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METHOD OF MANUFACTURING PISTONS

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This invention relates to pistons and particularly that type employed in internal combustion engines.

In the operation of internal combustion engines of the high speed type, it is desirable to make pistons, particularly of the trunk type, as light as possible. The use of aluminum or alloys thereof in piston construction has been extensively attempted and solves the problem of weight reduction. Aluminum, however, has a greater coefficient of expansion than cast iron and as a result considerable clearance must be allowed between the piston and the cylinder wall to allow for the greater expansion of the piston. This leads to poor compression when the engine is cold, leakage of oil and gases, piston slap, etc. Furthermore, aluminum wears exceedingly when highly heated and the clearance or loose fit provided soon becomes too great.

The object of the present invention is to provide a method of manufacturing pistons which will have a proper fit with the cylinder under working conditions. Formerly it has been the custom to machine pistons while they are cold and estimate and allow for the amount of expansion which will take place under working conditions when the piston is hot. On account of the heat all coming from the head end of the piston and traveled by conduction from the head to the other parts of the piston it is very difficult to estimate what the temperatures of the various parts of the piston will be under working conditions.

By turning the piston hot in a lathe provided with means for heating the piston in a manner and to an extent closely resembling the heat conditions which the piston would be subjected to while working in an engine, the piston may be machined of uniform diameter throughout its entire length. Satisfactory results have been obtained by applying the flame of a gas Bunsen burner on the head of the piston during the turning process in the lathe. After a piston which has been heated in this way becomes cool, it will be found to have different diameters at various longitudinal sections due to the fact that the top end was hotter than the bottom while it was being turned. If the proper amount of heat was applied during the turning process, the reduced diameter towards the top will be just sufficient to insure that the piston will have a proper fit in the cylinder under working conditions. This method will simplify to a considerable extent the manufacture of pistons, which under the present method of manufacture have to be turned to several different diameters when the piston is cold to provide ample clearness when the piston is hot.

While certain features of the present invention are more or less specifically illustrated, I wish it understood that various changes in form and proportion may be resorted to within the scope of the appended claims. I similarly wish it understood that the materials and finish of the several parts employed may be such as the experience and judgement of the manufacturer may dictate or various uses demand.

Having thus described my invention, what I claim and desire to secure by Letters Patent is:

1. A method of manufacturing pistons which consists in finishing the outside diameter of the piston under the influence of a heating device applied at the head end of the piston whereby the head end of the piston will be heated to a higher temperature than the skirt of the piston.

2. A method of manufacturing pistons which consists in finishing the outside diameter of the piston while the piston is in such a heated condition that the head of the piston will be the hottest and then have a temperature gradient towards the bottom of the skirt resembling the temperature conditions existing in the piston while the same is in operation in a motor.

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