Feb. 28, 1933. T. G. BUSH, JR 1,899,228

ARBOR FOR PIPE CASTING MOLDS

Filed April 13, 1932 2 Sheets-Sheet 1

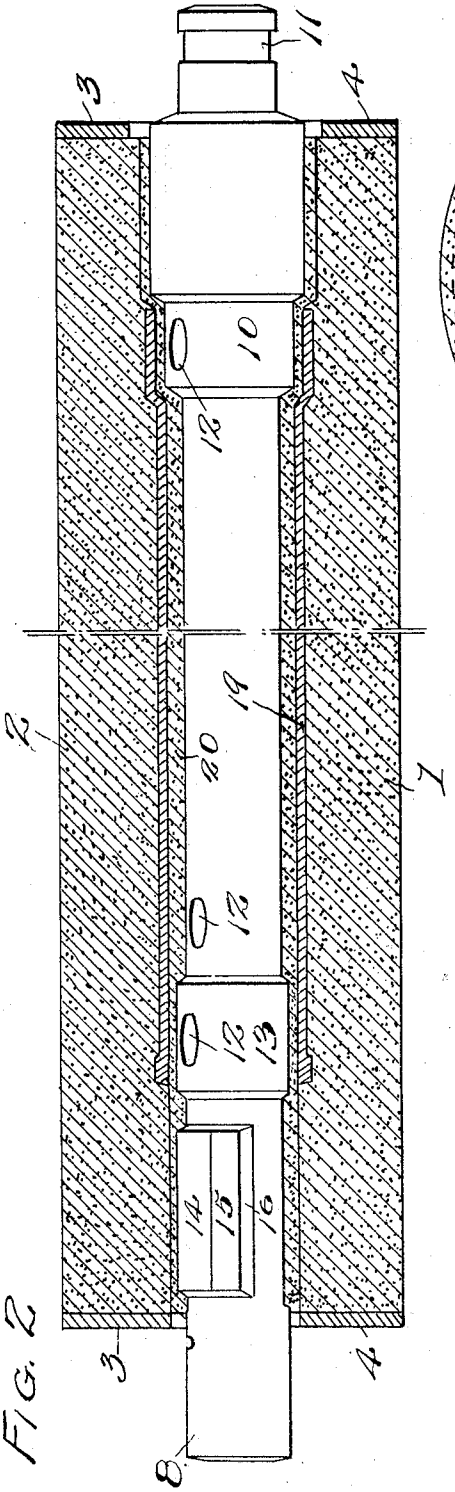


FIG. 2

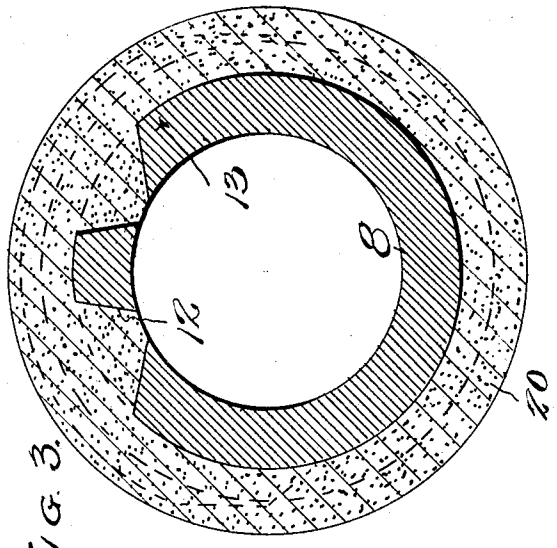


FIG. 3.

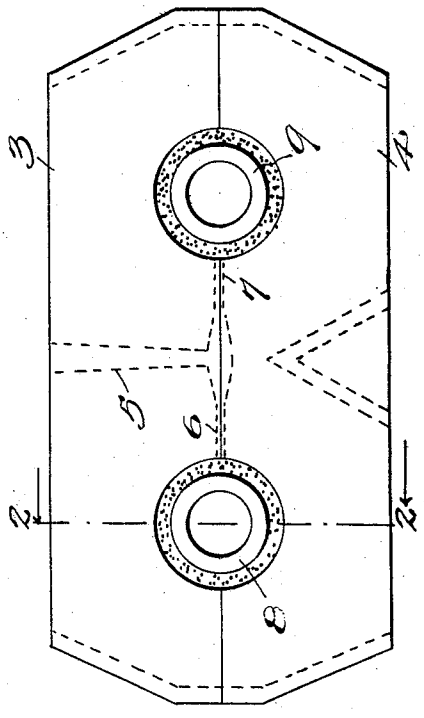


FIG. 1.

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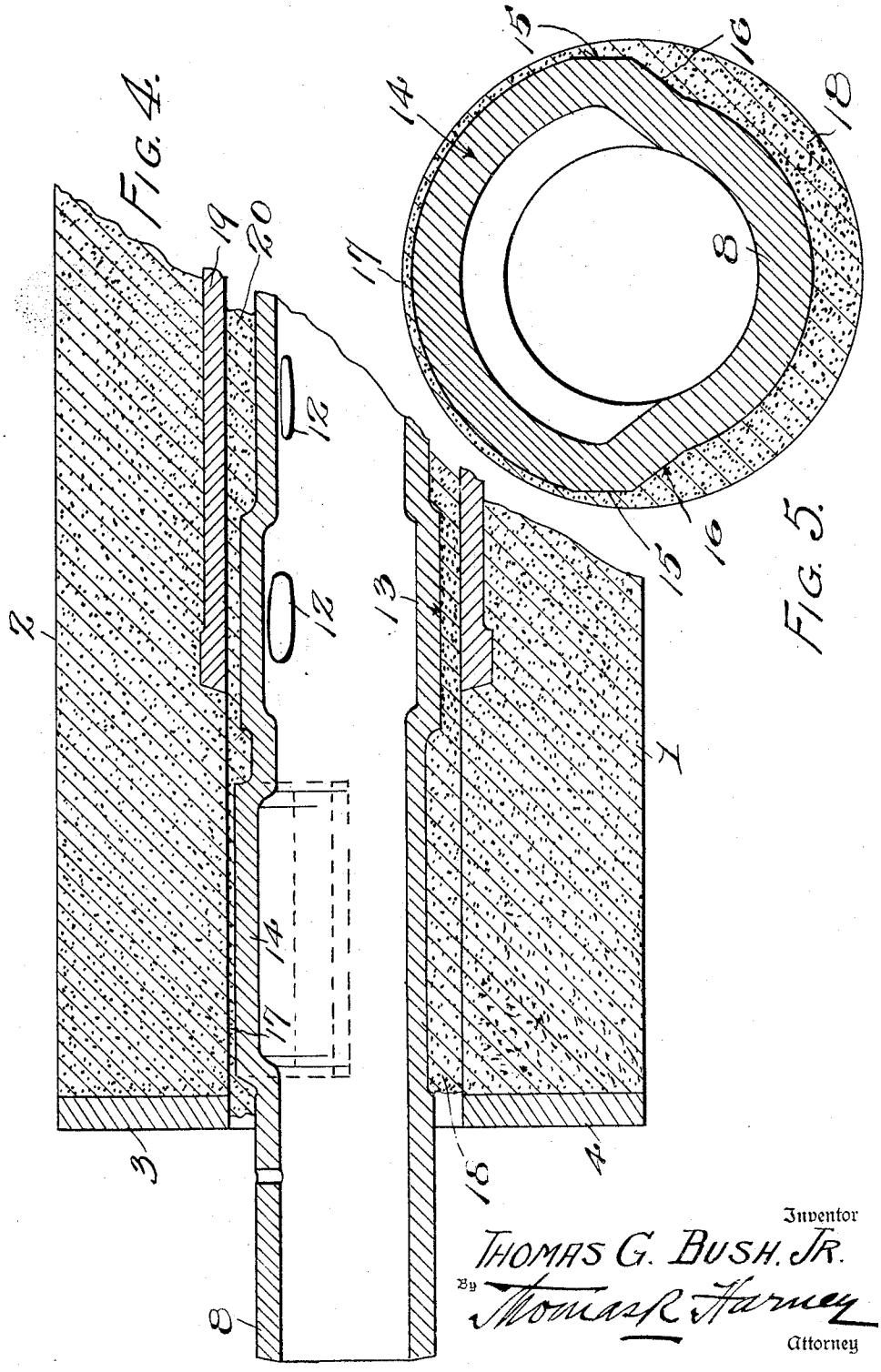
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ARBOR FOR PIPE CASTING MOLDS

Filed April 13, 1932 2 Sheets-Sheet 2



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Patented Feb. 28, 1933 1,899,228

UNITED STATES PATENT OFFICE

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ARBOR FOR PIPE CASTING MOLDS

Application filed April 13, 1932. Serial No. 605,040.

My present invention relates to an improved arbor for pipe-casting molds or flasks, of the type employed in the manufacture of pipe and similar tubular structures, by the horizontal method.

As is well known to those familiar with the casting of pipes by this method, it is imperative and essential that the arbor or core-bar within the sand-core about which the pipe is cast, shall be located and maintained in true axial alinement with the flask, to insure the production of pipes having walls of uniform thickness. The uniformity in the thickness of the walls of the cast pipe, is desirable and necessary for various reasons, as for instance to insure cutting of the pipe, when required, without danger of cracking or breaking.

In carrying out my invention, I fashion the arbor, near its spigot end, with an exterior pad, located at the upper or cope side of the arbor, and approximately semi-circular in shape. With the drag in horizontal position on the floor of the foundry, the core is placed in position; the cope is superimposed thereon in usual manner; and the semi-circular pad of the arbor is positioned beyond the spigot end of the pipe that is cast within the mold in usual manner; the arbor, of course, being of such size as to permit the arbor to be withdrawn and pass through the pipe after it has been cast.

By the employment of the improved arbor of my invention, the necessity for use of mechanical supports to prevent the core from sagging out of alinement is eliminated, while on the other hand the core is accurately centered in the mold or flask and maintained in proper position for the pouring operations.

When the core is placed in the drag and the cope superimposed thereon, the soft sand of the core permits a slight or limited degree of settling of the core, then, when the molten metal is poured, the core is lifted to its proper position, and there maintained, to insure proper alinement and uniform thickness of the walls of the cast pipe.

The invention consists in certain novel features of construction in the arbor or core bar and in certain combinations and arrangements of parts in the mold or flask, as will hereinafter be more fully set forth and claimed.

In the accompanying drawings, I have illustrated one complete example of the physical embodiment of my invention in which the parts are constructed, combined, and arranged, according to one mode I have devised for the practical application of the principles of my invention, but it will be understood that changes and alterations may be made in the exemplified structure within the scope of my claims, without departing from the principles of my invention.

Figure 1 is an end view of a double mold or flask, of the horizontal type, involving the arbor of my invention, and showing by dotted lines one of the pouring gates or sprue-holes and the lateral ducts therefrom to the two cores of the double mold;

Fig. 2 is a longitudinal vertical sectional view at line 2—2 of Fig. 1, with the arbor in side elevation, and broken away for convenience of illustration;

Fig. 3 is an enlarged, transverse vertical sectional view through the usual small, annular, exterior pad of the arbor, showing vent holes therein;

Fig. 4 is an enlarged longitudinal vertical sectional view at the spigot end of the mold with the arbor also in section; and

Fig. 5 is a transverse vertical sectional view of the core through the pad portion of the arbor, and illustrating the novel features of my invention.

In order that the general arrangement, relation, and utility of the parts may readily be understood, I have illustrated in the drawings a well known horizontal type of double mold or flask in which the drag is indicated as 1 and the cope as 2, the mold or flask being provided with the usual end walls 3 and 4. The molten metal is poured through the gates or sprue holes 5 (dotted lines Fig. 1) which are spaced along the longitudinal center line of the horizontal mold, and the molten metal flows through the lateral ducts 6 and 7 to the two cores of the double mold. In Figure 1, the arbors 8 and 9 are indicated for the two cores, and inasmuch as these ar-

bors are of duplicate construction, a description of one will suffice for both.

The arbors are constructed as usual of iron, and of course vary in length and diameter in accordance with the size of the pipe to be molded; and, as indicated in Figure 2, the arbors are fashioned with the customary bell or hub end 10 and trunnion 11, and with the required vent holes 12 to permit venting of the arbor, through the soft sand surrounding the arbor, and forming the core.

Within the spigot end of the pipe, the arbor is fashioned with the usual annular, exterior pad 13, and as seen in Figures 2 and 4, I employ an additional exterior pad 14 on the arbor which is free of the cast pipe, and located between the spigot end of the pipe and the adjoining end of the cope or upper section of the mold.

The exterior pad 14 projects from the exterior face of the arbor and this pad may be fashioned in suitable manner, as by adding material or metal to the exterior face of the wall of the arbor, or as indicated in the drawings, the pad 14 may be formed as an exterior bulging portion of the arbor and providing an increased interior bore at this portion of the arbor. As indicated in Figure 5, the exterior surface of the pad is approximately semi-circular, and the pad occurs at the cope side of the arbor, with the semi-circular surface terminating in approximately vertical lateral faces 15, and inwardly inclined faces 16 merging with the lower semi-circular face of the arbor, which, as indicated, is of less diameter than the pad surface at this point.

In making up the core, the soft sand surrounding the pad, as at 17, forms a thin layer at the cope side as compared with the thickness of the sand at 18 at the drag side of the core, and thus a very thin layer, say one-sixteenth of an inch in thickness, of soft sand, surrounds the pad at the cope side of the arbor.

In Figures 2 and 4, the pipe to be cast is designated as 19, and the usual thickness of sand, at 20, surrounds the arbor and forms the core about which the pipe is to be cast.

As is customary, the sand in the cope and also in the drag is packed or tamped to a comparatively hard density, while the core sand about the arbor is softer and less dense than the cope sand and drag sand, in order that the casting may be vented entirely through the sand on the arbor and forming the core for the pipe.

Due to the fact that the sand on the arbor and forming the core for the pipe, is comparatively soft, the core, when placed in the mold, because of the combined weight of the arbor and the core-sand, settles slightly below the center line of the mold and compresses the core-sand accordingly at the drag side of the core.

As the molten metal is poured into the gates or sprue-holes 5, and flows through the lateral ducts 6 and 7 to the cores, and thence under the drag side of the cores the latter are lifted bodily throughout their length, straight up in the mold, and as the molten metal is flowing over the cope sides of the cores, the latter are held in proper position.

The thin layer of core sand at 17, between the pad 14 and the cope sand, limits the rise of the core to a given and predetermined point, thereby insuring a perfect alinement of the core, co-axial with the longitudinal axis of the mold, and thus forming a pipe 19 with a uniform thickness in its walls.

It will thus be evident that the core, when placed in the drag, is permitted to settle, due to its weight, in the drag, then due to the lifting effect of the molten metal as it is poured, and flows under the core, the core is lifted, slightly, into proper alinement in the mold, and its lifting movement is limited by the presence of the pad 14 on the arbor and the thin layer 17 of core sand between the pad and the cope sand.

Various alterations and changes may be made in the exemplified structure, within the scope of my claims, and it will be understood that the pad may be employed on arbors or core-bars of various sizes, depending on the sizes of the pipes to be manufactured, as for instance throughout a range of from three-inch pipe to fifteen-inch pipe inclusive.

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

1. An arbor for use in pipe-molds having an exterior pad at its cope-side and a uniform exterior surface at its drag-side.

2. An arbor for use in pipe-molds having a semi-circular pad projecting from its cope-side and having its lateral ends merging with the exterior surface of the drag-side of the arbor.

3. An arbor for use in pipe-molds having a semi-circular pad projecting from its cope side, said semi-circular pad having lateral exterior parallel faces, and angular flat faces between said parallel faces and the semi-circular face at the drag side of the arbor.

4. In a pipe-casting sand mold, comprising a drag and a cope, an intermediate sand core including a central arbor, said core being adapted to settle in the drag, and an exterior pad on the arbor between the spigot-end of the mold-cavity and the adjoining end of the mold, whereby bodily lifting movement of the core by molten metal is limited, for the purpose described.

In testimony whereof, I have affixed my signature.

THOMAS G. BUSH, JR.