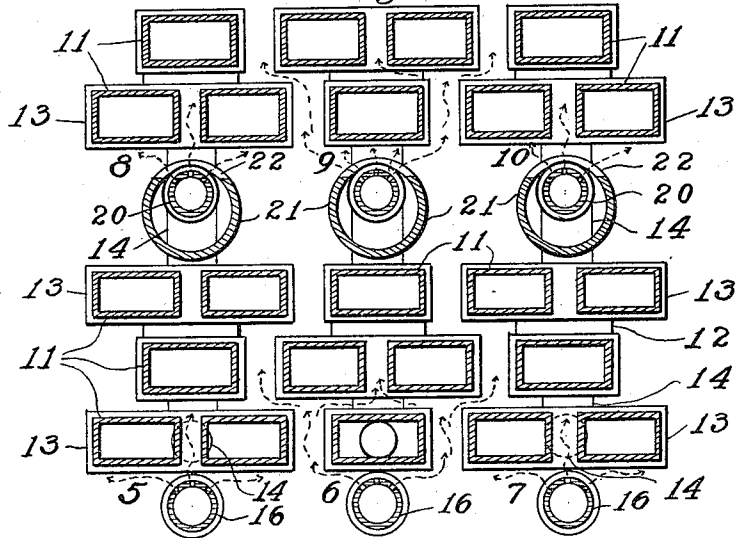
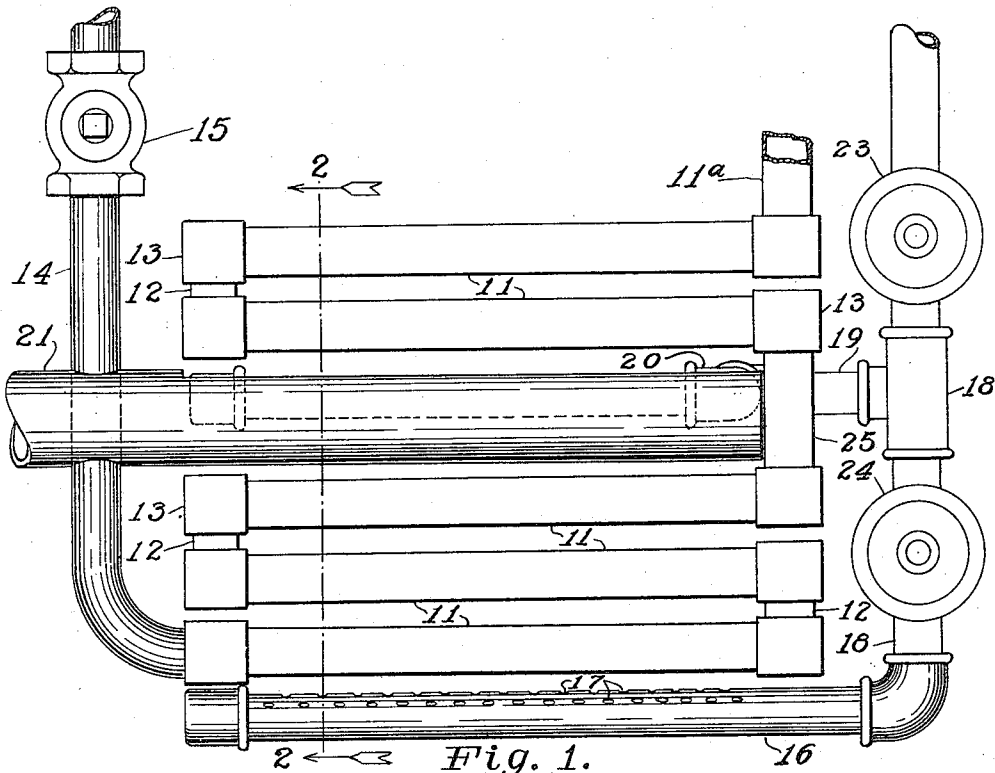


P. JORGENSEN.
 SUPERHEATING STEAM GENERATOR.
 APPLICATION FILED OCT. 3, 1912.

1,075,151.

Patented Oct. 7, 1913.



Witnesses:
H. P. Palmer
A. S. Phillips

Fig. 2.

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UNITED STATES PATENT OFFICE.

PETER JORGENSEN, OF CHICAGO, ILLINOIS.

SUPERHEATING STEAM-GENERATOR.

1,075,151.

Specification of Letters Patent.

Patented Oct. 7, 1913.

Application filed October 3, 1912. Serial No. 723,681.

To all whom it may concern:

Be it known that I, PETER JORGENSEN, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Superheating Steam-Generators, of which the following is a specification.

This invention relates to improvements in steam generators of the super-heating type, and it consists in certain peculiarities of the construction, formation, arrangement and operation of the various parts thereof, as will be hereinafter more fully set forth and specifically claimed.

The principal object of the invention is to provide a steam generator of the above named class, which shall be simple and inexpensive in construction, strong, durable, and efficient in operation, and so made and with its parts so arranged with respect to one another as to present as large a surface as possible (and a great deal larger surface than heretofore afforded in generators of this type), to the action of the heat, thereby using the heat to the best advantage in generating steam and re-heating or super-heating the same, and without material loss of heat.

Another object of the invention is to provide a super-heating steam generator which shall comprise a series of groups of conduits, so formed, constructed and arranged with respect to one another, and with respect to fuel burners, that heat from the said burners may be applied independently to one or more of said groups.

Various other objects and advantages of the invention will be disclosed in the subjoined description and explanation.

In the accompanying drawing which serves to illustrate an embodiment of the invention—Figure 1 is a side view in elevation of a super-heating steam generator, and Fig. 2 is a cross sectional view taken on line 2—2 of Fig. 1, looking in the direction indicated by the arrows.

Like numerals of reference refer to corresponding parts throughout the views of the drawings.

The reference numerals 5, 6 and 7 designate as wholes the lower groups of conduits of the generator, and the numerals 8, 9 and 10 indicate as wholes the upper groups of conduits of the apparatus. Each of the said groups includes a series of conduits 11, which

are by preference rectangular in cross section, as shown, and in use are usually located in parallelism with one another and horizontally, but their positions may be otherwise or varied. The conduits 11 comprising each of the groups are spaced apart and arranged in staggered relation to one another. The lowermost conduits or conduit of each of the lower groups has communication with the conduit or conduits 11 thereabove through a hollow connection 12, which unite headers 13, at the ends of the conduits. Each of the headers 13, at one end of the lower conduits 11, of each of the lower groups has communication with a pipe 14, which leads to a supply of water, and each of these pipes may be provided with a valve 15, of the ordinary or any preferred construction to control the passage of water therethrough.

Located below each of the lower groups 5, 6 and 7, are tubular burners 16, each of which is provided in its upper portion with perforations 17, for the escape of gas or any suitable hydrocarbon which may be used as fuel for supplying heat to the generator. Each of the burner tubes has communication at one of its ends with a pipe 18, which leads to a supply (not shown) of gas or other hydrocarbon. Each of the pipes 18, has leading therefrom a branch pipe 19, which communicates with a burner 20, located in an air supplying tube 21, each of which has communication at one of its ends with atmospheric air or a supply of air under pressure, not shown. Each of the pipes 21, which surround the burners 20, is provided at its upper portion with a longitudinally extended slot or opening 22, to permit of the passage of heat and flames from the burner 20, therein, and each of said air pipes is located under one of the upper groups 8, 9 and 10, and so as to discharge the heat from said pipes and burners against the conduits 11, of the upper groups, in a novel manner, as will be presently explained. Each of the fuel supply pipes 18, is provided above its branch pipe 19 with a valve 23, and below said branch pipe with a valve 24, of the ordinary or any preferred construction, which are employed to control the supply of said fuel to the burners 16 and 20, the latter as before stated being located below the upper groups and above the lower ones.

By referring to the drawings, it will be seen and understood that each of the upper

groups is communicatively connected to the group below the same by means of a hollow connection 25, which connections unite the headers 13, of the upper and lower groups adjacent to the fuel supply pipe. By this arrangement it is obvious that water and steam will flow from the pipes 14, through the conduits 11, of the lower groups and upwardly through the connections 25, into the lower conduits 11, of the upper groups, from whence it will pass through hollow connections 12, which unite the conduits of each of the upper groups at their ends adjacent to the water supply pipe. Each of the upper groups has at one of its ends, preferably that end adjacent to the fuel supply pipe, a conduit 11^a, which may lead to a container for the steam.

It will be observed by reference to Fig. 2 of the drawing, that each of the lower groups is composed of three horizontally disposed rows of conduits 11, while the upper groups are composed of two rows of similarly disposed conduits, but I do not desire to be limited to the number of conduits which shall compose each group, as it is apparent that the number thereof may be varied. It will also be seen in said figure of the drawing that the conduits in each group, both in the upper and lower series, are arranged in staggered relation to one another, and that the burner tube 16, in each of the groups 5, and 7, is located below the space between the lowermost conduits 11, of said groups, which conduits are located side by side, yet in spaced relation to one another, while the tube 16, of the group 6, is located directly beneath the lowermost conduit 11, of said group. The same arrangement of the burners 20 is employed with respect to the conduits of the upper groups 8, 9, and 10, and it is therefore apparent that the flames and heat from the various burners will contact with the bottom and side surfaces of the conduits, and will also surround them, and that as the conduits are preferably rectangular in cross section they will present a very large surface to the action of the heat, thus enabling steam to be quickly generated and superheated. Each of the pipes 14, is by preference extended vertically through openings in one of the air-supply pipes 21, at a point near one end of the groups, thus affording simple and efficient means for supporting the last named pipes.

It is obvious that, by the above described arrangement of the burners and valves, heat can be applied to the groups independently

of one another, or that all of them can be heated at the same time if desired.

It is further apparent that by providing the burner tubes 20, with the slotted air supply pipes 21, which latter pipes may communicate at one of their ends with the atmosphere or with air under pressure, a more intense heat will be provided for reheating or super-heating the steam in the upper groups of conduits.

It is further evident that as the pipe section 14, for the supply of water is connected to the lower group of conduits and is extended upwardly at one of the ends of a pair of the upper and lower groups, and that as the slotted pipe 21, surrounds the burner tube 20, located between said groups, which burner tube is connected to the fuel supply pipe section 18, and that as one of the upper groups is connected to a lower group by means of the connection 25, said parts will be arranged in compact form and so that they can be moved in unison, or, in other words, they are all connected together so that they may be located in a comparatively small space and at any desired point.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent is—

A super-heating steam generator including a plurality of superimposed groups of conduits, each group comprising a plurality of rows of conduits arranged in superimposed relation, the conduits of the respective rows of each group being arranged in staggered relation, the adjacent rows of the respective groups being spaced apart a distance in excess of the spacing of the conduits of any one group, the conduits of each group and of each row of each group being in communication, and the conduits of the upper row of the lower group being in communication with the conduits of the lower row of the upper group, means for delivering water to the lower row of conduits of the lower group, an outlet communicating with the upper row of the upper group, and means arranged beneath each group and fed from a common source for heating the conduits of that particular group only.

In witness whereof, I have hereunto subscribed my name this third day of September A. D. 1912, in the presence of two subscribing witnesses.

PETER JORGENSEN.

Witnesses:

ROBERT P. HILLINGER,
H. P. PALMER.