G. H. DYER & H. E. MACK, Jr.

METHOD OF MAKING PISTONS.

APPLICATION FILED JULY 20, 1910.

1,102,188.

Patented June 30, 1914.

2 SHEETS—SHEET 1.

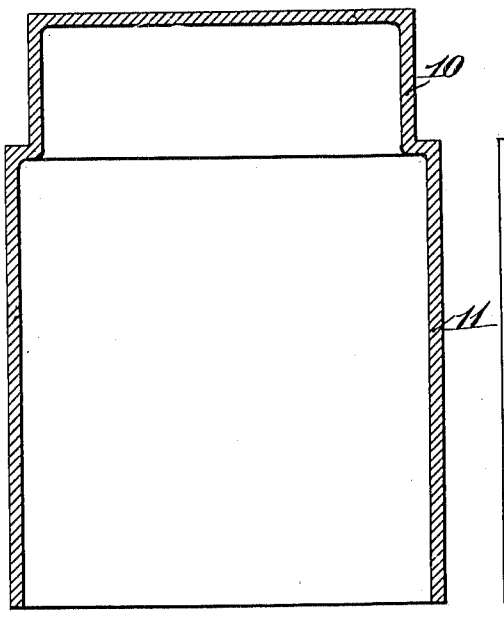


Fig. 1.

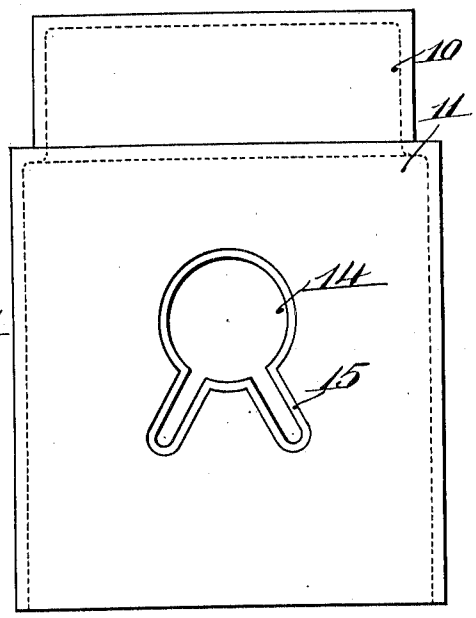


Fig. 2.

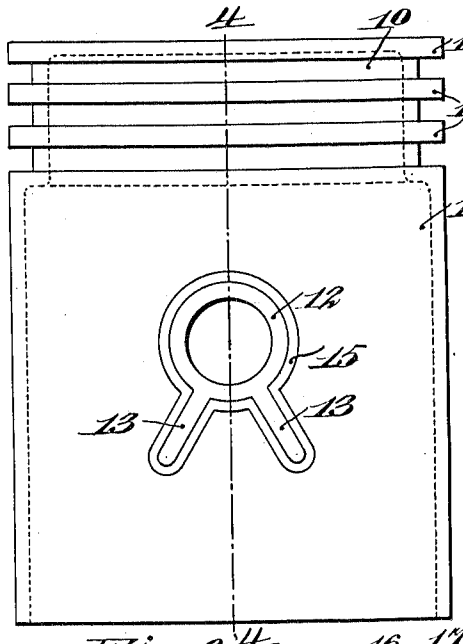


Fig. 3.

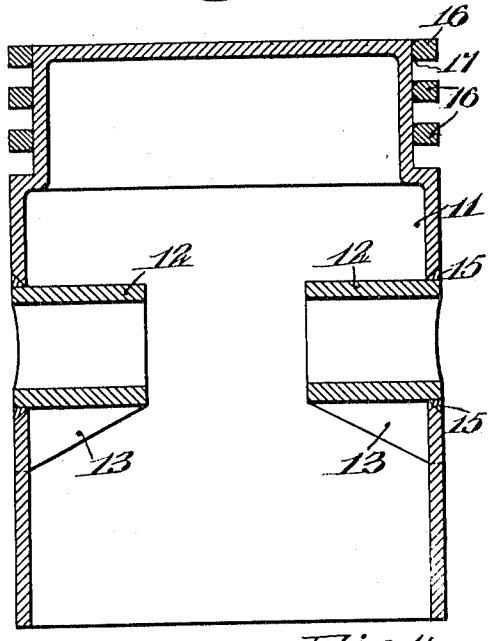


Fig. 4.

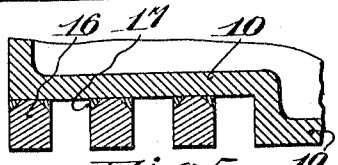


Fig. 5.

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2 SHEETS—SHEET 2.

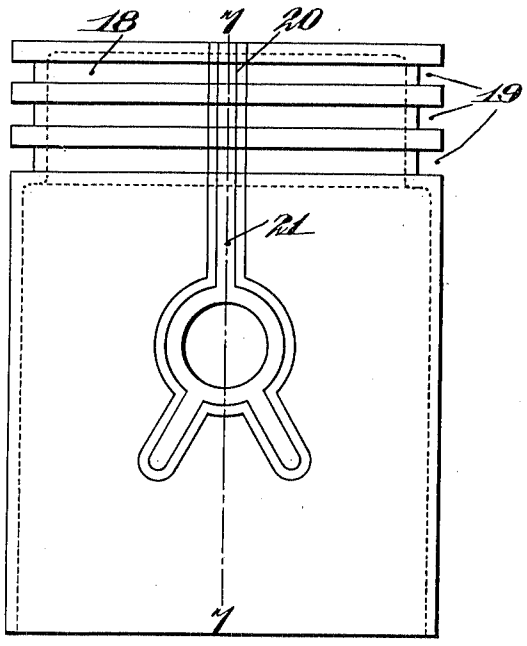


Fig. 6.

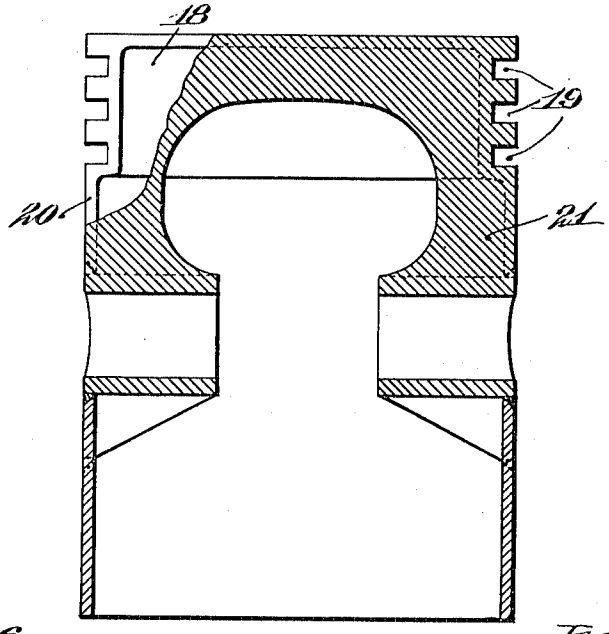


Fig. 7.

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UNITED STATES PATENT OFFICE.

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METHOD OF MAKING PISTONS.

1,102,188. Specification of Letters Patent. Patented June 30, 1914.

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To all whom it may concern:

Be it known that we, GEORGE H. DYER and HENRY E. MACK, Jr., citizens of the United States, residing at New York, county of New York, State of New York, and Boston, county of Suffolk, State of Massachusetts, respectively, have invented certain new and useful Improvements in Methods of Making Pistons; and we 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.

This invention relates to pistons, more particularly to pistons for internal combustion engines, and the method of making the same. So far as is known to the inventors, such pistons are at present made of cast metal and as so made are subject to various disadvantages well known to those skilled in the art.

The object of the present invention is to produce a piston, and provide a method of making the same, which will gain additional strength and decrease in weight, or both, over cast metal pistons and in addition attain a more perfect balance.

To this end the invention contemplates a method of making pistons which consists in drawing up a piston body from one piece of sheet metal, preferably sheet steel, and then uniting to said piston body wrist-pin bearings placed in suitable diametrically disposed openings formed in the piston body for their reception.

The preferred manner of practising the invention to make the piston is hereinafter described and particularly defined in the appended claims.

The invention will be more readily understood by reference to the accompanying drawings illustrating the preferred manner of practising the invention and producing the resultant article in which—

Figure 1 shows a cross section of one form of piston body drawn from sheet metal; Fig. 2 is a plan view of the piston body shown in Fig. 1 with diametrically disposed openings formed therein for the reception of the wrist-pin bearings; Fig. 3 is a plan view similar to Fig. 2 showing the wrist-pin bearings in place and the piston body provided at one end with suitably spaced rings forming packing ring recesses; Fig. 4 is a central section on the line 4—4 of Fig. 3; Fig. 5 is a detail illustrating the method of uniting the spaced rings to the piston body; and Figs. 6 and 7 show a modified construction to be described, Fig. 7 being a central section on the line 7—7 of Fig. 6.

Referring first to Figs. 1 to 5, in practising the preferred method of making pistons contemplated by this invention, first a piece of sheet metal, preferably sheet steel, is drawn up for use as a piston body, in the form shown in Fig. 1, having a portion 10 at one end of less diameter than the main portion 11 of the body. It is preferred, although not essential, that the wrist-pin bearings 12 (see Fig. 4), to be used, be provided with one or more radially disposed, reinforcing webs 13. Preferably these webs are triangular in section increasing in depth from the inner ends of the wrist-pin bearings to the wall of the piston body, as this form has been found to provide successfully for the desired reinforcement of the bearings. For the reception of these wrist-pin bearings, two diametrically opposed openings 14 (Fig. 2), suitably shaped to receive them, are formed in the walls of the main portion 11 of the piston body. The reinforced wrist-pin bearings 12 are then set in the openings 14 substantially flush with the outer surface of the piston body, as shown in Fig. 4, and are firmly united to the piston body by welding. Preferably the autogenous method of welding is used and to this end the edges of the openings 14 are beveled, or chamfered off, as shown at 15. In the preferred method of manufacture, the wrist-pin bearings will be

put in the openings formed therefor undrilled and will be drilled after having been welded in place. In order to provide suitable recesses to hold the usual packing rings, the portion 10 of the piston body has united thereto a plurality of suitably spaced rings 16 substantially equal in diameter to the diameter of the main portion 11 of the piston body. These rings also are preferably welded to the body autogenously and they may be, therefore, conveniently provided with beveled or chamfered portions 17 (Fig. 5).

Referring now to Figs. 6 and 7, instead of forming the wall of the piston body of substantially the same thickness throughout and with an end portion of less diameter, as shown in Fig. 1, the piston body may conveniently be so drawn up as to leave the outside diameter the same throughout its length but have provided a thickened end portion 12. This end portion may thereafter have a series of circumferential slots cut therein to form suitable packing ring recesses 19. Figs. 6 and 7 show also a further modification in that the head of the piston body, in addition to the wrist-pin bearing openings 14, is provided with a transverse slot 20 extending radially from and connecting the two openings. In this construction of the piston the wrist-pin bearings, in addition to the reinforcing webs 13, are connected by a transverse reinforcing web 21 which is opposed to the reinforcing webs 13 and which, when the bearings are in place, fits within the slot 20. The web 21, in this form of the invention, provides a substantial reinforcement for the head of the piston. The wrist-pin bearings having the reinforcing web 21 may be united to the piston body at the meeting edges of the bearings and webs with the body in any suitable manner, preferably by autogenous welding as described for the form of the invention shown in Figs. 1 to 5. It should be understood, also, that the wrist-pin bearings provided with the additional reinforcing web 21 may be assembled with a piston body drawn up in the form shown in Fig. 1 if so desired, or, if it is deemed preferable to use the form of piston body shown in Figs. 6 and 7, wrist-pin bearings with or without the transverse reinforcing web 21 may be used therewith.

While in the following claims various steps in the method of making the piston of the present invention are recited in a certain defined sequence, it should be understood that the method is not limited to the exact sequence recited but on the contrary it is particularly pointed out that variations from the sequence of the steps as claimed are considered to be within the spirit and scope of the invention.

Having thus described the invention, what is claimed as new, is:—

1. The method of making pistons which consists in drawing up a piston body from one piece of sheet metal; then forming diametrically opposed suitably shaped openings therein for the reception of wrist-pin bearings; and then securing the bearings in said openings substantially flush with the outer surface of the piston, by welding.

2. The method of making pistons which consists in drawing up a piston body from one piece of sheet metal; then forming diametrically opposed openings therein shaped for the reception of wrist-pin bearings having one or more outwardly projecting reinforcing webs; and then setting said bearings within said openings until substantially flush with the outer surface of the piston body and uniting them thereto autogenously.

3. The method of making pistons which consists in drawing up a piston body from one piece of sheet metal having one end portion of less diameter than the remainder of the body; then forming diametrically opposed, suitably shaped, openings in the portion of the body of larger diameter for the reception of wrist-pin bearings; and then securing the bearings in said openings by welding and also securing a plurality of suitably spaced rings on the portion of the body of lesser diameter by welding.

4. The method of making pistons which consists in drawing up a piston body from one piece of sheet metal having one end portion of less diameter than the remainder of the body, but having its wall of substantially equal thickness throughout; then forming diametrically opposed openings in the portion of the body of larger diameter shaped for the reception of wrist-pin bearings having one or more outwardly projecting reinforcing webs; and then securing the bearings in place at the interior of the piston body by welding them to the body while in said openings and also uniting, by welding, to the portion of the piston body of lesser diameter a plurality of suitably spaced rings substantially equal in diameter to the diameter of the larger portion of the piston body.

5. The method of making pistons which consists in drawing up a piston body from one piece of sheet metal; then forming diametrically opposed openings therein shaped for the reception of wrist-pin bearings having one or more outwardly projecting reinforcing webs at one side; then forming a slot, connecting said openings, across the

head of the piston body; and then inserting in said openings and slot wrist-pin bearings connected by a transverse reinforcing web and uniting all of said parts to the piston body by welding.

6. The method of making pistons which consists in forming a piston body having one end portion of less diameter than the remainder of the body, and welding a plurality of rings on the end portion of less diameter.

7. The method of making pistons which consists in drawing up a hollow piston body of sheet metal and securing wrist-pin bearings within said hollow piston body.

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