge pipe, means to conduct water from said storer to said common supply pipe, and means for taking out dry steam from said storer.

In testimony whereof I affix my signature.

JOHANNES RUTHS.