

No. 698,348.

Patented Apr. 22, 1902.

G. ADROT & P. PONS.
STEAM REINTEGRATOR.

(Application filed Jan. 20, 1902.)

(No Model.)

2 Sheets—Sheet 1.

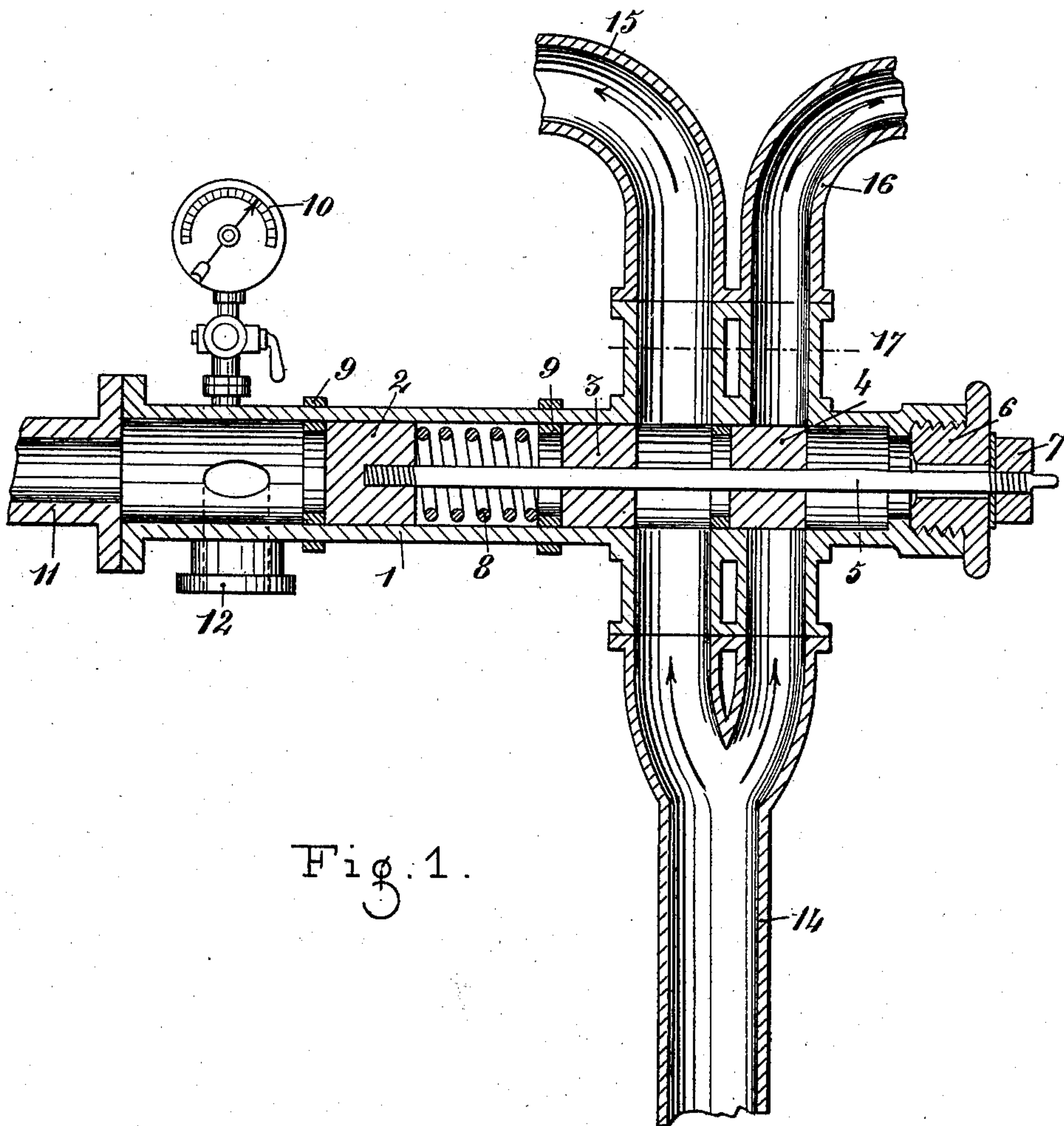


Fig. 1.

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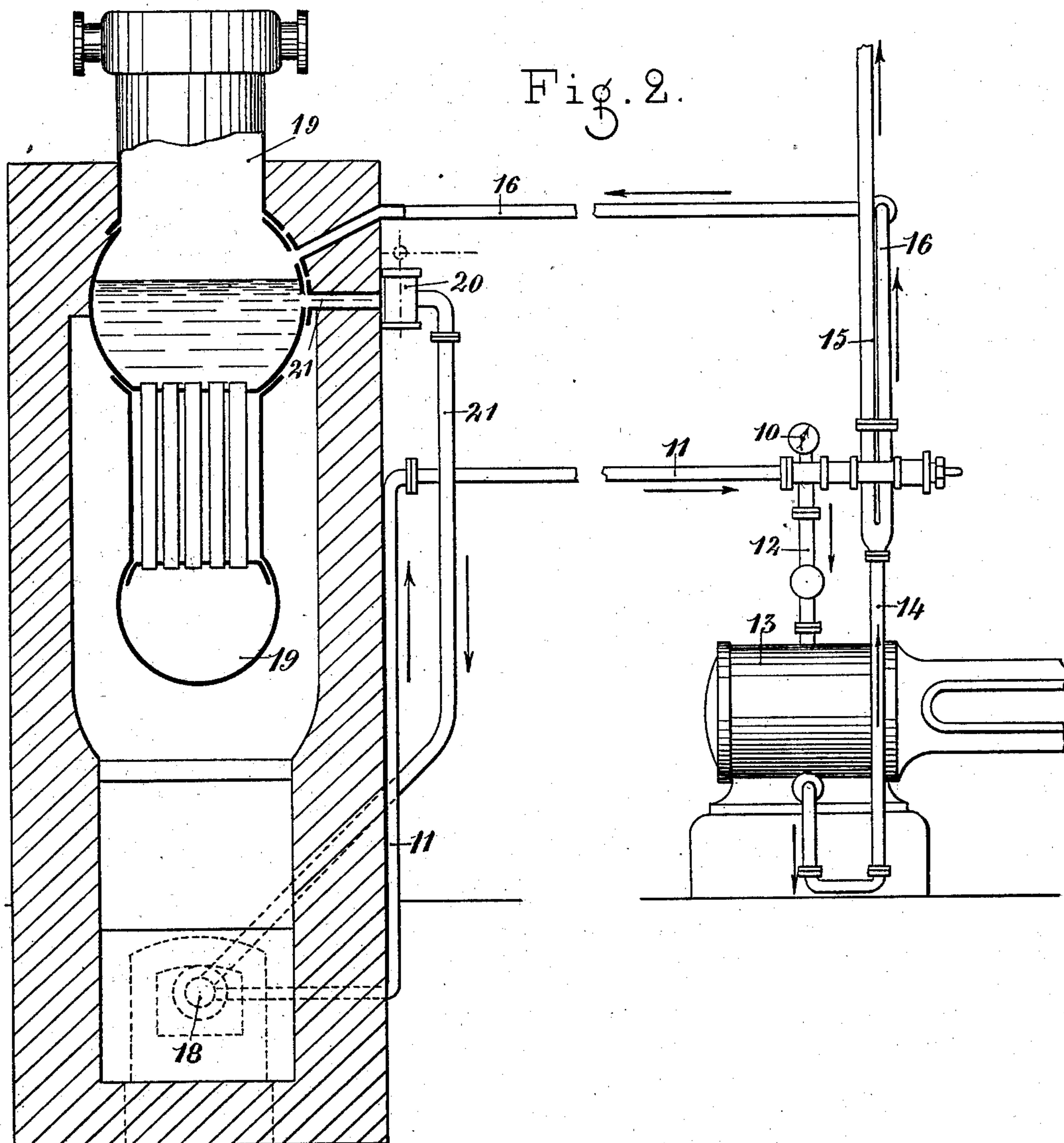
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UNITED STATES PATENT OFFICE.

GEORGES ADROT AND PIERRE PONS, OF MARSEILLES, FRANCE.

STEAM-REINTEGRATOR.

SPECIFICATION forming part of Letters Patent No. 698,348, dated April 22, 1902.

Application filed January 20, 1902. Serial No. 90,523. (No model.)

To all whom it may concern:

Be it known that we, GEORGES ADROT and PIERRE PONS, citizens of the French Republic, residing at Marseilles, France, have invented certain new and useful Improvements in Steam-Reintegrators; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The present invention has for its object to provide a steam-reintegrator applicable to power-engines of all kinds—such as stationary engines, locomotives, and vessel-engines—from which the steam escapes into the atmosphere, the invention being also applicable to any concentrating apparatus and insuring the direct return to the boiler of the steam escaping from the cylinder. To this end a steam-superheater is used, into which water from the boiler is pressed by means of a suitable pump for the purpose of superheating same and of converting it into steam having a greater pressure corresponding to its temperature. This steam is then directed to the cylinder after passing through the reintegrator itself, which comprises a delivery-pipe provided with inner pistons, which through the action of the superheated steam either uncovers the channel of the steam-escape while allowing same to return to the boiler or uncovers the channel of the steam-escape to the atmosphere at the time of putting the apparatus at work when the pressure within the superheater is not high enough to insure the regular operation of said apparatus.

In the annexed drawings, which are given by way of example, Figure 1 shows a section made through the axis of the reintegrator itself. Fig. 2 shows the device applied to a stationary engine.

The reintegrator consists of a sufficiently strong metal tube 1, within which are arranged three movable pistons 2 3 4, fixed on a rod 5, passing through a stuffing-box 6 and provided with an adjusting-nut 7. Between the pistons 2 and 3 is a spring 8, and 9 represents stops for limiting the stroke of each piston. A pressure-gage 10 shows the pressure of the steam at the time it enters the reintegrator through the pipe 11.

Upon the tube 1 are two branching pipes,

one of which, 12, conducts the steam to the cylinder 13, and the other, 14, which at the opposite end is in connection with the reintegrator and with the cylinder. The latter is divided into two channels, one, 15, leading to the atmosphere and liable to be obstructed by the piston 3, and the other, 16, returning to the boiler and liable to be obstructed by the piston 4. A cock arranged on the line 17 allows of the channel 16 being obstructed.

For the operation a superheater is used, which may be placed close to the boiler 19, of which it utilizes the waste heat and which receives through any pump 20 and in regular manner the water from the said boiler, the said water being taken a little below the middle level by means of a pipe 21. The high-pressure steam which results therefrom and which is led to the reintegrator by the pipe 11 acts on the piston 2, held by the spring 8, so as to cause piston to move, and thus obstruct the aperture of the channel 15, leading to the atmosphere, by means of the piston 3, and so as to open the aperture of the channel 16, leading back to the boiler, by moving the piston 4. This action will continue as long as the pressure within the pipe 11 shall be greater than the back pressure within the pipe 16, added to the power of the spring 8, the latter being intended for overcoming the point of inertia in case the pressures should become counterbalanced. The engine will now be working in the desired manner as far as reintegration of the steam to the boiler is concerned.

To put the reintegrator at work before setting the engine in operation, it is first necessary to let the steam escape to the atmosphere; as to begin with the steam by impinging against the piston 2 pushes the same forward and uncovers the channel to the boiler. At the start it may happen that the superheater does not possess a pressure high enough to cause the return of the escape steam to the boiler. In this case the two-way cock 17 will be opened, one way of which is in the direction of the atmosphere, and it will be maintained in that position until the engine is working regularly, when it will have to be turned in the direction of the boiler. It will be understood that the water of the boiler, regularly introduced in the boiler, will cause the pressure to rise

to a higher degree to that in the boiler or generator previous to its reintegration and that it will thus remain at its constant high pressure and that the pistons 2 3 4 will produce their effect regularly, and consequently that the aperture 15 being closed and the aperture 16 open the engine will always receive the steam necessary to its good working.

Having thus fully described our invention, what we claim as new, and desire to secure by Letters Patent of the United States, is—

1. In a boiler having a steam-escape leading to the atmosphere, a superheater, a pipe connecting it with the water in the boiler, a reintegrator, a pipe connecting it with the superheater, a pipe leading from the reintegrator to the atmosphere and to the steam-chamber in the boiler, and automatic valves in the reintegrator operated by the pressure of the superheated steam, substantially as described.

2. A steam-reintegrator comprising a boiler,

a superheater, a tube having pipes leading from the superheater and to both the boiler and the atmosphere, three pistons in said tube rigidly connected together, one piston exposed to the action of the superheated steam and the others adapted to close or open the pipes to the boiler and atmosphere, respectively, a cylinder, a pipe leading therefrom to the tube, a pipe leading from the cylinder to the tube and branching to meet the pipes leading to the boiler and atmosphere, respectively, and a spring acting upon the pistons in opposition to the superheated pressure, substantially as described.

In testimony whereof we affix our signatures in presence of two witnesses.

GEORGES ADROT.
PIERRE PONS.

Witnesses:

ROBERT K. FAST,
P. VISSET.