No. 860,989. PATENTED JULY 23, 1907.

W. B. NORTON.

MOLD.

APPLICATION FILED SEPT. 8, 1905.

2 SHEETS—SHEET 1.

Fig. 1.

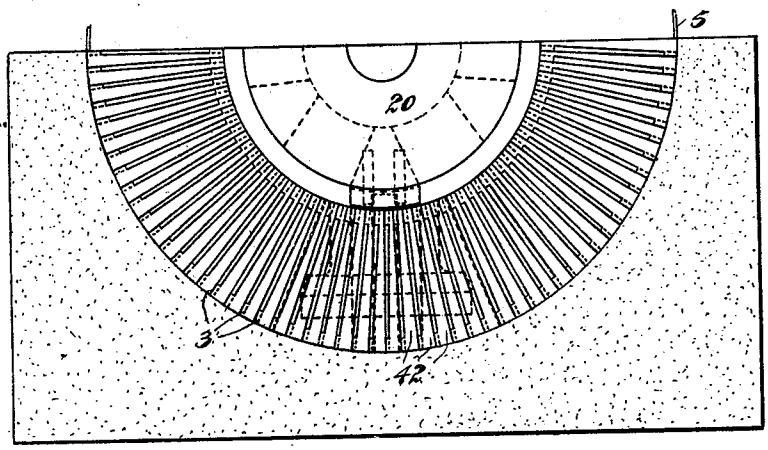
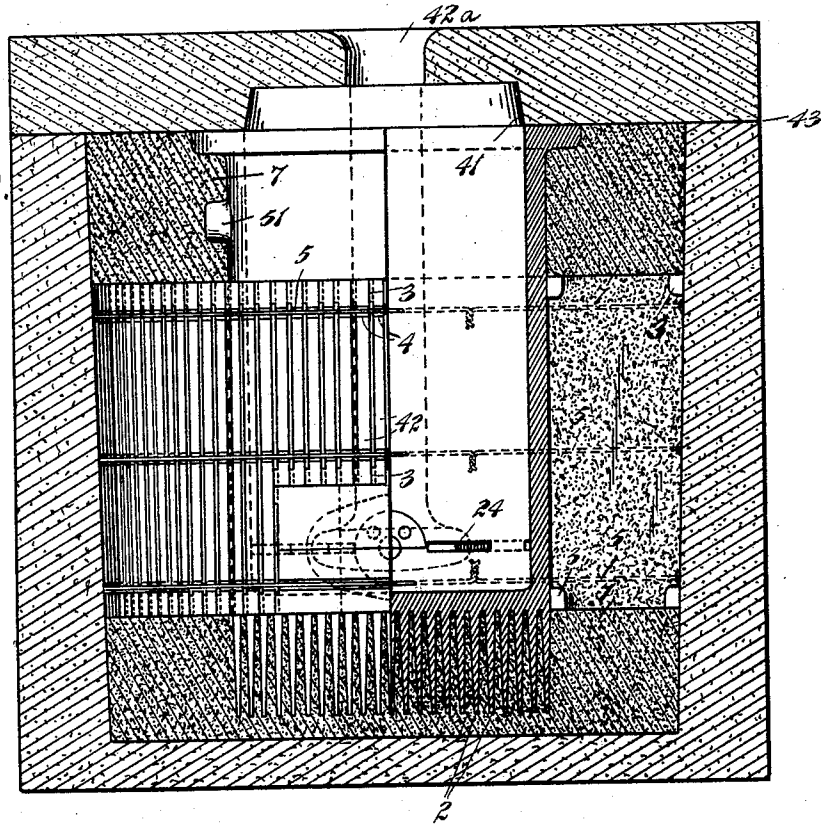


Fig. 2.



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2 SHEETS—SHEET 2.

Fig. 3.

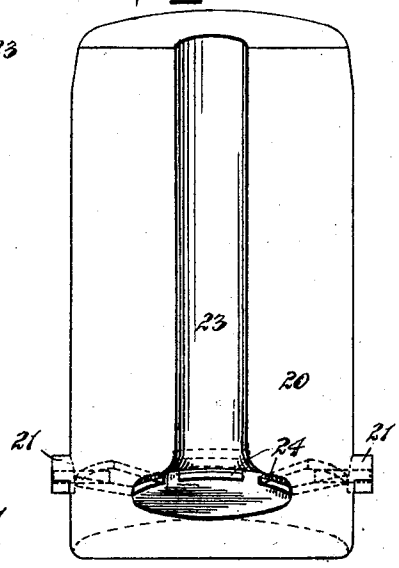


Fig. 4.

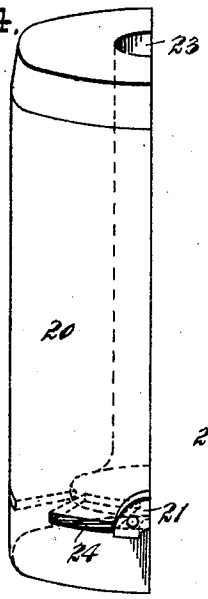
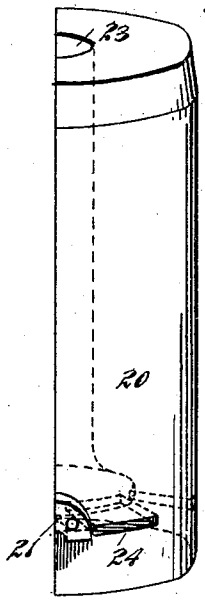


Fig. 5.



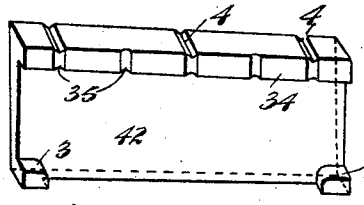


Fig. 11.

Fig. 6.

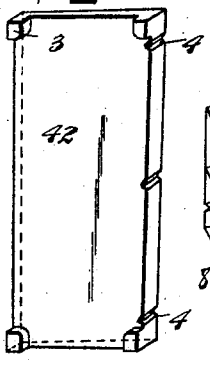


Fig. 7.

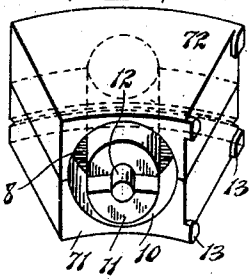


Fig. 8.

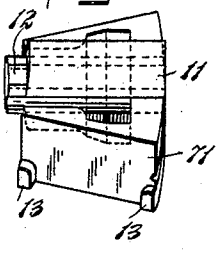
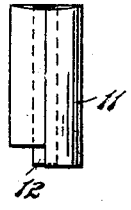


Fig. 9.



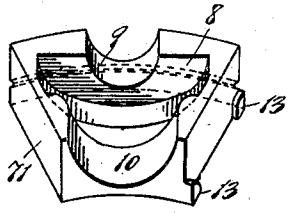


Fig. 10.

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WILLIAM B. NORTON, OF DETROIT, MICHIGAN.

MOLD.

No. 860,989. Specification of Letters Patent. Patented July 23, 1907.

Application filed September 8, 1905. Serial No. 277,486.

To all whom it may concern:

Be it known that I, WILLIAM B. NORTON, a citizen of the United States, residing at Detroit, county of Wayne, State of Michigan, have invented a certain new and useful Improvement in Molds for Casting Metal; and declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

This invention relates to molds to be used for the production of castings that are provided with broadly extending fins set close together; such a mold is especially adapted to the production of the cylinders of explosive engines.

In the drawings:—Figure 1, is a plan view of one-half of such mold with the cope removed. Fig. 2, is an elevation partly in section. On the left-hand side of this view the thin cores are shown in elevation. On the right-hand side the front half (one quarter of the entire fin part of the mold) is removed. Under this removed part, the fin plates at the end of the cylinder are shown in section. Fig. 3, shows a perspective of half of the core which forms part of the mold; the front half being removed. Fig. 4, shows a perspective of half of the core of the mold. (Fig. 4, shows the same part as Fig. 3, but turned partly on its vertical axis). Fig. 5, shows a perspective of half of the core (the reverse of Fig. 4). Fig. 6, is a perspective of a single fin plate. Fig. 7, is a perspective showing the parts employed to make that part of the mold in which is cast the projection for the valve opening. Fig. 8, is a perspective of the under half of the parts shown in Fig. 7, with the sub-core, (Fig. 9), in place therein. Fig. 9, is an elevation of a sub-core used in connection with parts shown in Fig. 8. Fig. 10, is a perspective of the lower one of the parts shown in Fig. 7; the sub-core is removed therefrom. Fig. 11, is a perspective of a fin plate having a flange thereon.

The entire mold is made from assembled baked plates, cores and green sand. In producing it, there is as a preliminary work, a number of plates and cores made, which are assembled and which partially form the mold in which the casting is made. The assembled parts of the baked core material are supplemented by green sand which is employed in part to construct the simpler parts of the mold, but is principally employed to hold the baked parts in place and form the proper venting walls surrounding the baked parts.

The flask is not shown in the drawing; it may be simply two rectangular boxes of proper size.

To form the end of the cylinder casting there is employed a baked mold 1, made of core material, and provided with deep cavities 2 for the reception of the metal which forms those fins that project from the end of the finished cylinder; this part of the mold is made as a single piece, by using a pattern with projecting fins and a stripper-plate through which they engage and through which the projecting fins are withdrawn after the core material has been compacted around and between the fins, leaving the piece 1 in proper condition for baking. In assembling the mold, this piece 1, is located at the bottom and upon it is placed an assembled mass of fin molds, plates and other parts; each fin plate 42 is made wedge shaped in horizontal cross-section and provided on one of its sides with small lugs 3, which are adapted to bear against an adjacent fin mold plate, and is preferably provided at its thick edge with grooves 4, in which binding wires 5 engage to secure the mass together.

Instead of the lugs 3 at the ends of the plate on its thick edge, a flange 34, (Fig. 11) may extend entirely along this edge provided at intervals, however, with vent notches 35. The fin plates 42 are of various lengths; some of them extend from the plate 1, upward along the axis of the proposed casting as far as it is desired to have the fins extend, others of them are shorter and are arranged over core structures arranged for the proper formation of the openings into the end of the cylinder, of which there may be two or three according to circumstances, generally two, one for the inlet valve, one for the outlet valve, and sometimes a third for the insertion of a sparking plug. The construction and insertion of that part of the mold which is used at the valve opening will be best understood from Figs. 7 to 10; this part of the mold is preferably made in several pieces; the under piece 71 provided with lugs 13 on one side against which a fin plate bears, and having a cavity 8, a core print opening 9, and an opening 10 into the cavity 8. In the assembled structure the opening 10 lies toward the interior thereof. Upon the piece 71, (shown in Fig. 10), rests the piece 72, shown in (Fig. 7), which is a counterpart of part 71. Within the cavity 8, held by a projection which extends into the core print opening 9 is a sub-core 11, having an iron strengthener 12, that projects into the space inside the cavity of the completely assembled body of fin plates. The under part of the projecting end of the strengthening iron 12 is covered with core material, the upper part left bare for engagement with a lug 21 on the main core 20; the lug 21 engages over the core 11, and covers the upper half of the strengthener 12, the lower surfaces of the lug 21 are flat and engage closely against the flat upper surfaces of that part of the lug 11, which lies along the sides of the strengthening wire 12.

The cavity within the assembled mold receives a hollow core 20 provided with a sprue hole 23, and with feed holes 24 leading from the sprue into the cavity in the mold.

The baked plates and those parts employed to form the casing for the valve orifices are assembled and se-

cured together by paste and sometimes by wire bands 5, which are used in a way similar to hoops on an article constructed of staves; thus secured the plates can neither float nor yield laterally.

In assembling the parts and finishing the complete mold, a false pattern nearly cylindrical in shape except that it has an ample provision for draft, is placed on a mold board together with the drag flask, and the sand is packed between until the drag part of the flask is filled. A pattern for a core print is placed centrally on the top of the round false pattern and the cope placed over the drag is filled with sand, after which the cope is lifted off, leaving the core print 41, through which there has been formed a sprue hole 42[a]; the parting between the cope and the drag is at the line 43; the false pattern is now lifted from the drag and the assembled parts of the pattern lowered into place; these parts consist of the baked base 1, the mass of fin-plates bound together including in and with the fin plates the parts of Fig. 7, of which there may be one, two or three, as circumstances require, and the top ring piece 7, which rests on top of the assembled fin plates; provision may, if necessary, be made in the piece 7 for an oil cup nipple 51. After these parts in their assembled condition are lowered into place, the main core 20 is inserted with the lugs 21 engaging over the small cores 11, to which they are preferably cemented by pasting; the cope is put in place over the drag. The cope holds the upper end of the core in place and holds the core down during the pouring.

In the drawing, the mold is shown as though filled with metal, which appears sectioned on the broken right-hand side of the drawing.

What I claim is:—

1. In a mold for casting a cylinder provided with broadly extending fins with deep grooves between said fins, the combination with a plate adapted for use as a mold for the end of a cylinder and provided with grooves deeply extending thereinto, a plurality of plates each provided on a face thereof with spacing lugs against which an adjoining plate engages, a core piece extending radially through the mass of fin plates, and provided on the end which projects inward with a bearing, a main core adapted to engage in the cavity within the fin plates, and to bear upon said radial core, substantially as described.

2. In a mold for casting metal, in combination with a plurality of wedge-shaped plates assembled about an empty center portion, the thin edge of each plate being nearest the center and each being spaced from those adjoining by projecting lugs adapted to engage thereagainst, a removable core member adapted to be inserted within said center portion, provided with pouring ducts through which fluid metal can escape to the cavity in the mold external to the core and to the empty spaces between said plates, and a base plate whereon said core and wedge-shaped plates rest, provided with deep indentations whereby projecting fins may also be formed across the end of the cylinder substantially as described.

3. In a mold for casting engine cylinders, in combination with a horizontally extending base portion provided with recessed portions and projecting fin members separating said portions from one another, a plurality of longitudinally extending cores adapted to rest with one end upon a portion of said horizontally extending base portion, each being provided with projecting portions to space it from similar adjoining cores, and all of said cores when in position surrounding a central open portion, and removable bands encircling the structure formed by said longitudinally extending cores, adapted to hold the same from both longitudinal and lateral displacement, substantially as described.

In testimony whereof, I sign this specification in the presence of two witnesses.

WILLIAM B. NORTON.

Witnesses:
CHARLES F. BURTON,
MAY E. KOTT.