

E. WIART.  
 SUPERHEATING GENERATOR.  
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Patented Aug. 1, 1911.

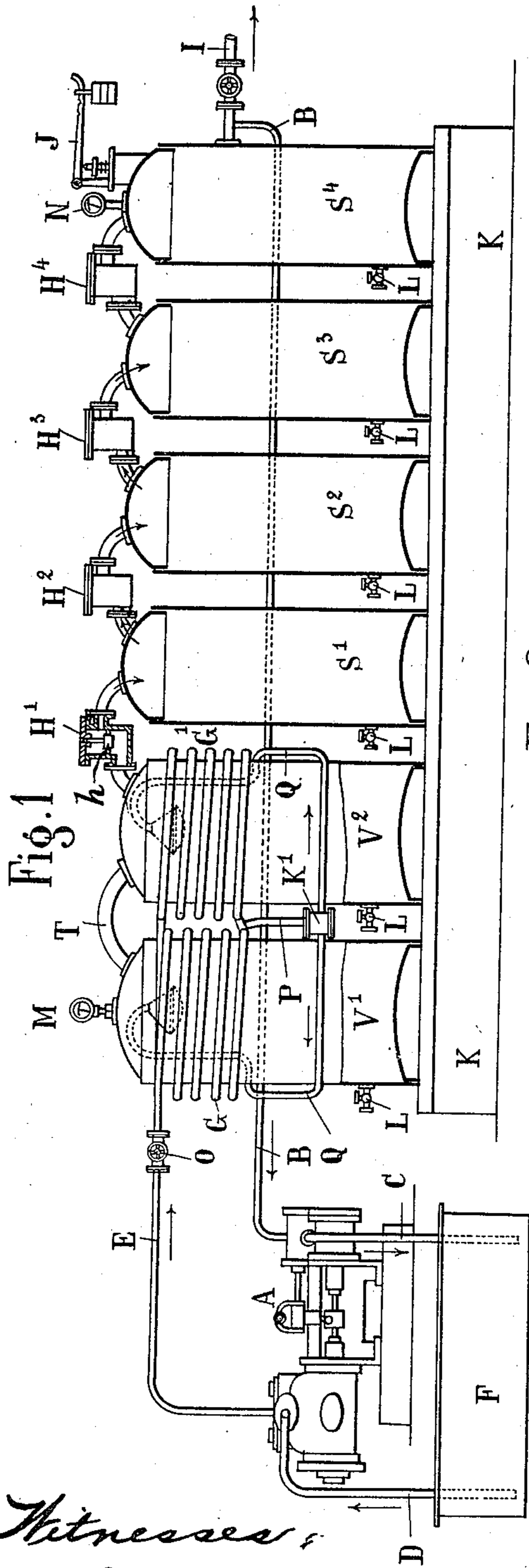
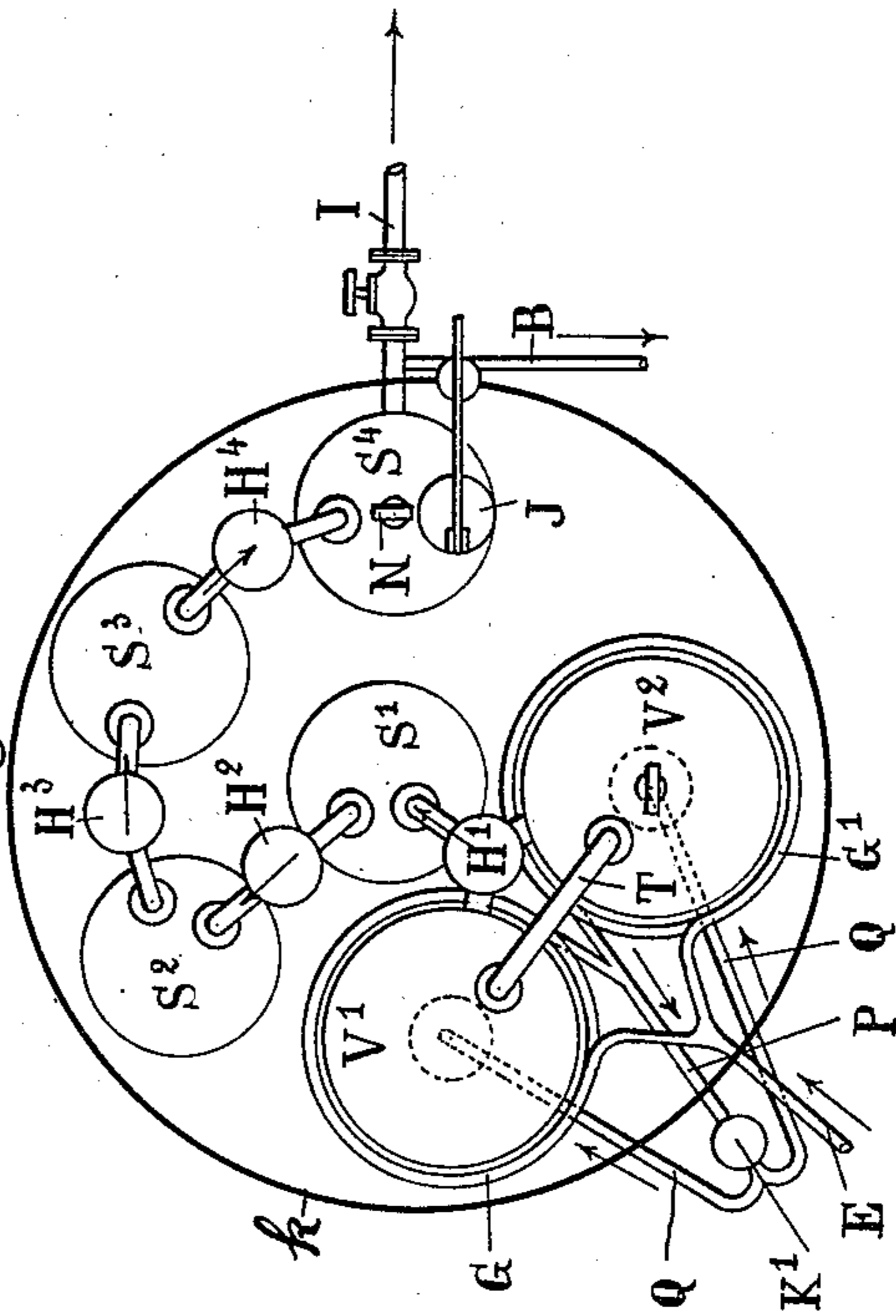


Fig. 2



Witnesses:  
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 E. B. Wells.

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 Ernest Wiart  
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# UNITED STATES PATENT OFFICE.

ERNEST WIART, OF LA FERTÉ-BERNARD, FRANCE.

## SUPERHEATING-GENERATOR.

999,284.

Specification of Letters Patent.

Patented Aug. 1, 1911.

Application filed October 28, 1910. Serial No. 589,604.

*To all whom it may concern:*

Be it known that I, ERNEST WIART, a citizen of the Republic of France, and resident of La Ferté-Bernard, Sarthe, France, have invented Improvements in Superheating-Generators, of which the following is a specification.

This invention is intended to simplify as much as possible the operation of vaporizing liquids, and to combine this operation with the successive operations of drying and superheating the vapor, and mixing other liquids and gases with the vapors.

As will be seen hereafter, this invention enables a very small body of liquid to be treated, it being sufficient for this to be proportional to the delivery. Moreover, in order to make the matter clear, it may be mentioned that if the consumption of steam be for example 1 kilogram per second, the maximum weight of the liquid subjected per second to the action of the generator, will likewise be about one kilogram, no body of liquid ever remaining in the generator, as it is vaporized instantaneously. Without dealing here with the theory of steam boilers, it may be pointed out that a steam boiler working normally contains from 18,000 to 23,000 kilograms of water for a heating surface of 250 meters accordingly as it is a semi-tubular or a multi-tubular boiler, although such a boiler only delivers from 600 to 700 grams of steam per second.

The following are the principal elements which constitute the new superheating generator: a feed pump, vaporizers which form the actual generator, superheating and drying vessels, a heating apparatus inclosing the generators and superheaters.

Figure 1 is an elevation showing the various elements arranged in a line. Fig. 2 being a plan, the different elements being arranged in a group.

The feed-pump A comprises a steam inlet pipe B, that branches off from the distributing valve I, and exhaust pipe C that dips into the reservoir F, the liquid contained in which is thereby heated; a suction-pipe D drawing off the liquid in the reservoir F, a pipe E conveying the liquid from the reservoir F into the coil pipes G and G' and thence to the vaporizers. It should be pointed out that the temperature of the liquid contained in the reservoir F is heated to 60° or 70° by the exhaust steam that is conveyed by the pipe G.

The generator properly speaking is formed by a number of vessels V' V<sup>2</sup> (in the drawing two are shown) which communicate with one another by means of a simple pipe connection T, so that the pressure and the temperature are always equal in the two vessels. Each vessel V' V<sup>2</sup> is provided either externally or internally with coil pipes G G'. These coil pipes are connected at their ends by a pipe P on which a non-return valve K' is arranged. On this valve a pipe is arranged, which is divided into two branches Q that run into the vaporizers V' V<sup>2</sup>. The coil pipes G G' are intended for heating the liquid so that it is raised to as high a temperature as possible before being introduced into the vaporizers V' V<sup>2</sup>.

The driving and superheating vessels S' S<sup>2</sup> S<sup>3</sup> S<sup>4</sup> four or more in number (in the drawing four are shown) are provided with communication pipes H' H<sup>2</sup> H<sup>3</sup> H<sup>4</sup> furnished each with a non-return valve as h that opens in the direction of the vaporizers to the engine or the like, completely stopping the passage in the opposite direction. Thus S' communicates with V' and V<sup>2</sup>, S<sup>2</sup> with S', S<sup>3</sup> with S<sup>2</sup>, S<sup>4</sup> with S<sup>3</sup>. Further S<sup>4</sup> is provided with a distributing valve I employed for supplying the engine or the like.

The heating apparatus which incloses the vaporizers and the superheaters comprises a furnace K with a limited draft, surmounted by an inclosing wall as k of masonry or simply of sheet iron.

The arrangements for regulating and insuring safety comprise: a manometer M placed in the dome of the vessel V' and another manometer N placed in the dome of the vessel S<sup>4</sup>. A safety valve J is arranged on the dome of the vessel S<sup>4</sup>. A drain cock L is placed at the base of each vessel.

In starting the apparatus the vaporizers V' and V<sup>2</sup> contain a few liters of cold water, the furnace is lighted and kept going by a moderate draft, proportioned to the quantity of steam which it is desired to obtain. As soon as this reserve of water boils the steam is diffused in all the vessels, the temperature constantly increasing, the pressure increases in proportion, and, as soon as the manometers indicate the pressure that is desired, the apparatus is ready for supplying energy. The steam pipe B for actuating the feed-pump A is opened. The pump is started immediately and forces the liquid

into the coil pipes G and G'. This forcing action is regulated by means of the valve O so that the whole of the liquid forced into the vaporizers is at once vaporized without  
 5 any liquid being left, which explains more clearly what is meant here by the proportionality of the feed and delivery. The steam generated by the vessels V' V<sup>2</sup> being saturated, is dried and superheated in the  
 10 following vessels, and passes through the distributing valve I completely invisible.

This novel apparatus enables air or different gases or liquids of any kind to be mixed with steam, by the use of a number  
 15 of suitable pumps, and thus hot dry gases to be obtained, which are employed specially in therapeutics, chemistry and otherwise.

What I claim is:

- 20 1. In an apparatus of the character described the combination with a vaporizing vessel, of a series of superheating vessels, valved communication pipes between said  
 25 superheating vessels, a valved communication pipe between the first one of the series of said superheating vessels and the vaporizing vessel, a feed pump, a pipe placing the steam inlet end of said pump in communication with the last one of the series of super-  
 30 heating vessels, a pipe placing the steam outlet end of the feed pump in communication with the vaporizing vessel, a liquid reservoir, and pipes placing the opposite ends of the pump in communication with the said  
 35 liquid reservoir, and means for heating the vaporizing vessel and superheating vessels comprising an inclosing casing in which the vaporizing and superheating vessels are arranged.
- 40 2. In an apparatus of the character described, the combination with a vaporizing vessel, of a series of superheating vessels, valved communication pipes between said  
 45 superheating vessels, a valved communication pipe between the first one of the series

of said superheating vessels and the vaporizing vessel, a feed pump, a pipe placing the steam inlet end of said pump in communication with the last one of the series of super-  
 heating vessels, means for placing the steam  
 50 outlet end of the pump in communication with the vaporizing vessel comprising a coil of pipe arranged to effect the heating of the liquid passing from the pump into the  
 vaporizing vessel, a liquid reservoir, pipes  
 55 placing the opposite ends of the pumps in communication with the said liquid reservoir, and means for heating the vaporizing vessel, the coil of pipe, and the superheating  
 60 vessels comprising an inclosing casing in which the various vessels and said coil of pipe are arranged.

3. In an apparatus of the character described the combination with a vaporizing device comprising a plurality of vessels in  
 65 communication with each other, of a series of superheating vessels, valved communication pipes between said superheating vessels, a valved communication pipe between the  
 first one of the series of superheating ves-  
 70 sels and the vaporizing device, a feed pump, a pipe placing the steam inlet end of the said pump in communication with the last one of the series of superheating vessels, a  
 pipe placing the steam outlet end of the feed  
 75 pump in communication with the vaporizing device, a liquid reservoir, and pipes placing the opposite ends of the pump in communication with the said reservoir, and means for  
 heating the vaporizing device and the su-  
 80 perheating vessels comprising an inclosing casing in which said vaporizing device and superheating vessels are arranged.

In testimony whereof I affix my signature in presence of two witnesses.

ERNEST WIART.

Witnesses:

H. C. COXE,  
 VICTOR HATREAY.