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Obtaining Motive Power by the Explosion of Gases.

(This Invention did not proceed to the Great Seal.)

PROVISIONAL SPECIFICATION left by Eugène Barsanti and Felix Matteucci at the Office of the Commissioners of Patents, with their Petition, on the 13th May 1854.

We, EUGÈNE BARSANTI, Professor of Physics and Mathematics in the 5 Institut Ximeniano, and FELIX MATTEUCCI, Gentleman, of Florence, in the Grand Duchy of Tuscany, do hereby declare the nature of the said Invention for "A NEW OR IMPROVED MODE OF APPLYING THE EXPLOSION OF GASES AS A MOTIVE POWER" to be as follows:—

For this purpose it is preferred to use two cylinders, with pistons and parts 10 arranged in such manner that the piston in one cylinder may be moving in one direction when the piston in the other cylinder is moving in the opposite direction, though engines according to this Invention may be arranged to work with one or other number of cylinders. The requisite explosive compound of gases is obtained by combining hydrogen gas and atmospheric air, 15 and the exploding of such compound is by electricity, brought into action by the working of the engine. Each of the cylinders used in constructing engines according to this Invention has at its lower end two openings, which are connected by an outer passage; the one opening when the piston is at its lowest position communicates with the interior of the cylinder above the 20 piston, and the other opening communicates with the cylinder below the piston, and the cylinder above the piston is open to the atmosphere; hence there is a free passage between the atmosphere and the under side of the piston when the piston is at its lowest position. From which it follows, that when one

Barsanti & Matteucci's Improvements in Obtaining Motive Power.

piston is pushed forward through this passage by the last stroke of the returning course of the other, by means of the arrangement which connects them, the quantity of atmospheric air requisite for the charge rushes in, and through his same passage the azote is expelled when the piston reaches the bottom of the cylinder. There is, besides, a third opening in the part destined to receive the charge, communicating with an apparatus abundantly supplied with hydrogen, this opening being closed and opened at suitable intervals by the movement of the machine, in consequence of which the hydrogen can be admitted in due proportion after the air, as the piston ascends. This movement produces an electric sparkle in the interior of the machine, which ignites the mixed gases as soon as the communication is cut off. This apparatus consists of two receivers, so that in one of these the gas is in a state of tension, and the other communicates directly with the cylinders, the degree of tension being adjusted so as to vary the proportion of the charge, and consequently the force of the explosion.

It results from this arrangement of the parts, that when explosion takes place in one of the cylinders the piston belonging to it is thrust forward and the vacuum thus produced; pressure of the atmosphere forces it back, and when it arrives at the extremity of its returning course explosion takes place in the other cylinder, and thus the pistons move alternately. There are three distinct modes of applying this power, viz. :—

1. The rods of the pistons are so formed that the effect occurs only in the course of their return, and consequently that effect is the result of atmospheric pressure.
2. The cylinders are closed in the upper part by a lid provided with valves, and a conducting tube, so arranged as to make the machine work as a pump of pressure, which condenses the atmospheric air in a receiver, from which the air is transmitted to one or two moving cylinders, constructed on the same principle as those of the steam engine.
3. The third manner, exclusively adapted to navigation, consists in connecting to the rods of the piston a system of pallets, so disposed as to meet the resistance of the water in ascending. These pallets are moveable, so as not to occasion obstruction in the returning movement of the pistons. In this manner the expansive force of gas may be employed to act directly.

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