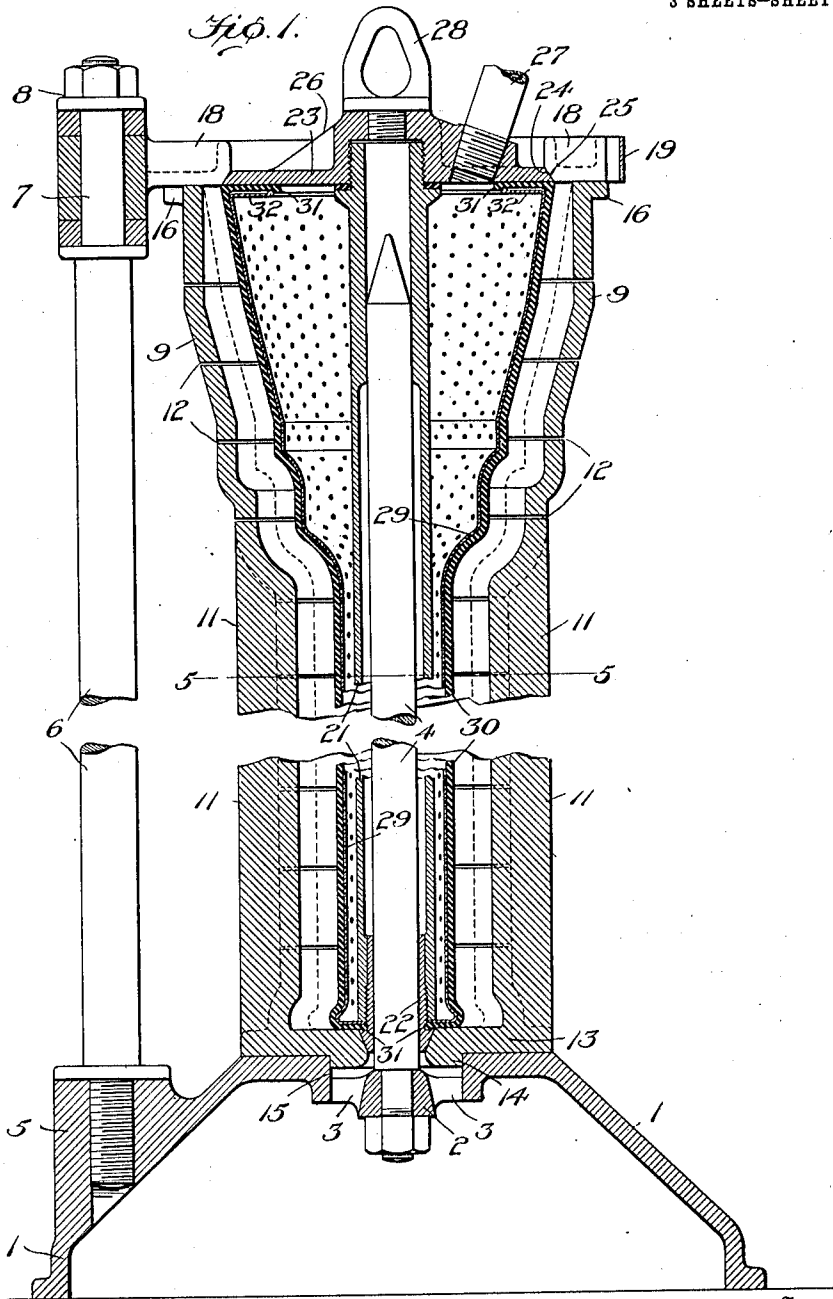


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 APPARATUS FOR FORMING MOLDS AND MOLD CORES.
 APPLICATION FILED FEB. 4, 1911.

1,021,349.

Patented Mar. 26, 1912.

3 SHEETS—SHEET 1.



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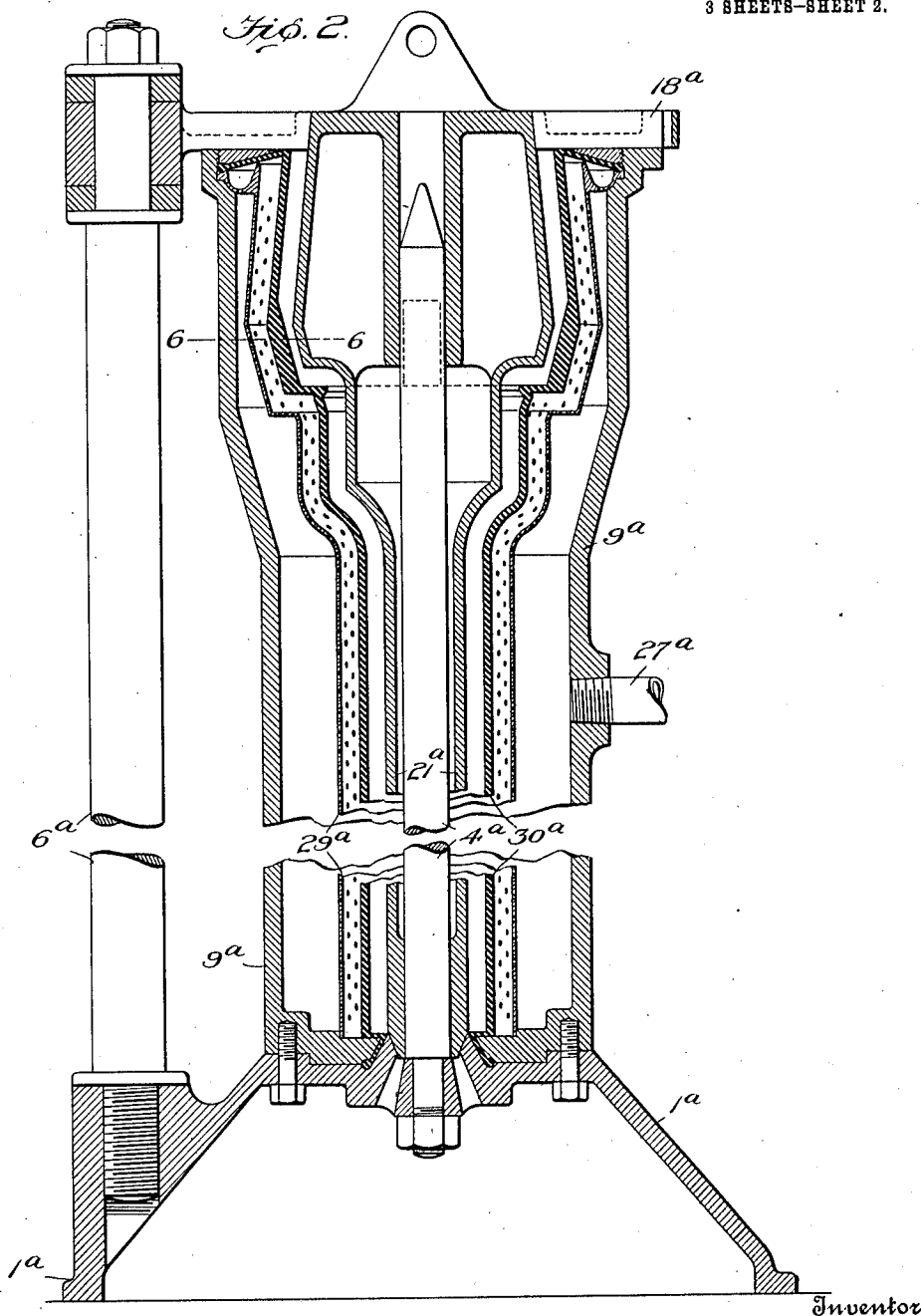
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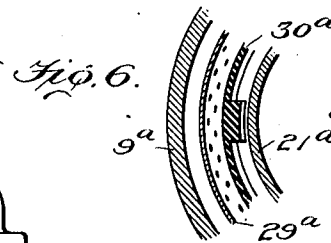
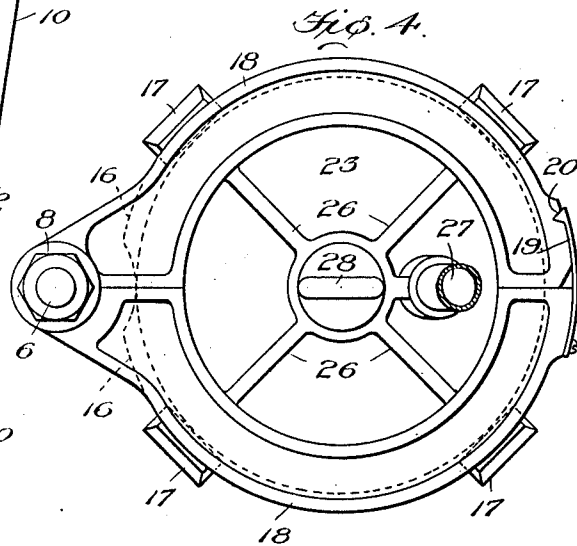
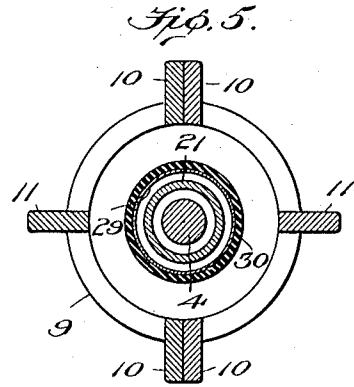
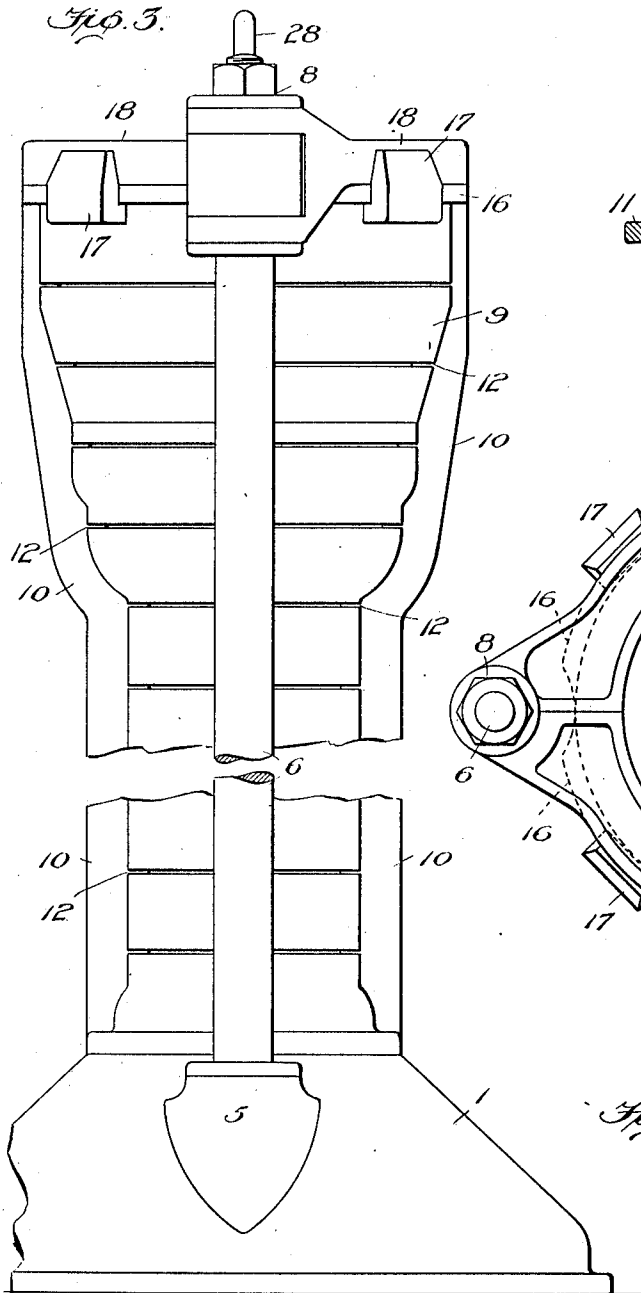
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APPARATUS FOR FORMING MOLDS AND MOLD-CORES.

1,021,349.

Specification of Letters Patent.

Patented Mar. 26, 1912.

Application filed February 4, 1911. Serial No. 606,577.

To all whom it may concern:

Be it known that I, JEROME F. BRYANT, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Apparatus for Forming Molds and Mold-Cores; and I 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.

My present invention relates to metal founding, particularly to mold and core-making, and to novel apparatus for use in connection with an equally novel method or process, also of my invention, for casting pipe and hollow ware in general.

The improved method or process aforesaid forms the subject-matter of an independent application for Letters-Patent Serial No. 605,166, filed in the U. S. Patent Office on the 28th day of January, 1911.

The ultimate object of the present invention is, therefore, the production of pipe or other cast articles of hollow ware, its immediate object being that of producing the molds and mold cores by agency whereof the said articles are cast or molded.

As further objects, the present invention contemplates the practical production of molds and mold cores with speed, accuracy and precision; the employment of a confining flask adapted to receive sand or similar molding material, a flexible pattern of the desired shape, and a flowing substance such as air or other fluid under pressure adapted to flex or deform said pattern, thereby molding or packing the molding material aforesaid, as will be hereinafter particularly described and pointed out in the claims following.

In the accompanying drawings which form part of this application for Letters Patent and whereon corresponding numerals of reference indicate corresponding parts in the several views: Figure 1 is a central vertical longitudinal section through a vertically divided confining flask, its within contained flexible pattern and perforated metallic former, a hinged lid or cover, and a vertical standard constituting a support for the latter. Fig. 2 is a similar view of a core-making flask differing from Fig. 1, mainly in the relative position of its flexible

pattern and perforated metallic former, and in the addition of a central core barrel. Fig. 3 is a rear elevation of the confining flask, its hinged cover and supporting standard, shown by Fig. 1. Fig. 4 is a top plan view of the two-part hinged flask-lid or cover shown in section by Fig. 1. Fig. 5 is a horizontal section on the line 5—5, Fig. 1, and Fig. 6 is a fragmentary horizontal section on the line 6—6, Fig. 2.

Reference being had to the drawings and numerals thereon, 1 indicates a base by preference of cast iron, hollow and of truncated cone shape, having a central hub 2 with radial arms or spider connections 3, and pointed pilot pin 4 shouldered upon said hub and rising vertically therefrom. At one side of base 1 is an integral boss 5 into which is threaded the lower end of a standard 6. This standard is of a length corresponding with the length or height of the entire structure, is reduced at its upper end as at 7, and is provided with a cap-nut 8 for purposes that will later appear.

The numeral 9 indicates a two-part vertically separable flask having longitudinal side flanges 10, 10, by means whereof its parts are clamped together, and also having vertical ribs 11, 11, intermediate of said flanges for purposes of reinforcement. This flask is thoroughly vented by agency of a series of narrow horizontal grooves 12 which encircle the flask members and completely sever them into sections independent of each other except for the vertical flanges 10 and ribs 11 aforesaid, which serve to retain said sections in their proper superimposed relation as best shown by Fig. 3.

At its lower end the flask bottom 13 is provided with a concentric projection 14 adapted to mate with a corresponding depression 15 at the center of base 1 as a means of mounting the flask 9 upon said base; while at its opposite or uppermost extremity the flask is provided with an encircling flange 16 adapted to be engaged by clench lugs 17 upon a two part top-ring or cover 18 best shown by Fig. 4. The two parts of the ring cover 18 are counterparts one of the other, and are hinged or pivotally mounted upon the reduced upper end 7 of standard 6 being there secured by the cap-nut 8 so as to be movable in the same horizontal plane, and when closed to engage

with their hook-shaped clench lugs 17 beneath the flask flange 16. As a means of further locking the cover members 18 in closed relation over the end of flask 9, one of said members is provided with a peripheral spring latch 19 and the other with a suitable detent or depression 20 with which said latch engages.

Within flask 9 and slidably fitted upon the pilot pin 4 is a hollow sleeve or barrel 21 into the lower end whereof is threaded interiorly a nipple 22 and upon the upper end whereof is threaded exteriorly an annular cap plate 23, the latter having a beveled edge 24 adapted to be engaged by the reversely beveled inner edge 25 of ring cover sections 18 when closed. The cap plate 23 is reinforced by radial surface flanges 26, is provided with an air pipe connection 27, and further with a central ring clevis 28 for lifting purposes.

Surrounding the barrel 21 is a metallic or non-yielding perforated former 29 of the desired shape, upon which is fitted a flexible or elastic pattern 30, preferably of rubber, the latter beaded upon its upper and lower edges as at 31, both of said members 29 and 30 being secured at their lower ends between the head of screw-nipple 22 and the end of barrel 21 as shown by Fig. 1. While, as also shown by said Fig. 1, the pattern 30, is in like manner secured between the upper flanged end 32 of former 29 and the under surface of cap plate 23 when screwed to its seated or normal position.

This being a description of my present invention in its best form at present known to me, its use and operation may be briefly set forth as follows: The flask 9 having been "locked up" as indicated by Fig. 1 of the drawings, with a perforated former 29 and its elastic pattern 30 in position, as shown, a partial vacuum is produced within said former by exhausting the air from connection 27. As a consequence the pattern 30 now clings closely to said perforated former, molding material such as sharp sand is next introduced from above between the inner walls of retaining flask 9 and the outer surface of the flexible or elastic pattern 30 thus surrounded, the ring-covers 18 are closed upon cap-plate 23, pressure is introduced through the air connection 27, and this operating equally in all directions from center to circumference through perforations 31, forces the pattern 30 outward, thereby packing the molding sand against the inner walls of flask 9, as indicated by dotted lines, to later serve as the mold for the outer surface of a pipe or other article of hollow ware to be cast. This accomplished, ring-covers 18 are swung back; the air again exhausted from former 29, and said former, together with its pattern 30, central barrel 21, and cap plate 23, is re-

moved bodily from within the completed mold, preliminary to the substitution of a mold-core when required by the character of an article to be cast.

This being a description of my present invention in one form of construction, its use and operation, it should be noted that I do not confine my claims to any particular shape or configuration of the elements and parts hereinbefore set forth, nor to the materials stated, as these may be variously modified without departing from the spirit of my invention. For example, Figs. 2 and 6 of the drawings represent a transposed arrangement and combination of parts for producing mold-cores upon substantially the same plan and by substantially the same means as those heretofore described. In this modified construction there being employed a base 1^a, supporting centrally a vertical pilot pin 4^a, a flask 9^a mounted upon said base and a cover 18^a for the flask pivotally supported upon a standard 6^a rising from the base 1^a aforesaid. In this construction, however, it will be noted that the air pipe connection 27^a enters the side of flask 9^a rather than through its top, that the relative positions of the perfected metallic former 29^a and the flexible pattern 30^a are reversed, the latter being arranged within the former; and also, that a slidably fitted hollow core-barrel 21^a is substituted for the hollow central guide shaft 21. In this or substantially this arrangement of parts a mold-core may be produced as follows:—Air or other operative fluid exhausted from the interior of flask 9^a via connection 27^a, operating through perforations in former 29^a, serve to expand pattern 30^a, whereupon sand or other similar molding material (not shown), is introduced between said pattern and its within contained core-barrel 21^a. Action of the operating fluid now being reversed, the said pattern is subjected to pressure, causing it to contract equally in all directions, and to instantly pack the molding material upon the central core-barrel, which, together with the core thus formed, may then be readily and safely removed after again exhausting the operating fluid to withdraw the pattern 30^a out of contact therewith. Obviously, a core thus produced for use in forming the bore of a pipe or other article of cast hollow ware, may be introduced over the pilot pin 4 within flask 9 first above described, and molten metal poured between the aforesaid mold and mold core in the well understood manner which need not be herein dwelt upon.

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

1. In mold and core making apparatus, the combination with a flask for containing

molding sand, of a flexible pattern within said flask, and means for flexing said pattern to pack the molding sand.

2. In mold and core making apparatus the combination with a rigid non-yielding flask for containing molding sand, of a flexible pattern within said flask, and means for flexing said pattern to pack the molding sand upon its face.

3. In mold and core-making apparatus, the combination with a flask for containing molding sand, a perforated former, within said flask, a flexible pattern adjacent to said former and means for flexing said pattern to pack the molding sand.

4. In mold and core-making apparatus, the combination with a flask for containing molding material, a pilot pin projecting into said flask, a sleeve surrounding said pin, a perforated former surrounding said sleeve, a flexible pattern adjacent to said former, and means for flexing said pattern to pack the molding material.

5. In mold and core-making apparatus, the combination with a flask for containing molding sand, of a flexible pattern within said flask, and means for flexing said pattern to pack the molding sand by agency of fluid pressure.

6. In mold and core making apparatus, the combination with a flask for containing molding material, having a closed bottom and an open top, of a central pilot pin projecting into said flask, a removable sleeve inclosing said pin, a perforated former of non-yielding material, a flexible pattern adjacent to said former, means for introducing fluid pressure within the former, and a removable closure for the open end of the flask aforesaid.

7. In mold and core-making apparatus, the combination with an outer flask for containing molding material, of a base support for said flask, a standard rising from the base at one side of the flask, a horizontally movable closure for the flask pivotally secured to said standard, a flexible pattern within the flask, and means for flexing said pattern to pack the molding material by agency of fluid pressure.

8. In mold and core-making apparatus, the combination with an outer flask for containing molding material, of an outside standard rising from the base of said flask, a two-part horizontally movable closure for the upper end of flask pivotally secured to said standard, a latch for the meeting edges of said closure sections, an elastic pattern within the flask, and means for expanding said pattern by fluid pressure to pack the molding material upon its face.

9. In a mold and core-making apparatus, the combination with an outer non-yielding flask for containing molding material, of a standard rising from the base of said flask, a two-part horizontally movable annular closure for the open end of said flask pivotally secured to the standard aforesaid, a central cap-plate over which the said two-part closure closes, means for locking said closure members in closed relation, an elastic pattern within the flask, and means for expanding said elastic pattern by fluid pressure to pack the molding material.

In testimony whereof I affix my signature, in presence of two subscribing witnesses.

JEROME F. BRYANT.

Witnesses:

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EDWARD F. KOUNOVSKY.