

(No Model.)

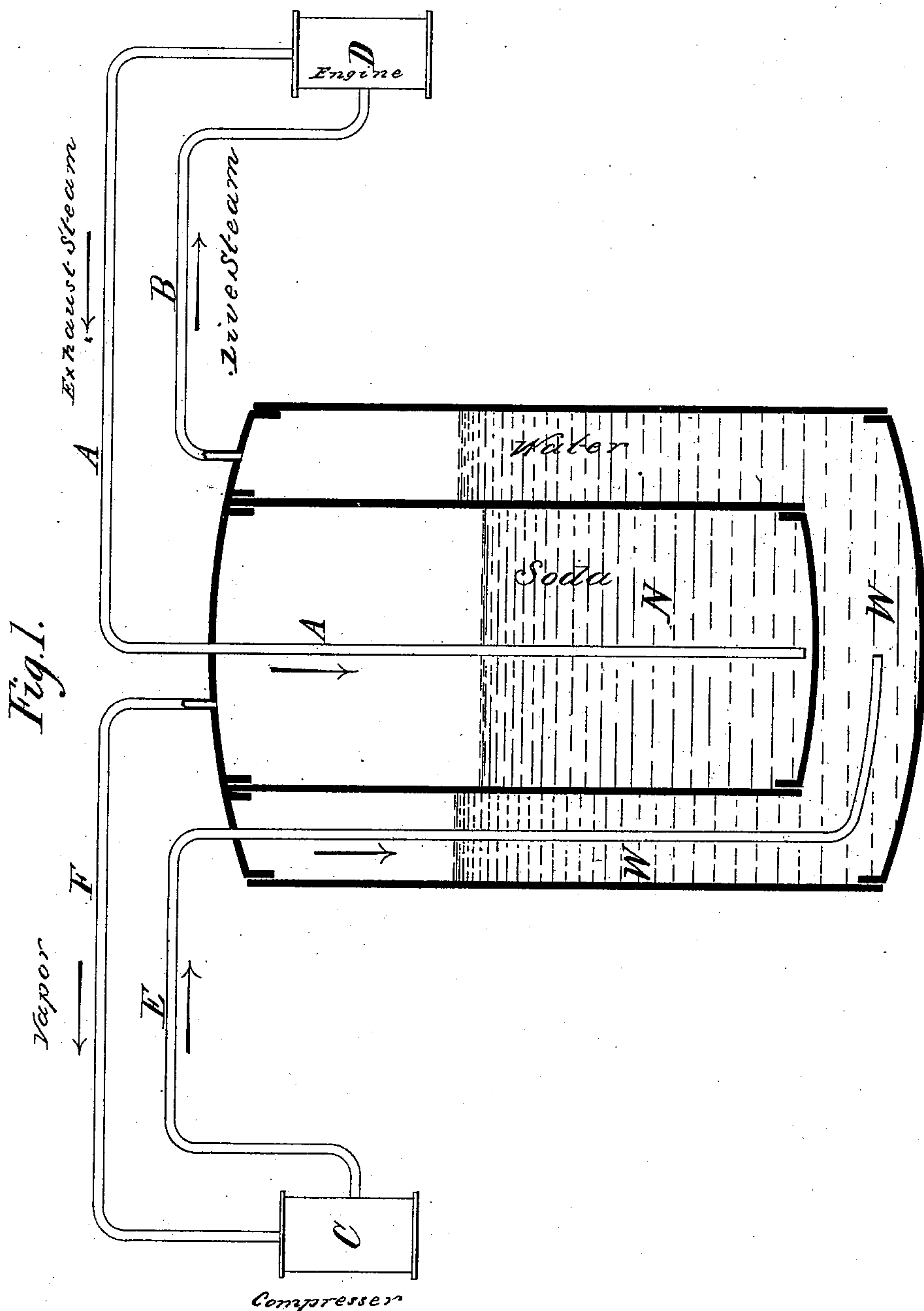
2 Sheets—Sheet 1.

M. HONIGMANN.

STORING POWER.

No. 333,222.

Patented Dec. 29, 1885.



Witnesses:

Matthew Pollock  
Miner Lindeman

Inventor.

Moritz Honigmann  
by his attorneys  
Brown & Hall

(No Model.)

2 Sheets—Sheet 2.

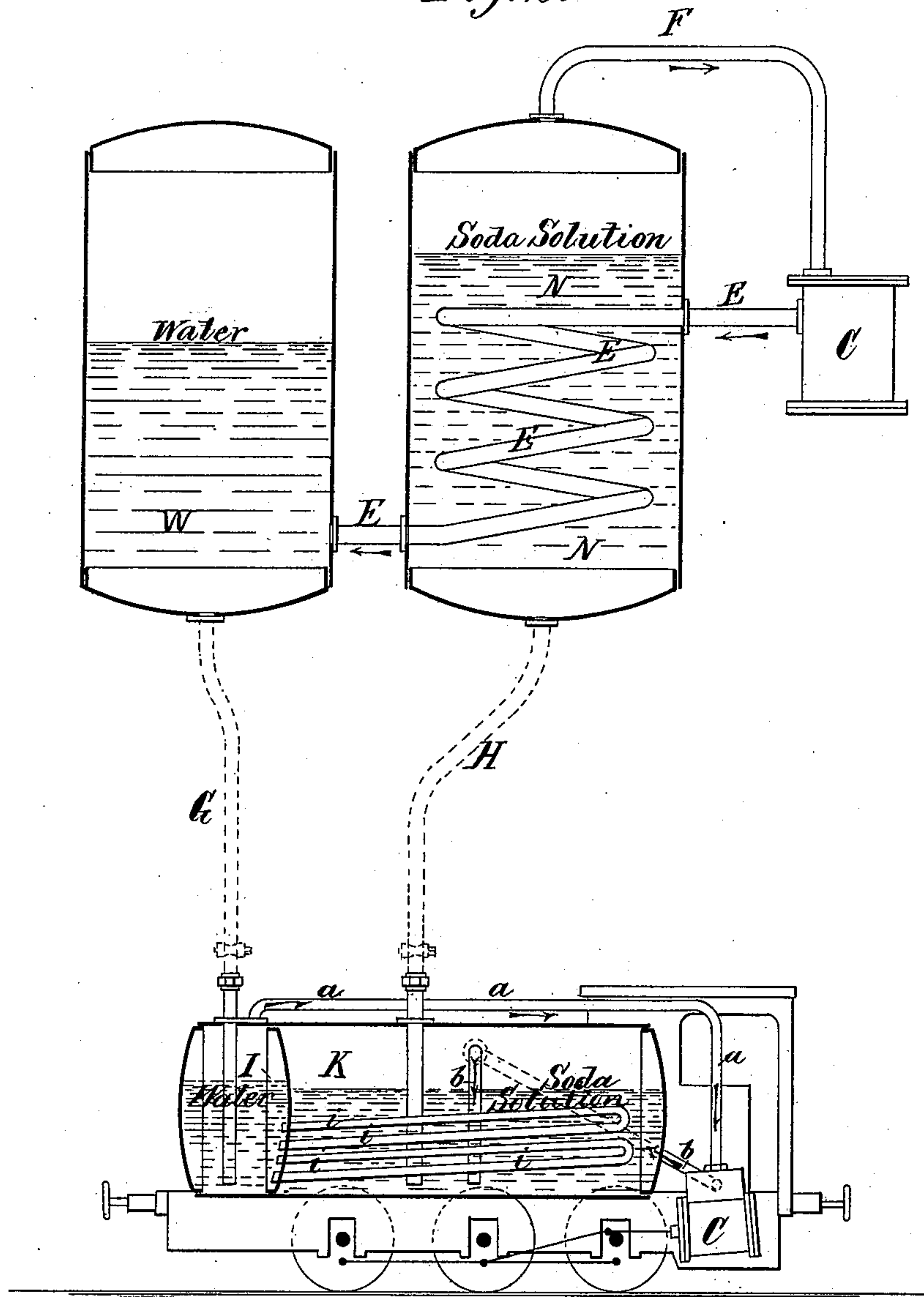
M. HONIGMANN.

STORING POWER.

No. 333,222.

Patented Dec. 29, 1885.

Fig. 2.



Witnesses:  
Emil Herter  
C. Sundgren

Inventor  
Moritz Honigmann  
by his attorney  
Brown & Hall



# UNITED STATES PATENT OFFICE.

MORITZ HONIGMANN, OF GREVENBERG, NEAR AIX-LA-CHAPELLE, GERMANY.

## STORING POWER.

SPECIFICATION forming part of Letters Patent No. 333,222, dated December 29, 1885.

Application filed May 28, 1885. Serial No. 166,984. (No model.)

*To all whom it may concern:*

Be it known that I, MORITZ HONIGMANN, a citizen of Germany and residing at Grevenberg, near Aix-la-Chapelle, Germany, have invented new and useful Improvements in Means for Storing Power, of which the following is a specification.

This invention relates to means for the transformation of wind, water, steam, and electric power into stored or accumulated steam-power.

In the working of fireless steam-engines by means of soda or other substances whose solutions have a high boiling-point only the heat transformed into work is lost.

This invention is an improvement on the means of carrying out the process of utilizing exhaust-steam, which is the subject of my United States Patent No. 287,937, dated November 6, 1883, the object of said improvement being to effect fireless working of steam-engines in perfectly-closed spaces without any loss of heat excepting that transformed into work, the same steam being constantly used for the working of the machine, and the storage of power being effected only by elementary forces without the use of fuel. This is performed in the following way: When, during the fireless working by means of soda or other substances the steam has passed long enough from the water-vessel through the steam-engine to dilute the soda, this operation is reversed, the steam being drawn by means of an exhaustor or a compressor from the soda-vessel into the water-vessel, in which it becomes absorbed. As the introduction of the compressed steam is effected in such a manner that a rapid circulation is produced in the pipes between the soda and water vessels, the differences of temperature due to the absorption and vaporizing process are quickly equalized.

In many arrangements, and specially in locomotives and ships, the above-described soda-regeneration process is not performed in the soda-steam vessel itself, but in a special vessel from which the condensed water and evaporated soda are periodically or continually removed. It has been found that the soda-steam vessel is a reservoir of accumulated power, and the greater the quantity of vaporized soda the greater will be the power. It is therefore evident that by the above-de-

scribed process means are obtained for the working of steam-engines, stationary or portable, with next to no expense by means of wind or water power.

By the above-described soda-regeneration process the soda-steam boiler is freed from many of the difficulties and disadvantages which are attached to the working of steam-boilers with fire in the ordinary manner.

In cases where neither water-power nor constant wind-power is obtainable an ordinary steam-engine with compressor can be employed.

My invention is illustrated in the accompanying drawings. It must, however, be understood that I do not confine myself to the special constructions shown, but that they only serve as illustrations of methods of carrying my invention into effect.

Figure 1 in the drawings is an elevation, partly in section, illustrating the application of my invention in connection with a stationary steam-engine. Fig. 2 is an elevation, partly in section, illustrating the employment of the invention for a locomotive.

I will first describe Fig. 1. When the soda solution contained in the vessel N has been diluted by the steam received through the pipe A from the steam-engine D, during which process the heat generated has produced steam in W to supply the steam-engine D by pipe B, then the operation is reversed, the compressor C being put in motion either by wind, water, or any other power. The compressor C draws the water vapor contained in the soda vessel N out by the pipe F, and presses it through the pipe E into the water contained in the water-boiler W, which by this is heated, and communicating its warmth to the soda-boiler N, increases the evaporation of water vapor out of the soda. This continues until the soda is sufficiently concentrated and the apparatus can again evolve power.

I will now describe Fig. 2. The concentrating apparatus shown in this figure, though especially adapted for locomotives, is also applicable for stationary engines. The only essential difference between it and that shown in Fig. 1 is that instead of the solution-vessel, or, as I have sometimes termed it, the "soda" vessel N, being placed within the water-vessel or steam-boiler W to impart heat



from the solution to the water in W through the walls of said vessel N, the two vessels are separate, and the delivery-pipe E from the compressor, instead of passing directly into the water-vessel or steam-boiler W, is connected with one end of a coil which is arranged within the solution-vessel N, and the other end of which communicates with the water in W, the said coil being virtually a portion of the pipe E, and serving as a means of imparting to the solution in N heat from the condensed water vapors passing through the said pipe, and thereby increasing the evaporation of water out of the said solution.

In the figure which I am now describing, which illustrates a method of applying my invention to locomotives, the concentrating apparatus is supposed to be stationary at a railway depot or station, and the locomotives to be employed in connection with it are to be, as shown in the figure, provided, in place of the ordinary boiler, with separate vessels, I and K, or with a boiler having two compartments, one, I, of the said vessels or compartments containing the water from which steam is to be generated for supplying the engine, having connected with it the induction-pipe *a* of the engine-cylinder C, and the other, K, of said vessels or compartments, which contains the steam-absorbing solution, receiving the end of the induction-pipe *b* of the engine.

The vessel I is represented in Fig. 2 as having connected with it both ends of a series of U-shaped water-circulating pipes to present a large heating-surface to the solution in the vessel K. Pipes G and H are connected, respectively, with the stationary water-boiler W and solution-vessel N, and are provided with detachable connections by which they can be connected at will, respectively, with the corresponding vessels or boilers I K of the locomotive for the purpose of filling the vessel K with the concentrated solution from N and filling I with hot water from W. On disconnecting these pipes the engine of the locomotive will work like the engine described in my Letters Patent No. 287,937, hereinabove referred to.

When the solution in the vessel has become so diluted as to be ineffective, the said vessel may be connected with the vessel N, or with a similar vessel at another station and trans-

ferred thereinto for reconcentration, the transfer being effected by a pump or by other suitable means. The vessel I is then refilled with hot water from a vessel, W, or one like it, by a pipe, G, and the vessel K refilled with concentrated solution from the vessel N, or one like it, by a pipe, H, and on the said pipes being disconnected the locomotive is ready to run again.

This invention differs from that which is the subject-matter of my Letters Patent No. 324,696, dated August 18, 1885, in that according to this invention the reconcentration of the steam-absorbing solution is effected by mechanical exhaustion and compression, while according to my said patented invention the reconcentration is effected by the employment of steam from a boiler to raise the temperature of the solution.

Having thus described my invention and the manner of employing the same, I claim—

1. The combination, with the steam-engine, the water vessel or boiler from which steam is supplied thereto, and the vessel for containing the solution into which the exhaust-steam from the engine is absorbed, of a compressor connected with the latter vessel for exhausting the water vapors from the said solution, and connected with the first-named vessel or boiler for delivering thereinto the water of said vapors, substantially as and for the purpose herein described.

2. The combination of the water vessel or boiler, the solution-vessel for containing the solution having a higher boiling-point than water, the compressors connected with said vessels for exhausting the water vapors from the solution-vessel and transferring the water thereof to the boiler, and the coil contained within the solution-vessel, and through which the water or water vapors circulate between the compressor and the boiler for communicating their warmth to the solution, substantially as and for the purpose herein described.

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

MORITZ HONIGMANN.

Witnesses:

GEO. F. LINCOLN,  
GEORGE S. LINCOLN.