

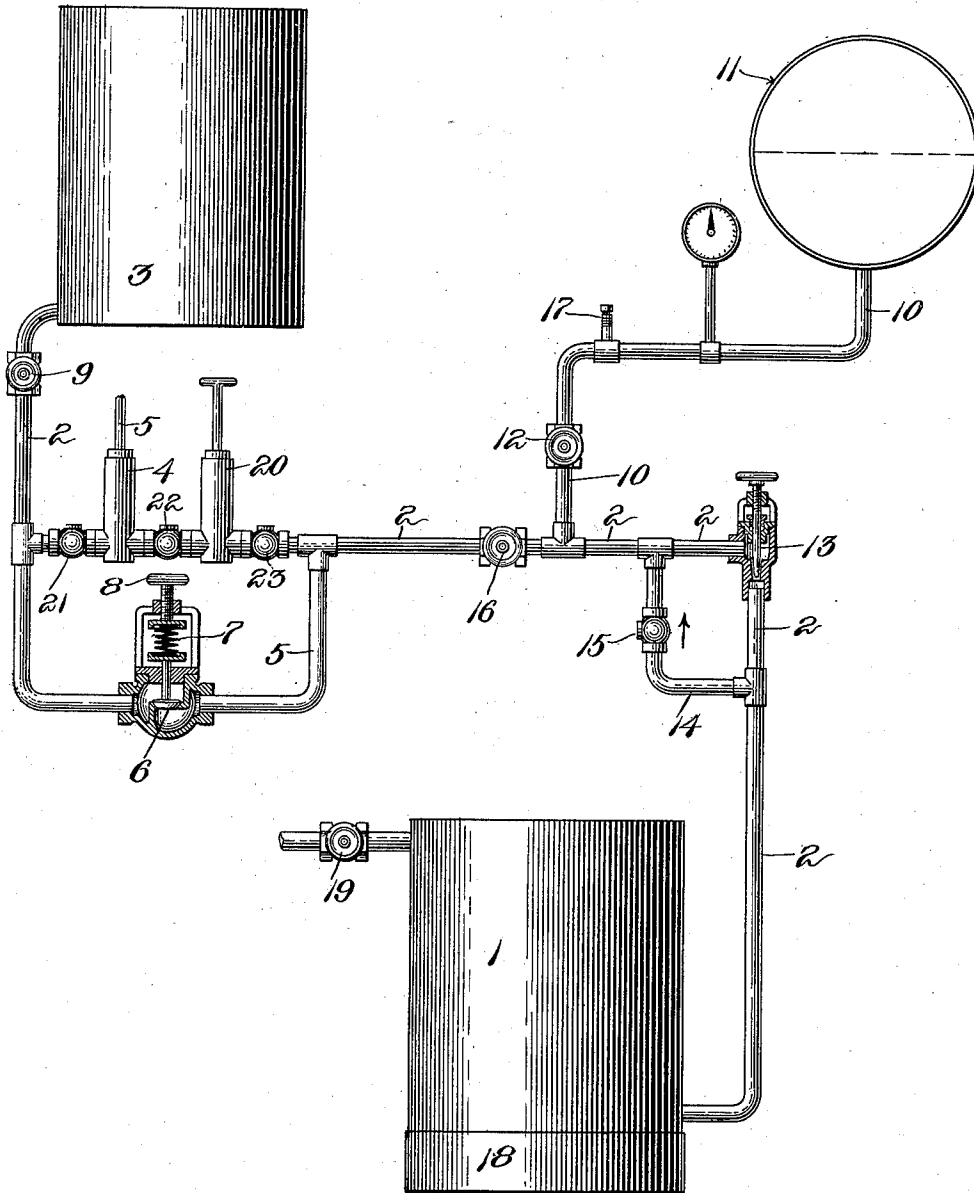
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Patented Jan. 28, 1902.

R. O. HOOD.
FLUID VAPORIZING SYSTEM.

(Application filed Feb. 28, 1901.)

(No Model.)



Witnesses:

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UNITED STATES PATENT OFFICE.

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FLUID-VAPORIZING SYSTEM.

SPECIFICATION forming part of Letters Patent No. 691,944, dated January 28, 1902.

Application filed February 28, 1901. Serial No. 49,285. (No model.)

To all whom it may concern:

Be it known that I, RALPH O. HOOD, a citizen of the United States, residing at Danvers, in the county of Essex and State of Massachusetts, have invented a certain new and useful Improvement in Fluid-Vaporizing Systems, of which the following is a specification, reference being had therein to the accompanying drawing.

10 In said drawing I have illustrated one embodiment of my invention by a diagram, from which a full and clear understanding of my invention may be had.

My invention has for its object to provide 15 an improved fluid-vaporizing system in which the rate at which the fluid is fed to the vaporizer is regulated automatically, so that the pressure in the vaporizer is maintained below a predetermined point.

20 My improved fluid-vaporizing system comprises a vaporizer, a fluid-supply tank or reservoir and a feed-pipe connecting the vaporizer and tank, a feed-pump in said pipe, and a by-pass around said pump, in which is an 25 automatic valve adapted to open when a predetermined pressure exists in the vaporizer, whereby when that predetermined pressure exists in the vaporizer and the valve opens the fluid from the pump is caused to pass 30 through the by-pass, around the pump, and back into the feed-pipe on the tank side of the pump.

Another feature of my invention consists in providing an auxiliary fluid reservoir or 35 tank containing a quantity of fluid under pressure and connecting the same with the feed-pipe at a point between the feed-pump and the vaporizer.

A third feature of my invention consists 40 in providing a valve or other adjustable restriction in the feed-pipe between the feed-pump and the vaporizer and in providing a by-pass around said valve, in which is a check-valve so arranged as to open under pressure 45 from the vaporizer and to close when such pressure diminishes, whereby a free passage from the vaporizer is provided through the by-pass when an excess of pressure exists in the vaporizer and whereby all fluid fed to

the vaporizer is caused to pass through the 50 valve or other restriction to the vaporizer.

Having reference to the drawing, 1 represents a fluid-vaporizer, herein shown as a steam-generator of that class known as "flashers" or "flash-boilers," which may be of any 55 suitable type. Generator 1 is connected by a feed-pipe 2 with a fluid-reservoir, herein shown as a water-supply tank 3, from which water is fed to generator 1 through pipe 2 by means of a pump 4, which latter is driven by 60 any suitable means. (Not shown.) Extending around pump 4 is a by-pass 5, one end of which communicates with pipe 2 at one side of pump 4 and the other end of which communicates with pipe 2 at the other side of pump 4. 65 In the by-pass 5 is a valve 6, which is held on its seat by a measured force, herein arranged to be produced by a spring 7, the pressure of which is regulated by means of a screw 8, as will be clear. In pipe 2 between by-pass 70 5 and water-supply tank 3 is a valve 9, by means of which the amount of water fed to generator 1 at each stroke of pump 4 may be regulated by hand when desired. Spring 7 is so adjusted by screw 8 that when the system is in operation if the predetermined 75 pressure exists in pipe 2 on the vaporizer or generator side of pump 4 valve 6 will open and the water passing through pump 4 will be permitted to return through by-pass 5 to 80 the supply side of pump 4, and it will continue to circulate through the pump and by-pass 5 until the pressure in pipe 2 on the vaporizer or generator side of pump 4 falls. As 85 soon as the pressure in pipe 2 falls below the predetermined pressure for which spring 7 is adjusted valve 6 closes automatically, and the water forced through the pump 4 will pass along through pipe 2 toward vaporizer or generator 1. One end of a pipe 10 is connected 90 with feed-pipe 2 at a point between pump 4 and vaporizer or generator 1, and the other end of pipe 10 is connected with an auxiliary fluid-reservoir, herein shown as a tank 11. Pipe 10 is furnished with a valve 12, which is 95 permitted to remain open when the engine is in operation and which is closed by the operator when the engine is not in use.

In pipe 2 at a point between pipe 10 and vaporizer or generator 1 is a needle-valve 13, whose function is to so retard or regulate the entrance of the water into vaporizer or generator 1 as to prevent it from entering in a body, and thereby acting to cool the tubes of the vaporizer or generator. In order to provide for the free relief of an excess of pressure in generator 1, which would otherwise be retarded and more or less checked by valve 13, I have herein provided a by-pass 14, one end of which communicates with pipe 2 at one side of valve 13 and the other end of which communicates with pipe 2 at the other side of valve 13, and in by-pass 14 is a check-valve 15, which opens in the direction indicated by the arrow and closes in the opposite direction, so that by-pass 14 is closed to the water from pump 4 or tank 11, but open to water or steam under pressure from vaporizer or generator 1.

During the use of the apparatus since the water which is fed toward vaporizer or generator 1 by pump 4 is retarded in its passage through pipe 2 by needle-valve 13 the pressure in pipe 2 forces some of the water which is back of said valve 13 into pipe 10 and tank 11 until the pressure in tank 11 becomes greater than the predetermined pressure for which spring 7 is adjusted, when valve 6 will open and the water acted on by pump 4 will circulate through by-pass 5 and pump 4. Thus it will be clear that through the action of pump 4 and valve 6 a supply of water is maintained in tank 11 under a nearly-uniform pressure, which is determined by the force exerted on valve 6 by spring 7, and that an even flow of water through valve 13 is maintained. The compressed air in tank 11 serves in a way as a yielding piston or spring to force water through valve 13 to generator 1 when pump 4 is not in action. An excess of pressure in vaporizer or generator 1 is relieved by back pressure through pipe 2, by-pass 14 and valve 13, and by-pass 5 and valve 6 back to water-tank 3.

When the engine is not in use, valve 12 in pipe 10 is closed, as is also a valve 16 in that section of pipe 2 between pump 4 and pipe 10. When it is desired to first put the system in condition for use, a quantity of water is forced into tank 11 through a nipple 17 in pipe 10, within which nipple is a check-valve (not shown) which opens inwardly. After partly filling tank 11 the water in the same is put under the desired pressure, which is accomplished by forcing air under pressure through nipple 17. After supplying tank 11 with a quantity of water and establishing a definite pressure upon the same the furnace 18 of vaporizer or generator 1 is started, and then valve 12 is opened and the pressure in tank 11 forces water through pipes 10 and 2 by way of valve 13 into generator 1 until the pressure in vaporizer or generator 1 prevents the entrance of more water. After steam has been generated in generator 1 valve 16 is

opened, after which pump 4 is set in operation, and thereafter the water from the supply-tank 3 is fed to the vaporizer or generator and the pressure in the generator maintained automatically at a predetermined point.

At 20 is represented an auxiliary hand-operated pump, by means of which the operator may start the system in operation in place of utilizing tank 11 and pipe 10, as above described.

21, 22, and 23 are the check-valves of pumps 4 and 20.

What I claim is—

1. In a fluid-vaporizing system, in combination, a vaporizer, a fluid-reservoir, a pipe connecting the vaporizer and reservoir, a feed-pump in said pipe, a restricting-valve in said pipe between the pump and vaporizer, a by-pass around said valve, a check-valve in said by-pass, and means connected with said pipe between said pump and said by-pass for automatically relieving the vaporizer of excess of pressure.

2. In a fluid-vaporizing system, in combination, a vaporizer, a fluid-reservoir, a pipe connecting the vaporizer and reservoir, a feed-pump in said pipe, automatic means to stop the supply of fluid to the vaporizer when a predetermined pressure exists in the latter, a restricting-valve in said pipe between the pump and vaporizer, a by-pass around said valve, a check-valve in said by-pass, and means connected with said pipe between said pump and said by-pass for automatically relieving the vaporizer of excess of pressure.

3. In a fluid-vaporizing system, in combination, a vaporizer, a fluid-reservoir, a feed-pipe connecting the vaporizer and reservoir, a feed-pump in said pipe, automatic means to stop the supply of fluid to the generator when a predetermined pressure exists in the latter, an auxiliary reservoir containing fluid under pressure, and a pipe connecting the auxiliary reservoir with the feed-pipe at a point between the vaporizer and pump and a valve located in said connecting-pipe intermediate the auxiliary reservoir and the feed-pipe.

4. In a fluid-vaporizing system, in combination, generator 1, water-supply tank 3, pipe 2 connecting generator 1 and tank 3, pump 4 in pipe 2, by-pass 5 around pump 4, valve 6 in by-pass 5, valve 13 in pipe 2, by-pass 14 around valve 13, and check-valve 15 in by-pass 14.

5. In a fluid-vaporizing system, in combination, generator 1, water-supply tank 3, pipe 2 connecting generator 1 and tank 3, pump 4, in pipe 2, by-pass 5 around pump 4, valve 6 in by-pass 5, auxiliary water-supply tank 11, and pipe 10 connecting tank 11 with pipe 2 and provided with valve 12.

6. In a fluid-vaporizing system, in combination, generator 1, water-supply tank 3, pipe 2 connecting generator 1 and tank 3, pump 4 in pipe 2, by-pass 5 around pump 4, valve 6 in by-pass 5, valve 13 in pipe 2, by-pass 14

around valve 13, check-valve 15 in by-pass 14, auxiliary water-supply tank 11, and pipe 10 connecting tank 11 with pipe 2.

7. In a fluid-vaporizing system, in combination, a vaporizer, a feed-pipe connecting therewith, a restricting-valve in said feed-pipe, a by-pass around said valve, and a check-valve in said by-pass.

8. In a fluid-vaporizing system, in combination, a vaporizer, a feed-pipe connecting therewith, a reservoir containing fluid under

pressure, a restricting-valve in said feed-pipe between said vaporizer and said reservoir, a by-pass around said valve, and a check-valve in said by-pass.

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

RALPH O. HOOD.

Witnesses:

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