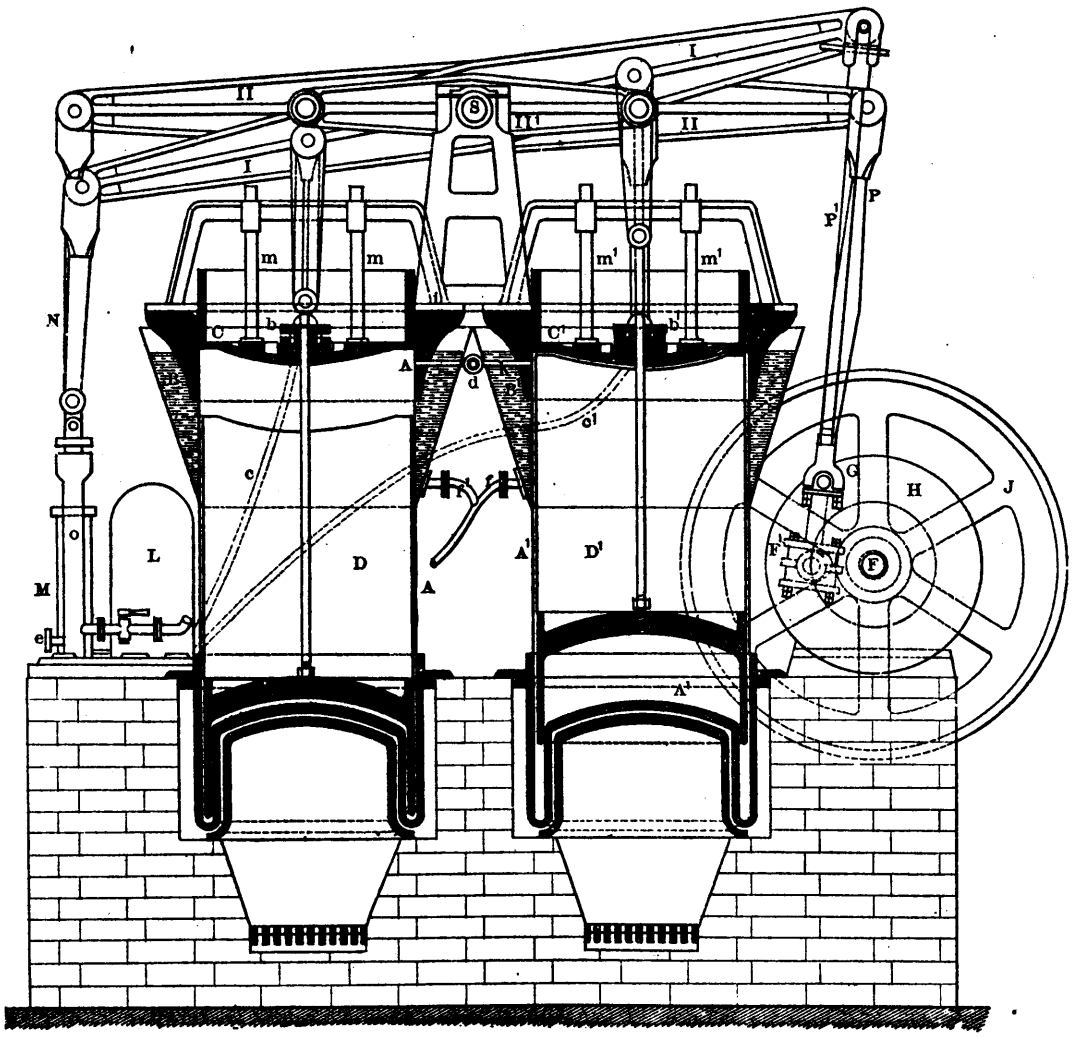

THE VAN RENNES HOT AIR ENGINE.

ANOTHER HOT AIR MOTOR—THE VAN RENNES ENGINE.

The accompanying diagram shows a section of a hot-air engine, built by Mr. Van Rennes, of Utrecht, Holland. In some of its features it is similar to Capt. Ericsson's well-known pumping engine, which we illustrated in our issue of June 12. It might even be supposed that Mr. Van Rennes' invention was largely inspired by inspection of the drawings and description of the pumping engine published some time since in European journals. It is true that this engine is double, but the hollow displacement plunger and its characteristic method of operation, the water jacket at the upper portion of the cylinder, together with the piston working in the same, are similar to those of the pumping engine. It is true that the method of driving or connecting the cylinders is different, but the difference is merely in the arrangement of the link work and walking beams. A compressed air chamber is employed, but this by no means adds to the convenience of the engine. Owing to this, apparently, it has been necessary to make the engine double.

The following is a description of the method of operation. A and A^1 are two cylinders, the lower part of which, the fire-box, is placed over a fire-place. While the fire-box is made of cast iron, the upper portion is constructed of boiler iron. The pistons C C^1 are open above, and are provided with a leather or other packing. They are guided by m m^1, and each of them has a stuffing box, through which the rods of movable plungers D D^1 pass. The lower portion of these plungers has the shape of a bell. The upper part of the cylinder is surrounded by a water jacket, B B^1. The plungers D D^1 are connected with the walking beam I, while the two pistons C and C^1 are attached to the walking beams II and II^1, the former of which is longer than the latter. By means of the connecting rod P and crank, its right arm turns the fly-wheel J, while the other arm of II drives the air pump M. The walking beam I is just as long as II, and by means of the connecting rod P^1 and crank G, gives the fly-wheel a rotary motion, while a pump is attached to the other arm. When the air in the fire-boxes is heated, the plunger D commences to ascend, driving the air above it into the space between it and the fire-box, where it expands considerably and causes the piston C to move upward. By means of the walking beams, the piston C^1 and plunger D^1 are forced into their lowest position and commence to reascend.

The upper portions of the cylinder are jacketed, as in Capt. Ericsson's engine, in order to absorb any waste heat which remains after making the stroke.

At b b^1 the cylinders have valves opening outward. They are in communication by pipes c c^1 with a chamber L containing compressed air. As soon as the air pressure is less in the cylinder A A^1 than in the chamber L, air will pass from the latter to the former. The pipes c c^1 have valves which are used in the following manner in order to start the engine: One of them is opened, so that communication between one cylinder and the chamber L is established. As soon as the fly-wheel has made half a revolution the valve on the second pipe is opened, and then the engine will be in operation. The running of the engine is regulated in the following way: The two cylinders are connected by a pipe, K, and both may be placed in communication with one another or be cut off from one another by means of a valve a. When the latter is closed the engine is developing its full power, but, if opened, it will gradually come to a stop, so that the position of the valve can command any speed desired.