

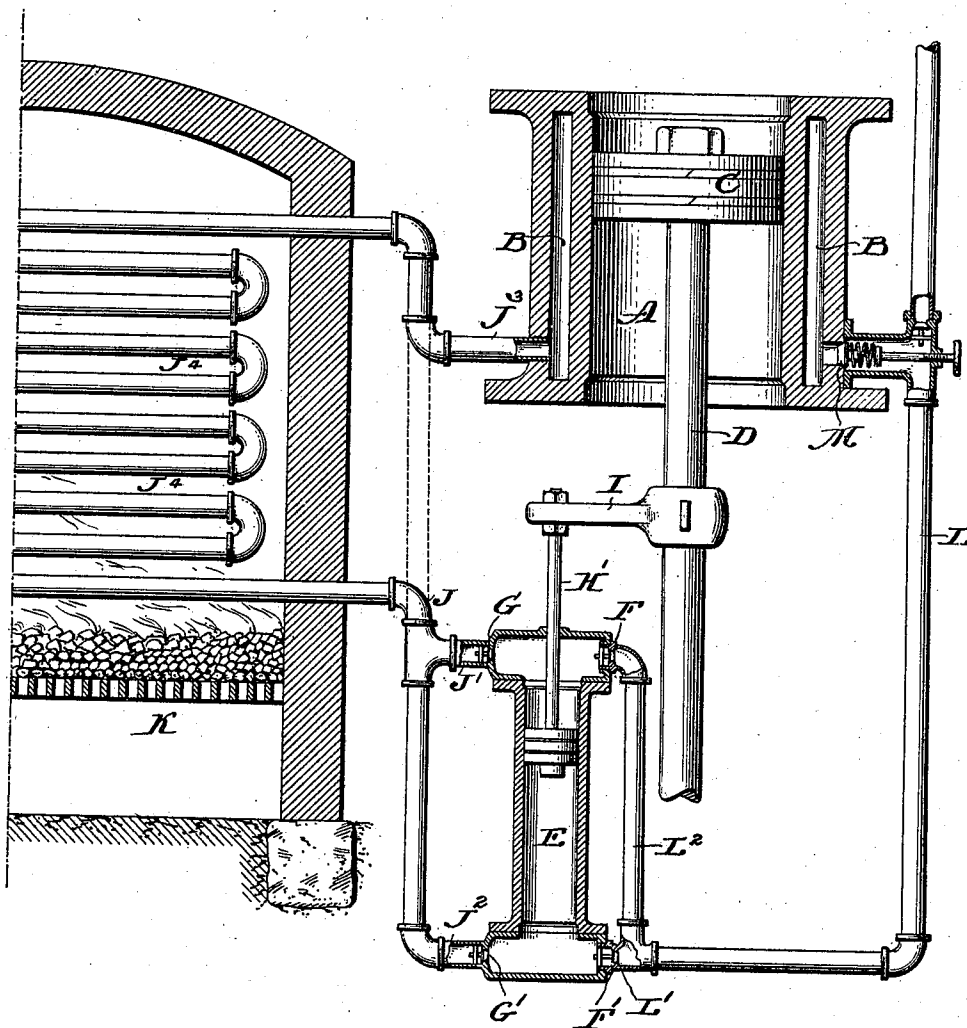
(No Model.)

A. MARICHAL.

APPARATUS FOR CONVEYING HEAT TO ENGINE CYLINDERS.

No. 577,986.

Patented Mar. 2, 1897.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR CONVEYING HEAT TO ENGINE-CYLINDERS.

SPECIFICATION forming part of Letters Patent No. 577,986, dated March 2, 1897.

Application filed August 24, 1893. Serial No. 483,900. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR MARICHAL, a subject of the King of the Belgians, and a resident of Philadelphia, State of Pennsylvania, have invented a certain new and useful Improvement in Apparatus for Conveying Heat to Engine-Cylinders, of which the following is a true and exact description, reference being had to the accompanying drawing, which forms a part of this specification.

My invention relates to the transmission of heat to engine-cylinders, and has for its object to convey heat to engine-cylinders in a way analogous to the use of a steam-jacket, but free from the drawbacks incident to the use of steam for that purpose.

My invention consists in devices for surrounding an engine-cylinder with an inclosed body of air and communicating heat to the air and through it to the cylinder by repeated compression of the inclosed body of air. In my device the body of air surrounding the cylinder is connected both with the admission and delivery ends of the pump and permitted to escape from the cylinder to the admission valve or valves of the air-pump when its pressure exceeds a determined amount. Thus the loss of heat which would be incident to permitting the inclosed body of air to escape to the atmosphere is avoided. The method of communicating heat to the engine-cylinder as carried out in my construction has the advantage over the usual use of the steam for the same purpose of being more easily regulated with regard to temperature, of requiring less pressure for a desired temperature, and of avoiding the steam connections which are necessary when steam is used.

My invention further consists in certain details and constructions embodying in themselves novelty.

These improvements are shown in the drawing, which represents in sectional elevation an engine-cylinder and connections adapting it to be heated by compressed air, and in which A is the cylinder of a steam-engine, and B a jacket surrounding it, as in the case of a steam-jacket.

C is the piston; D, the piston-rod; E, an air-pump, here shown as double-acting, hav-

ing entrance-valves F F' and exit-valves G G', H being the piston of the pump, worked by a rod H', which in turn is actuated by a moving part of the engine. As shown, it is connected by an arm I with the piston-rod D. From each delivery-valve a conduit J' J² leads to a common conduit J, which in turn connects with the jacket B. As shown, the connection is through a coil J⁴ and extension J³; but of course the conduit J can be connected directly, as shown in dotted lines, with the part J³, which enters the jacket. I have shown the coil J⁴ forming part of the connection and situated in a furnace K to indicate that my invention is not limited to a construction in which the desired heat is imparted to the air by compression alone, but includes as well devices for heating the compressed air on its way from the pump to the jacket. It will be understood, however, that practically any desired temperature can be imparted to the air by means of the conversion of the energy of the pump into heat in the act of compressing the air.

In the construction shown the pump is arranged to act at each impulse upon a new body of air sucked in from conduit L. Consequently the pressure in jacket B is due not only to increase of temperature, but to new volumes of air, and it is necessary to provide means for allowing the air to escape when it reaches a determined pressure, and this I do by means of a snifter-valve M. To prevent loss of heat, however, I conduct the air issuing from said snifter-valve to the feed-conduit L of the pump, and I arrange a valve N in said conduit in such a way that it will open to admit air to said conduit when the pressure in the conduit falls below a determined amount, but will close and remain closed when the conduit and pump are sufficiently supplied with air coming from the snifter-valve M in the jacket. By this arrangement it will be seen that practically no air is permitted to escape from the apparatus and that the same body is constantly subjected to the action of the pump, except that at times some new air is permitted to enter the apparatus, as when the pressure in pipe L falls below that of the atmosphere.

Having now described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination of an engine-cylinder
5 having a jacket B surrounding it, of an air-pump, a conduit leading from the pump to the jacket B, and a conduit as L leading from the jacket to the suction side of the pump, said jacket having no outlet save that lead-
10 ing to the pump and so that the body of air inclosed is constantly acted on by the pump without being permitted to escape.

2. The combination with an engine-cylinder having a jacket as B surrounding it, of
15 an air-pump, a conduit leading from the pump to the jacket B, a return-conduit L leading from the jacket to the entrance port or ports of the pump, and a snifting-valve controlling the passage of gas from the jacket to con-
20 duit L.

3. The combination with an engine-cylinder having a jacket as B surrounding it, of

an air-pump, a conduit leading from the pump to the jacket B, a return-conduit L leading from the jacket to the entrance port or ports
25 of the pump, a snifting-valve controlling the passage of gas from the jacket to conduit L, and a valve N situated in conduit L and arranged to give access to the same from the air when the pressure in said conduit falls below
30 a determined amount.

4. The combination with an engine-cylinder having a jacket as B surrounding it, of an air-pump and furnace and conduit leading from the pump to the furnace, through the
35 furnace to the jacket B, a return-conduit L leading from the jacket to the entrance port or ports of the pump, and a snifting-valve controlling the passage of the gases from the jacket to conduit L.

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Witnesses:

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