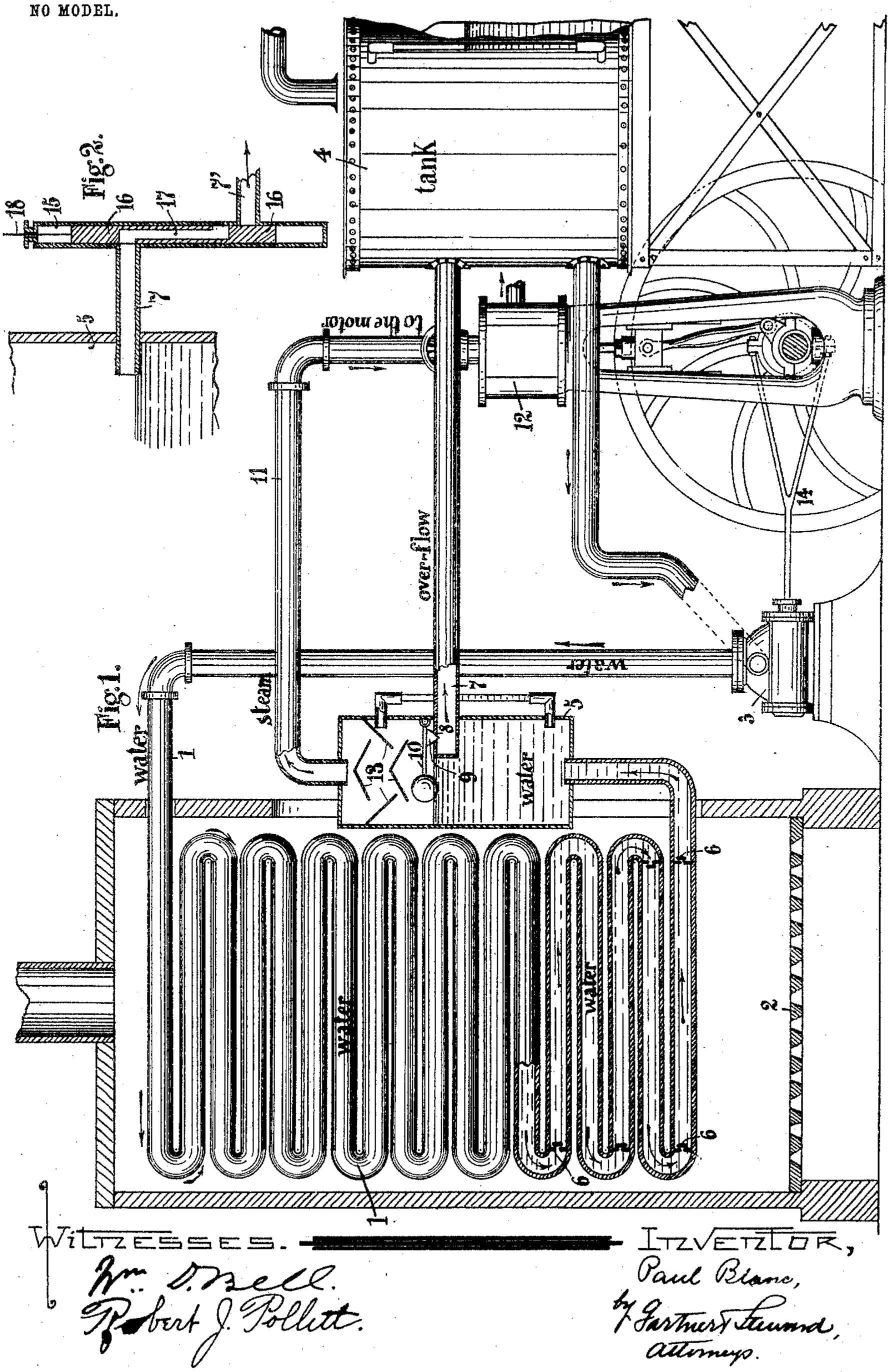
No. 776,639. PATENTED DEC. 6, 1904.

P. BLANC.

SUPERHEATER.

APPLICATION FILED JAN. 23, 1903.

NO MODEL.



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No. 776,639. Patented December 6, 1904.

UNITED STATES PATENT OFFICE.

PAUL BLANC, OF BRUSSELS, BELGIUM.

SUPERHEATER.

SPECIFICATION forming part of Letters Patent No. 776,639, dated December 6, 1904.

Application filed January 23, 1903. Serial No. 140,200½. (No model.)

To all whom it may concern:

Be it known that I, PAUL BLANC, architect, a citizen of the Kingdom of Belgium, residing at 75 Avenue Princesse Elisabeth, Brussels, Belgium, have invented a new and useful Improved Water-Superheater; and I do hereby declare the following to be a full, clear, and exact description of the same.

My present invention has for its object to obtain steam under much higher pressures than in actual generators.

A further object of the invention is to avoid or reduce in large proportions the danger of explosions and the resulting injurious effects thereof. Besides this main object the generator may also produce when desired actually-utilized pressures from one to fifteen or twenty atmospheres, the explosions being equally avoided.

In the accompanying drawings, Figure 1 is a general view of a generator plant according to my invention. Fig. 2 is a detailed sectional view of an overflow device which can be used with my generator.

While I have shown my invention as applied to a stationary plant, it will be understood that it may be used in motor-cars, as well as for all other industrial purposes.

Special reference being had to the drawings, 1 represents a suitable coil of any desired length practically arranged above a suitable furnace 2 and one end of which is connected to the water-feed pump 3, pumping water from a tank 4 and forcing the same into said coil 1, the other end thereof being connected to the reservoir 5. Said coil is provided interiorly over its entire length with clack-valves or other suitable valves 6, whereby it is divided into a number of successive sections or compartments. The length of said pipe, the diameter, the thickness of the walls, the arrangement above the furnace thereof are varied in accordance with the temperature to be attained and for the purpose of obtaining the best utilization of the furnace heat. The reservoir 5 is of a smaller capacity—say one liter or less, if desired—than the coil 1, and it is not directly exposed to the action of the furnace 2; but the same is arranged in such manner that it may be heated sufficiently at the beginning of the operation for producing the steam necessary for starting the motor, and during the operation the temperature thereof remains equal or higher than that of the water contained therein. The thickness of its walls corresponds to the maximum pressure to be obtained and to its size.

7 is an overflow-pipe starting from the reservoir 5 and having an opening 8 normally closed by the projection 9 of a float 10 and through which water is discharged into the tank 4 when the level of the water in the reservoir 5 rises above said opening 8, thereby maintaining said water-level at a constant line in the reservoir 5.

The generated steam passes from the top of the reservoir 5 through the pipe 11 to the engine 12 and to any other uses for the purpose of which steam is generated. The devices 13 prevent water from being projected into the take-off 11.

My invention operates as follows: The feed-pump 3, operated by the engine 12 through an eccentric 14, forces a continuous flow of water into the coil. At each stroke of the pump the weight of said feed-water must be always a little greater than the weight of steam consumed in the same time, so that coil 1 and reservoir 5 always contain water. The water heated in the coil 1 passes into the reservoir 5, wherein it is converted to steam under a pressure corresponding to the temperature to which the water has been heated. The produced steam is taken from said reservoir 5 through the aforementioned pipe 11. By reason of the continuous operation of the feed-pump 3 the level of the water has tendency to rise in the reservoir 5, and it is therefore necessary to have a device for maintaining the water at a given level. This end is attained by the float 10, which is arranged to leave passage to the excess of water through the opening 8 in the pipe 7, and said water, which is immediately converted to steam, may be conducted to any desired point—as, for instance, into the water-tank 4. The excess of water may be discharged through the agency of other devices. For instance, Fig. 2 shows a device wherein the overflow-pipe 7 discharges into a tubular compartment 15, con-

taining a member 16, having a longitudinal recess 17, said member being reciprocated through the medium of a rod 18 and suitable mechanical connection connecting the same with the engine. Said tubular compartment has an outlet-pipe 7, and the arrangement is such that the recess 17 is brought in alternate communication with the inlet 7 and the outlet 7′, said inlet and outlet being never in direct communication with one another. The excess of water is thus evacuated automatically through the pipe 7. In fact, in this arrangement steam is rejected at the same time as the excess of water; but the loss is sufficiently small to need no consideration. The capacity of said recess 17 may be equal (or higher) to the amount of water forced into the coil 1 at each stroke of the feed-pump 3, so that a constant water-level is maintained in the reservoir 5, even when the whole should operate without being heated. The substitution of the float by the device Fig. 2 constitutes a great advantage for motor-cars, for instance, which permits of giving the reservoir 5 the smallest possible volumes.

An essential feature of my invention consists in that this generator may be fed with already hot water, and in this case it becomes practically a "water-superheater" for existing boilers.

Another feature resides in that the generator being heated by means of liquid fuel the steam-pressure may be instantly varied by varying the quantity of fuel, which is an essential instant in the application of my invention to motor-cars and the like.

It will be understood that the generator as described may easily produce water heated to a temperature of 300°, for instance, such water at this temperature generating steam of sixty-atmospheres pressure, while the highest pressure heretofore obtained is of twenty atmospheres. Notwithstanding so high a pressure, the danger of explosion is effectively avoided by reason of the inner clack-valves of the coil 1 and the reduced dimensions of said coil and reservoir 5, by reason of the small volume of dangerous water and by reason of the fact that the coil and reservoir, having small volumes, present more resistance than ordinary boilers of large sizes. Moreover, the spheroidal state of the water is effectively avoided by reason of the continuous flow of water in the coil 1.

Should a rupture occur, it would be limited to a small section, the valves 6 preventing the hotter water from flowing back to the point of rupture, and only water of less and less greater heat would flow out thereof.

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

1. The combination with a source of heat, of a tubular water-container, a relatively small receptacle, having a steam-outlet in the top portion thereof, a tubular connecting means between the lower end of the water-container and said receptacle, said water-container and the connecting means being in proximity to be heated from said source of heat, means for inducing a circulation of water through said container, the connecting means and the receptacle, and means for discharging the excess of water from said receptacle, substantially as set forth.

2. The combination with a closed receptacle, a water-discharge, having means for evacuating the excess of water from said receptacle, and a steam-outlet in the receptacle, of a tubular water-container, divided lengthwise into a number of sections or compartments by means of suitable valves and discharging into said receptacle, a source of heat arranged to heat tubular container, and means for inducing water to flow through said container and receptacle, substantially as described.

3. The combination with a closed receptacle, a water-discharge located appreciably above the bottom thereof, a water-actuated valve controlling said discharge and a steam-discharge in the top portion, of a tubular water-container the lower end of which is in communication with said receptacle, said tubular container being divided lengthwise into a number of sections or compartments by means of suitable valves, a source of heat arranged in proximity to heat the container, and means for inducing water to flow through said container and receptacle, substantially as described.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

PAUL BLANC.

Witnesses:
JOSEPH MARKL,
GREGORY PHELAN.