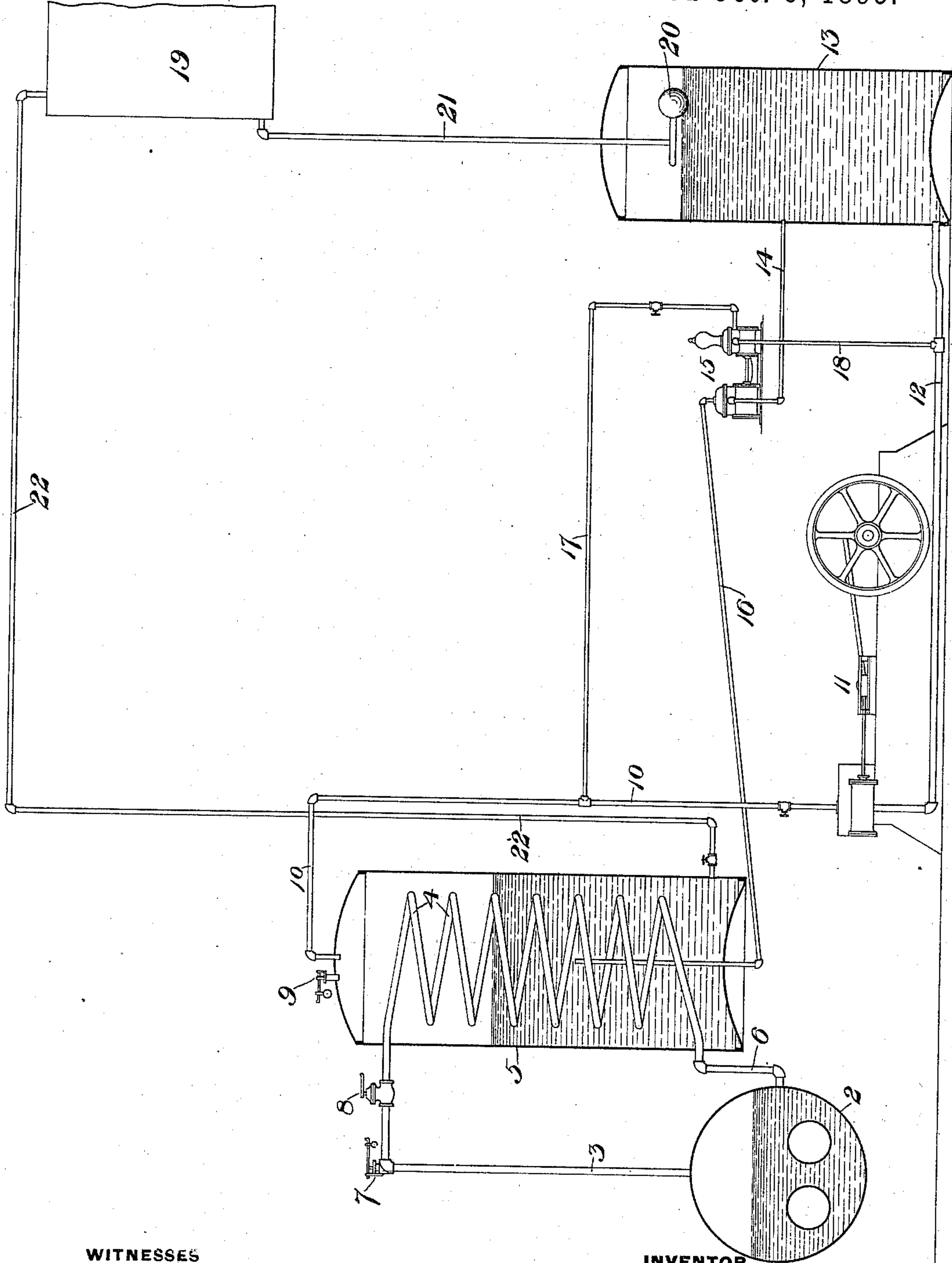


(No Model.)

H. E. GRANT.
POWER GENERATING SYSTEM.

No. 547,427.

Patented Oct. 8, 1895.



WITNESSES

Warren S. Bwartz
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INVENTOR

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UNITED STATES PATENT OFFICE.

HORACE E. GRANT, OF PITTSBURG, PENNSYLVANIA.

POWER-GENERATING SYSTEM.

SPECIFICATION forming part of Letters Patent No. 547,427, dated October 8, 1895.

Application filed June 30, 1894. Serial No. 516,179. (No model.)

To all whom it may concern:

Be it known that I, HORACE E. GRANT, of Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Power-Generating Systems, of which the following is a full, clear, and exact description, reference being had to the accompanying drawing, in which the figure is a diagrammatic view illustrating my power system in its preferred form.

My invention relates to the generation of power, and is designed to attain an improved method of and system for the same which shall be more economical than former systems, and at the same time absolutely safe from explosions.

In the drawing, 2 represents a primary steam-boiler of the ordinary type, from which a steam-pipe 3 leads to a coil of pipe 4 within a secondary boiler 5, from the lower end of which coil a pipe 6 leads back to the boiler, thus forming a closed circuit for the steam. The pipe 3 is provided with a safety-valve 7 and with a regulator 8, which may be operated either by the pressure or the heat to regulate the amount of steam passing through the circuit. This regulating-valve may be of the usual construction, and its object is to prevent variations in the heat of the primary boiler from causing similar variations in the secondary boiler, and thus maintain a uniform and constant heat therein.

The secondary boiler is preferably a vertical boiler provided with a safety-valve 9, and in it I prefer to employ liquid ammonia. The ammonia being vaporized by the coil of steam-pipe passes through a pipe 10 to the engine or prime motor 11, and its energy being utilized therein it passes through the exhaust-pipe 12 to the absorption-tank or condenser 13. From the tank 13 a supply-pipe 14 leads to the feed-pump 15, and thence is forced through the pipe 16 back into the boiler to be again vaporized. The pump is actuated by vapor taken through branch pipe 17, leading from the supply-pipe 10, and, being used in the pump, is exhausted through the pipe 18, leading to the exhaust-pipe 12. The tank 13 is supplied with additional cool water containing a small proportion of ammonia from the storage and cooling tank 19, a float 20 in

the lower tank preserving a constant level therein by actuating the admission-valve in the pipe 21. A blow-off pipe 22 leads from the secondary boiler to the elevated storage-tank.

The action is apparent. The ammonia vaporizing in the secondary boiler passes to and actuates the engine 11 and the pump 15, and the exhaust from both passing into the tank 13 is therein absorbed or condensed and returned to the secondary boiler by means of the pump to be again utilized.

The great advantage of my system lies in its absolute safety. The steam from the primary boiler passes through a closed circuit, and hence the water can never get low in this boiler, since it is hermetically sealed. In the secondary boiler it makes no difference how low the liquid falls, since it is heated therein only by the internal coil of pipe.

Water may be used in the secondary boiler, if desired, and other fluids may be used in either the primary or secondary boiler without departure from my invention.

The return-circuit for the steam or vapor generated in the secondary boiler may be dispensed with and the steam exhausted from the prime motor into the air, the essence of my invention lying in the use of the secondary boiler, from which the steam under pressure passes to and actuates the motor.

I claim—

1. A power generator comprising a boiler, a separate power generator, a return pipe leading from the boiler above its water line through the power generator and arranged to heat the same, and a pipe leading from the power generator to the prime motor; substantially as described.

2. A power generator comprising a boiler, a separate power generator, a return pipe leading from the steam space of the boiler through the power generator and arranged to heat the same, a safety valve upon the power generator, and a pipe leading from the power generator to the prime motor; substantially as described.

3. A power generator comprising a boiler, a separate power generator, a return pipe leading from the steam space of the boiler through the power generator, and having a regulator

thereon, and a pipe leading from the power generator to the prime motor; substantially as described.

4. A power-generating system comprising a
5 primary boiler, a secondary boiler, a return
pipe leading from the primary boiler through
the secondary boiler and arranged to heat the
same, a pipe leading from the secondary boiler
to the prime motor, an exhaust pipe leading
10 from the motor to a reservoir, and a supply
pipe from the reservoir to the secondary boiler;
substantially as described.

5. A power-generating system comprising a
primary boiler, a secondary boiler, a return

pipe leading from the primary boiler through 15
the secondary boiler and arranged to heat the
same, a pipe leading from the secondary boiler
to the prime motor, an exhaust pipe leading
from the motor to a reservoir, a pump con-
nected to the reservoir and secondary boiler, 20
and a supply pipe from the secondary boiler
to the pump; substantially as described.

In testimony whereof I have hereunto set
my hand.

HORACE E. GRANT.

Witnesses:

W. B. CORWIN,
H. M. CORWIN.