Dec. 1, 1925. 1,563,717

A. T. BROWN

APPARATUS FOR CASTING ENGINE CYLINDERS

Filed Dec. 28, 1923 3 Sheets-Sheet 1

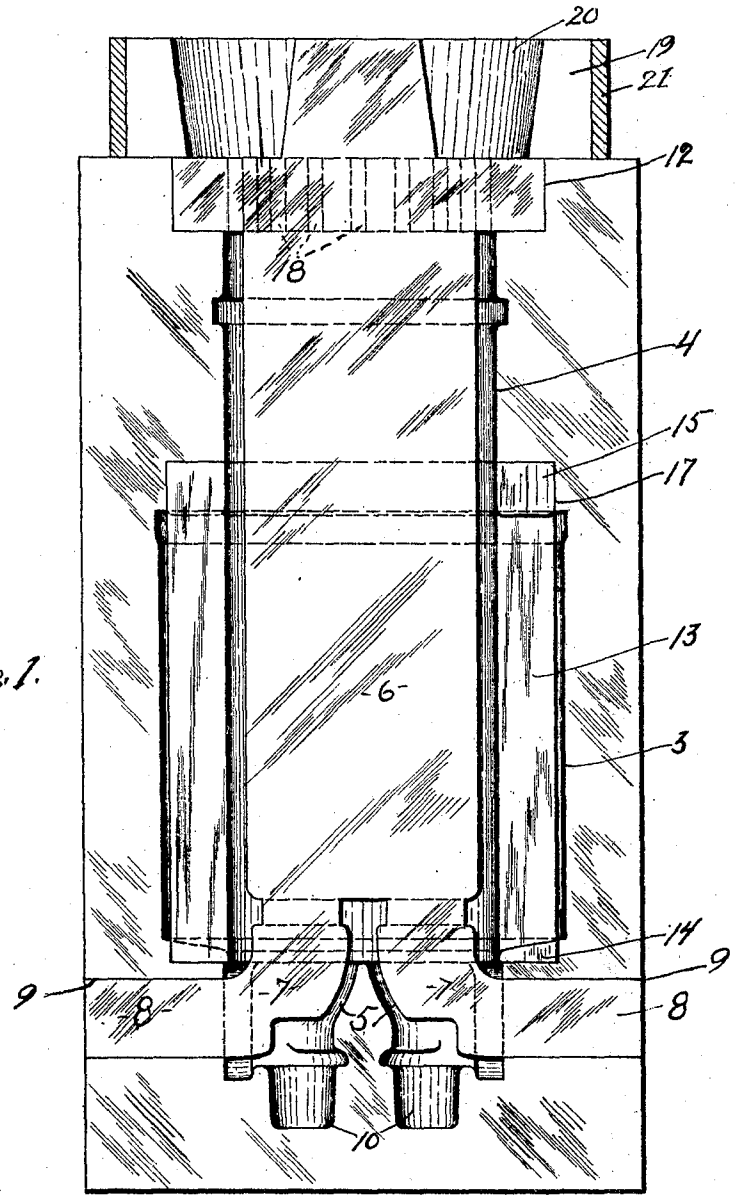

Fig. 1.

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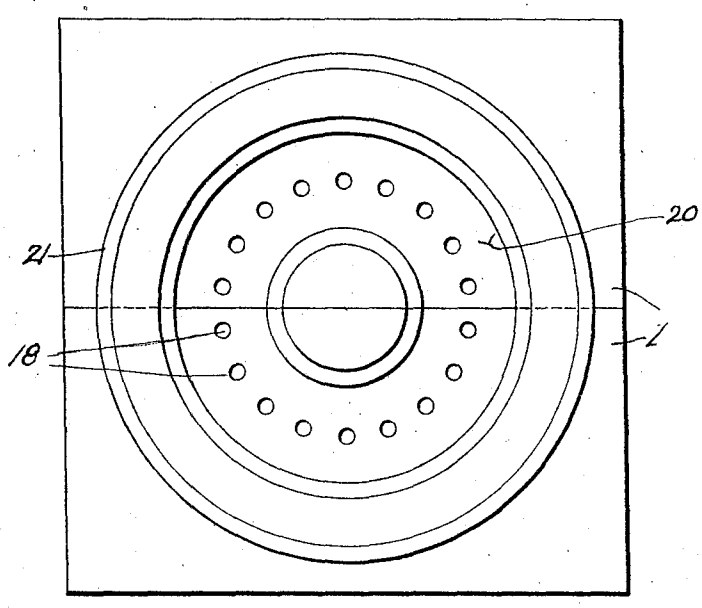

Fig. 2

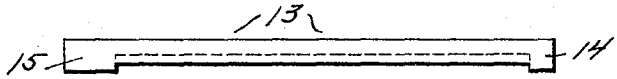

Fig. 9

Fig. 11

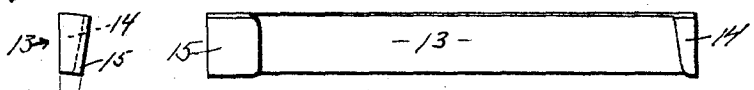

Fig. 10

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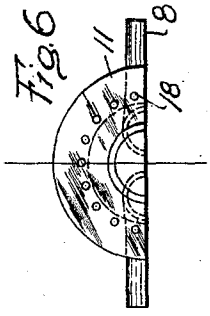

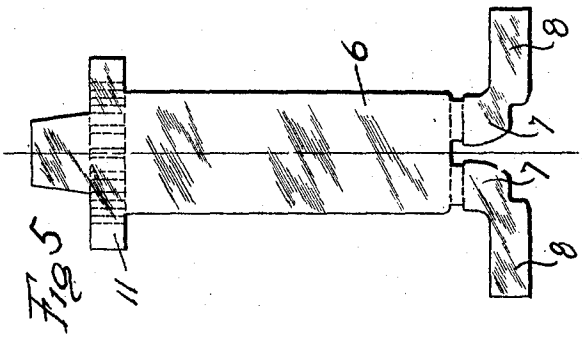

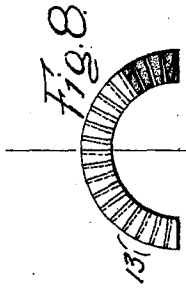

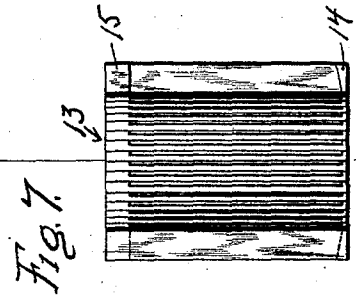

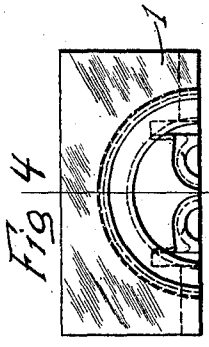

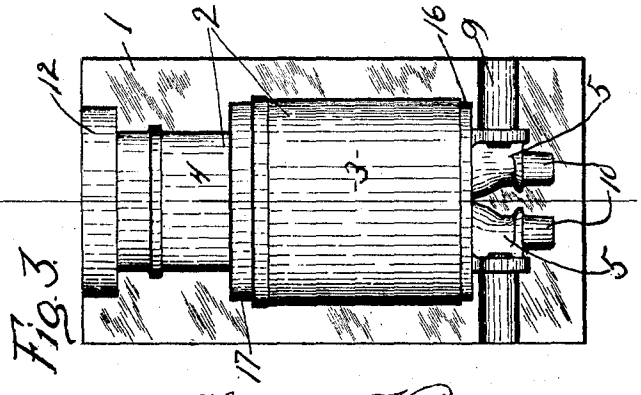

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Patented Dec. 1, 1925. 1,563,717

UNITED STATES PATENT OFFICE.

ALEXANDER T. BROWN, OF SYRACUSE, NEW YORK.

APPARATUS FOR CASTING ENGINE CYLINDERS.

Application filed December 28, 1923. Serial No. 683,164.

To all whom it may concern:

Be it known that I, ALEXANDER T. BROWN, a citizen of the United States, and a resident of Syracuse, in the county of Onondaga and State of New York, have invented a certain new and useful Apparatus for Casting Engine Cylinders, of which the following is a specification.

This invention has for its object an apparatus for casting cylinders of air-cooled internal combustion engines and particularly cylinders having lengthwise heat radiating flanges integral with the cylinder wall, the cylinder head and ports formed integral with the head, the lengthwise heat radiating flanges being surrounded by a jacket integral therewith, which apparatus is particularly simple in its construction and assembly, and highly efficient in use and which produces economically a highly efficient air-cooled cylinder.

The invention consists in the novel features and in the combinations and the constructions hereinafter set forth and claimed.

In describing this invention, reference is had to the accompanying drawings in which like characters designate corresponding parts in all the views.

Figure 1 is an elevation of one section of the box or mold of this apparatus, the ring for holding the entrance block through which metal is poured, being shown in section.

Figure 2 is an end elevation of the mold box.

Figure 3 is a view similar to Fig. 1, the cores and other parts being omitted.

Figure 4 is a plan view of the parts seen in Fig. 3.

Figure 5 is a face view of one of the sections of the main core.

Figure 6 is an end view thereof.

Figures 7 and 8 are respectvely an elevation and an end view of a semi-circular series of annular cores for forming the heat radiating flanges.

Figures 9, 10 and 11, are respectively a longitudinal edge view, a side elevation and an end view, of one of the cores of the annular series.

This apparatus comprises a body or box formed with a cylindrical cavity and with port forming cavities at one end of the cylindrical cavity, a main core arranged in the cylindrical cavity and spaced apart from the cylindrical wall thereof, and being also spaced apart from one end of the cylindrical cavity and having port forming extensions at such end arranged in the corresponding cavities of the box and an annular series of cores around a portion of the main core and spaced apart from the cylindrical wall of the box cavity and the central core to form heat radiating flanges and a jacket integral with the cylinder wall, the box and the main core being preferably divided longitudinally along a diametrical plane of the cylindrical cavity.

1 designates one of the sections of the box, the other section being substantially a duplicate of the section 1.

2 is a semi-cylindrical cavity formed in the section 1, the other section being formed with a similar cavity and these two cavities forming a complete cylindrical cavity, an end portion 3 of the cavity 2 being of greater diameter than the remaining portion 4. 5 are port forming cavities arranged at one end of the larger portion 3 of the cavity 2. 6 is one of the sections of the main core, it being generally semi-cylindrical in form and, in addition, including another section, which is a duplicate of the section 6, so that the main core is also divided along a diametrical plane. The core 6 in addition includes port forming extensions 7 at one end complemental to the cavities 5 and being spaced apart from the walls of such cavities 5. These extensions are also formed with elongations 8, or core prints which fit into grooves 9, in the box sections and support one end of the main core in the mold cavity. This mold cavity is further formed with cavities 10 extending from the port forming cavities 5 in order to form bosses which are ultimately bored out to form guides for valve stems.

The core sections 6 are further formed with an annular flange 11 at its end remote to that formed with the extensions 7 and the flanges 11 of the sections fit into a countersunk recess 12 in the box sections 1 and serve to support the adjacent ends of the main core 6.

13 is an annular series of cores or core sections arranged in the larger part 3 of the mold cavity, these cores 13 being spaced apart in order to form radial flanges on the cylinders and being also spaced apart from the core 6 and from the cylindrical wall of the cavity 3, in order that such flanges may be formed integral with the cylinder wall

and with a surrounding jacket. Each core 13 is formed with heads 14 and 15 at its opposite ends, which engage the head of the next core 13 and hold the major parts of the cores 13 spaced apart. These heads 14 and 15 are located in the end portions 16 and 17 of the cavity 3. Two or more of the cores 13 may be formed as a unit if desired instead of being formed singly.

The annular flange 11 is formed with passages 18 therethrough, in line with the mold cavity. A sectional entrance cap piece 19 is mounted on the upper end of the box and is formed with passages 20 therethrough communicating with the passages 18. This cap piece 19 is held together by a ring 21. The sections 1 of the box are held together in any suitable manner.

In operation, half of the annular series of cores 13 is placed in one section of the box, the other half in the other section, the core sections 6 are then placed in the respective sections of the box, the box sections and entrance piece assembled and the metal poured through the passages 20 and 18.

Owing to the arrangement of the mold cavity and cores, a cylinder is formed having an integral head, integral ports projecting from the head, integral heat radiating flanges surrounded by an integral jacket and the metal of the entire structure is substantially homogenous, so that the cylinder including the head rapidly radiates the heat generated during the use of the engine and the cylinders can be cooled rapidly and effectively by an air current passing over the head and through the jackets.

Furthermore, owing to the arrangement of the mold cavity, and cores, such mold forms a cylinder in which the cylinder walls, jacket and fins or flanges are integrally connected and arranged to form a truss which is light and strong and prevents the cylinder from distortion when heated during the use of the engine in which the cylinder is embodied.

What I claim is:

An apparatus for casting engine cylinders, comprising a box having a cylindrical cavity, the box being divided longitudinally into two sections, a core composed of two lengthwise sections located in the spaces of the box divisions respectively, and spaced-apart from the wall of the cavity, the core being also spaced from the end wall of the cavity, and having outwardly and laterally extending portions for forming the cylinder head and ports carried by the head, such projections being arranged in corresponding cavities formed in the box divisions and spaced-apart from the walls of such cavities, and an annular series of cores arranged in the cylindrical cavity, and spaced-apart from the former core, each of the annular series of cores having heads at their ends for engaging the adjacent core, the portions of the cores between such heads being spaced-apart to form radial flange forming spaces.

In testimony whereof, I have hereunto signed my name, at Syracuse, in the county of Onondaga, and State of New York, this 12th day of Dec. 1923.

ALEXANDER T. BROWN.