(No Model.)

C. TELLIER.

METHOD OR PROCESS OF PRODUCING MOTIVE POWER.

No. 492,976. Patented Mar. 7, 1893.

Fig. 1.

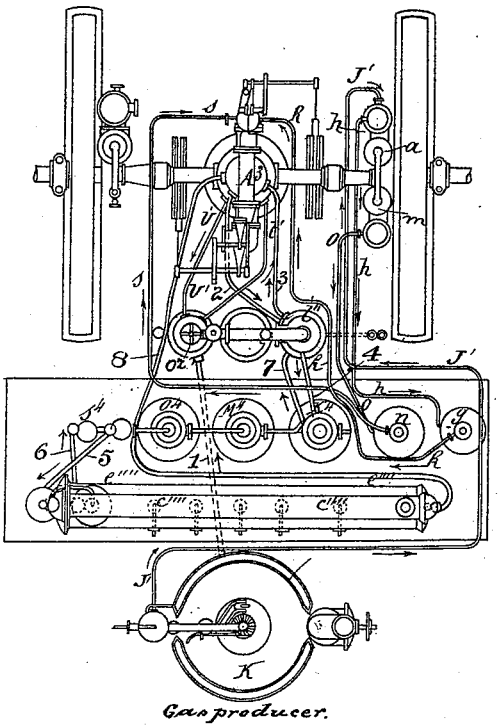
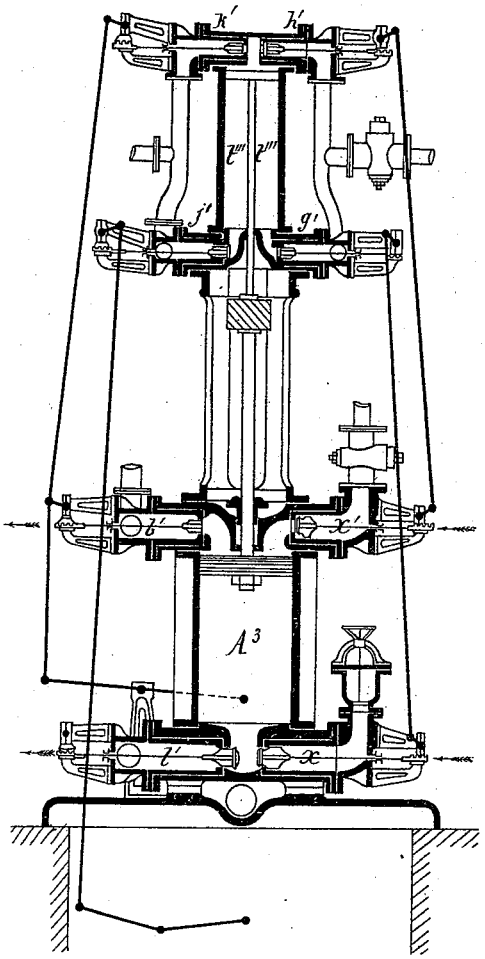


Fig. 2.



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CHARLES TELLIER, OF PARIS, FRANCE.

METHOD OR PROCESS OF PRODUCING MOTIVE POWER.

SPECIFICATION forming part of Letters Patent No. 492,976, dated March 7, 1893.

Application filed May 22, 1889. Serial No. 311,722. (No specimens.) Patented in France October 30, 1888, No. 193,809.

To all whom it may concern:

Be it known that I, CHARLES TELLIER, a citizen of the Republic of France, residing at Paris, France, have invented a new and useful Improved Method or Process of Producing Motive Power, (for which I have obtained Letters Patent in France, dated October 30, 1888, No. 198,809,) of which the following is a specification.

This invention consists in a method of economically producing motive power by the successive and combined employment in the motor cylinders of carbonic oxide, water-steam, and ammoniacal gas.

In my experiments relating to the production of motive power I have found that carbonic oxide accompanied with nitrogen, burned with a mixture of air under a motor piston, offers, even without pressure, great resistance to the combustion, its affinity for oxygen being then paralyzed by the presence of about seven times its volume of inert gas. Consequently, to effect the ignition it is necessary to burn a much larger proportion of carbonic oxide than would be necessary to produce the desired power, if the gas introduced into the motor cylinder were richer in carbonic oxide, and there is then disengaged a degree of heat greater than would be necessary to create the motive power to be obtained. Under these conditions it becomes difficult, not to say impossible, to recover, for the purpose of utilization, the heat remaining in the gases which have worked under the piston, as the temperature of about 400° which the issuing gases possess is opposed to a useful restitution of the heat. If the combustible gases are introduced into the motor cylinder either under atmospheric pressure or at a higher pressure and at the ordinary temperature, the combustion generates a quantity of heat which leaves the gases escaping after their work, a temperature of about 400°. Now if for example I take by way of exchange a part of this heat and communicate it to the gases being introduced into the cylinder, their temperature then rises and this increase of heat being carried to the escaping gases raises them to a very high temperature.

In order to better understand my invention, supposing that the gases introduced into the cylinder at 15°, have a temperature of 400° on their exit, it is clear that if I take back from the escaping gases a part of their heat, say 300°, and communicate it by way of exchange to the entering gases, these latter will not have a temperature of 15° but 315°, and if I add to this initial temperature the 400° resulting from the combustion, after working, it will be easy to see that the escaping gases will then have a temperature of 700°, which is too high as the cylinder would have the same temperature and this would cause the gases entering the cylinder to be spontaneously ignited. However, as the production and utilization of carbonic oxide constitute a very advantageous means of fully profiting by the fuel, it has occurred to me that after arriving at the result just described, viz:—the production of a certain amount of work, the heat of the escaping gases could be profitably utilized to increase this amount of work. First. By using this waste heat to produce superheated water-steam, furnishing motive power. Second. By abstracting from this water-steam, its latent heat of evaporation by means of an ammoniacal solution, the gas of which disengages under pressure, adds its action to the first two under a piston connected with that of the first cylinder in which the carbonic oxide and water steam act. It will thus be seen that the invention relates to the combination of certain phenomena which I employ to fully utilize the heat to the last unit.

The arrangement of the necessary apparatus, for applying the method just described may be varied but I prefer to employ the following. I employ for the production of carbonic oxide a gas producer similar to that described in my patent No. 431,677, dated July 8, 1890, and I cause the combustible gases to work in a motor cylinder, upon one side of a motor piston and then to escape after producing motive power carrying with them the heat produced by the combustion minus the portion which has been utilized for generating the motive power. These escaping gases are then employed to super-heat water-steam, generated in a boiler, heated by means of waste heat, by the apparatus themselves. I cause this super-heated steam to enter the chamber of the motor cylinder opposite to that in which motive power has been generated by the combustion of carbonic oxide.

When the superheated steam has thus produced motive power corresponding to its pressure and expansion I cause it to enter a surface condenser containing an aqueous solution of ammonia. The ammoniacal gas disengages itself under pressure and is brought into a special motor cylinder, connected with the first, in which the motive power thus generated adds its action to those proceeding from the carbonic oxide and water steam. Thus the water-steam not only produces ammoniacal vapor after operating beneath the piston, but it also produces, on the side of the piston opposite to that which receives the action of the carbonic oxide, a vacuum which allows of obtaining, from the power furnished by the burned carbonic oxide, a more energetic result. It will thus be seen that the heat has been utilized three times. First. By the employment of carbonic oxide. Second. By the utilization of water steam. Third. By the employment of ammoniacal vapor. These three actions combined serve to produce motive power in a very economical manner, as the heat has been successively transformed into motive power in as complete a manner as possible.

In the drawings, Figure 1, represents a diagrammatic plan of the various parts necessary to carry out my invention. Fig. 2. is a diagram representing a section of the double acting motor cylinders indicated on the plan at A^3.

A^3, is a motor cylinder which through the medium of a tube J′, compression pump *a*., tube *h*., receiver *g*. and tube *k*. receives carbonic oxide generated in the gas producer K: on the other hand it receives air through the medium of the pump *m*. tube *o*., exchanger *n*. and tube *s*. The two gases enter through the valve *x*; the piston then moves under the action of the combination of the two gases operating upon one of its faces. When these gases are burned they leave in a heated condition through the valve *l*′. They are introduced by a pipe U′. into an exchanger o^2. which they pass through and escape into the atmosphere. Water steam, produced either by the jacket of the gas producer K, or by a substitute boiler, passes by pipe 1., is introduced around some tubes in the exchanger o^2. and leaves in a superheated state to be used on the opposite face of the piston to that which was acted on by the combined gases. It is introduced into the cylinder A^3 through the tube *t*′. and the valve *x*′. This steam after having performed its work, escapes from the cylinder A^3. through the valve *b*′. and is conducted by a suitable tube 2. into a surface condenser *i*″. which contains around its tubes an ammoniacal solution. Under the influence of the heat disengaged by the condensation of the water steam, the ammoniacal solution gives off vapor under pressure which passes by pipe 3. and actuates the piston of the cylinder *t*‴. It enters this cylinder through the valves *g*′. *h*′. and egresses through the valves *k*′. *j*′, to be absorbed in the absorber *c*⁗. A pipe *e*⁗. connects the absorber *c*⁗. with the cylinder A^3. The absorber *c*⁗. receives a current of solution coming from the condenser *i*″. by pipe 4, which solution becomes cooled by passing into the exchanges O^4. M^4, K^4; and then through the pipe 5. Thus cooled, it is introduced into the absorber *c*⁗. where it absorbs the ammonia which has escaped from the motor cylinder *t*‴. The solution thus re-formed is drawn off by a pump s^4. through pipe 6. which forces it into the vaporizing condenser *i*″ through pipe 7., causing it in its passage to pass through the exchangers O^4., M^4., K^4., which serve to extract the heat of the drawn-off solution which comes from the vaporizing condenser *i*″. and goes to the absorber *c*⁗. to restore it to re-formed solution which returns from the absorber to the vaporizing condenser.

I claim—

The herein described method of producing motive power by means of a source of initial heat, the quantity of which is determined by the combustion in closed chambers of a given quantity of fuel, by causing to act simultaneously—First. The pressure resulting from the ignition of combustible gases: Second. The elastic force of water steam superheated by the escape of the said gases: Third. The elastic force of ammoniacal vapor produced by the condensation of the said water steam, these pressures being exerted upon pistons which are connected to produce a unitary result as hereinbefore described.

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