T. STOCKMANN.

FIRE POT FOR ENGINES.

APPLICATION FILED OCT. 5, 1911.

1,017,336. Patented Feb. 13, 1912.

Fig. 1

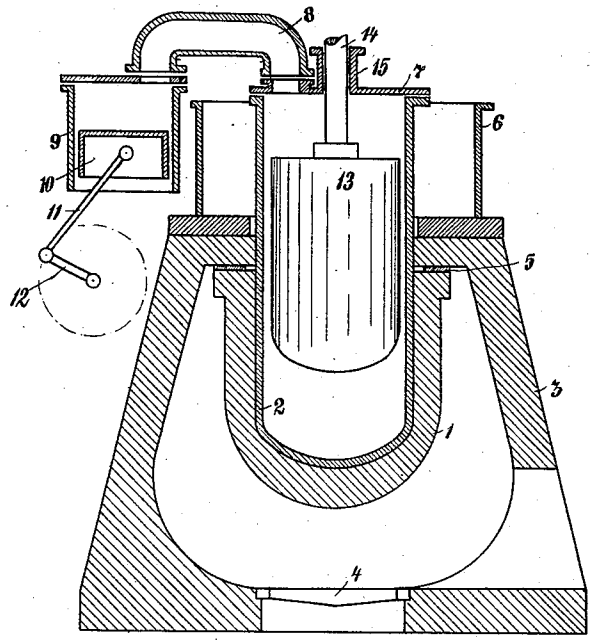


Fig. 2

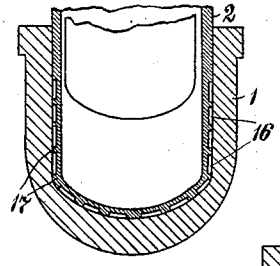


Fig. 3

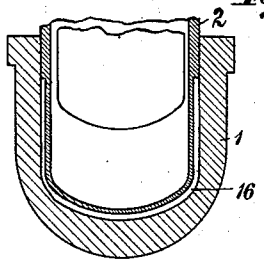


Fig. 4

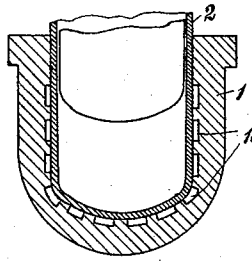


Fig. 5

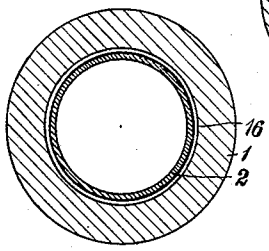
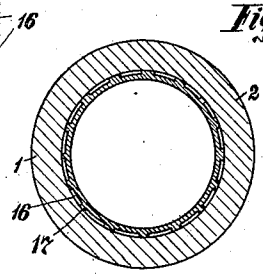


Fig. 6



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FIRE-POT FOR ENGINES.

1,017,336. Specification of Letters Patent. Patented Feb. 13, 1912.

Application filed October 5, 1911. Serial No. 653,061.

To all whom it may concern:

Be it known that I, THEODOR STOCKMANN, bookkeeper, a citizen of the German Empire, residing at Wilmersdorf, near Berlin, Germany, have invented certain new and useful Improvements in Fire-Pots for Engines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

The invention relates to a fire-pot for engines driven by hot air or gases and especially for engines of the type in which the air or the like has such a high pressure that the lowest pressure in the machine is considerably higher than the atmospheric pressure.

According to the laws of thermodynamics the efficiency of expansion engines is higher when the medium employed has as high a pressure and temperature as possible. It was however heretofore not possible to construct a fire-pot which when red hot is sufficiently impermeable to highly compressed air and at the same time fireproof and a good conductor of heat.

The usual fire-pots for hot air engines are made of cast iron, because this material is fireproof. When highly heated however it also becomes porous, so that a high pressure cannot be maintained in such vessels without employing an auxiliary compressor, which of course consumes considerable power. Such engines are accordingly extremely uneconomical. Wrought iron, on the other hand, is impermeable, but begins to crumble, oxidize and split at a comparatively low temperature (about 600° C.). Attempts have also been made to use porcelain or sheet metal coated with enamel for making fire-pots, but such materials are bad conductors of heat. Porcelain can only be used for high temperatures in an unglazed condition, in which it is porous and cracks as soon as it is unequally heated, which is also the case with enamel.

Now the present invention consists in combining an interior pot of wrought (drawn, rolled or pressed) metal, for example steel, with a tightly fitting protective mantle of cast metal, such as cast steel or cast iron, in conductive relation to the interior pot. In this case the interior pot at a red hot temperature has the necessary density and strength, while the exterior pot has the required fireproof properties, especially when it is allowed to retain the skin formed in casting.

The exterior pot has preferably a considerable thickness, so that by reason of the good conducting properties of the metal the heat is well and quickly distributed.

It is of special advantage to provide an exterior pot which only has the size of the part actually subjected to fire, and to construct said interior pot in one piece as a cylinder, closed at the top by a lid, and surrounded above the mantle by a jacket for cold water.

A further valuable feature of the invention consists in preventing the carbon contained in the exterior mantle from passing into the material of the interior pot. If this occurred the interior pot would be enriched in carbon and would become porous and weak. This drawback is avoided by inserting a thin layer of enamel or of any other material, for example, a layer of metal or air, between the two pots.

In the drawing several methods of carrying out the invention are shown by way of example: Figure 1 representing the principal parts of a hot air engine in section, Figs. 2–4, other constructions of fire-pots in longitudinal section, Figs. 5–6, cross sections of the construction shown in Figs. 2 and 4.

In a cast iron pot 1 the thin wrought iron cylinder 2 is inserted and both are inclosed by a furnace 3 of any suitable fireproof material, 4 being the grating for the fire. Between the cast iron pot 1 and the top part of the furnace 3 a layer of insulating material 5 is provided. The upper part of the interior pot or cylinder 2 is surrounded by a mantle 6 adapted to be filled with cold water. From the lid 7 of this cylinder 2 a pipe 8 leads to the cylinder 9, the piston 10 of which drives the main shaft of the engine through the agency of the connecting rod 11 and crank 12. The plunger piston 13, by which the air is distributed is fastened to a rod 14 passing through a stuffing box 15 of the lid 7 and adapted to be driven by the engine in any suitable manner.

Between the pots 1 and 2 in the construction shown in Fig. 1 a thin layer of electrolytically deposited metal or of enamel is provided, being secured on one or the other of said pots. The enamel cannot peel off

owing to non-uniform heating, because it is tightly held between the two pots, which fit snugly one in the other. In the other constructions shown in Figs. 2–4 there is an intermediate layer of air between the pots. This result is obtained by either the interior or exterior pot or both of them being provided with recesses 16 of such a nature that the pots only touch each other along certain ridges or at points. These recesses 16 can extend either around (Figs. 2 and 3) or over the length (Fig. 4) of the pots, ridges 17 being formed in both cases, or around in the one and over the length in the other, or special distance pieces may be inserted. It is also possible to dispense with the heavy cast iron outer pot replacing it by a thin lining of fireproof metal on the outer surface of the wrought iron inner pot, which lining may be brought on by galvanic currents or in any other suitable manner. This lining may be of such metal as nickel or platen.

What I claim and desire to secure by Letters Patent of the United States is:—

1. A fire-pot for high pressure hot air engines, comprising in combination, an interior pot of wrought metal of high density and sufficient strength, and a tightly fitting mantle of fireproof metal of good heat conducting properties, substantially as, and for the purpose, set forth.

2. A fire-pot for high pressure hot air engines, comprising in combination, an interior pot of wrought metal, an exterior pot of fireproof metal surrounding said interior pot and in conductive relation thereto, and a layer of carbon proof material between said pots, substantially as, and for the purpose, set forth.

3. A fire-pot for high pressure hot air engines, comprising in combination, an interior pot of wrought metal, an exterior pot of fireproof material surrounding and in heat conductive relation with said interior pot, and a layer of enamel between said pots, substantially as, and for the purpose, set forth.

4. A fire-pot for high pressure hot air engines, comprising in combination, an interior pot of wrought metal, an exterior pot of fireproof metal surrounding said interior pot, and ridges provided between said pots, substantially as, and for the purpose, set forth.

5. A fire-pot for high pressure hot air engines, comprising in combination, an interior pot of wrought metal, an exterior pot of fireproof metal surrounding one end of said interior pot, and a cooling mantle surrounding the other end of said interior pot, substantially as, and for the purpose, set forth.

In testimony that I claim the foregoing as my invention, I have signed my name in presence of two subscribing witnesses.

THEODOR STOCKMANN.

Witnesses:
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