J. C. BANNISTER.

METHOD OF AND APPARATUS FOR MAKING CORES.

APPLICATION FILED NOV. 8, 1911.

1,034,335. Patented July 30, 1912.

2 SHEETS—SHEET 1.

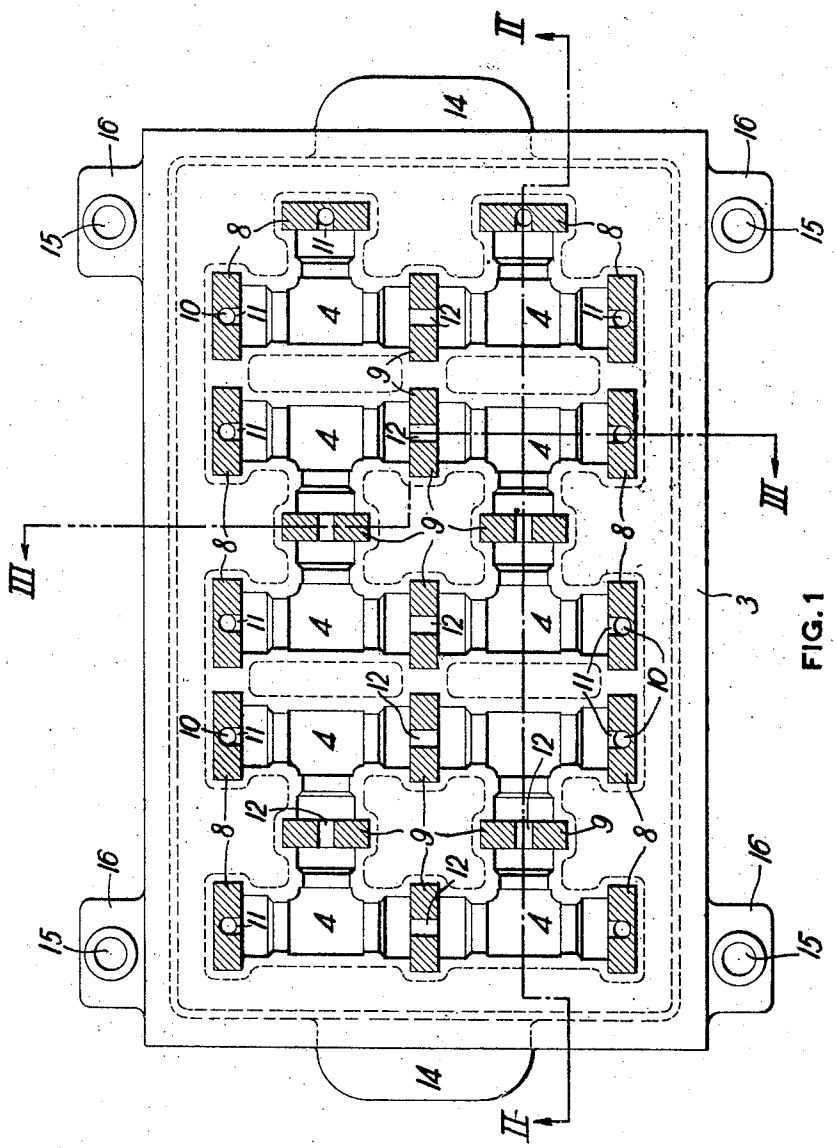

FIG. 1

WITNESSES

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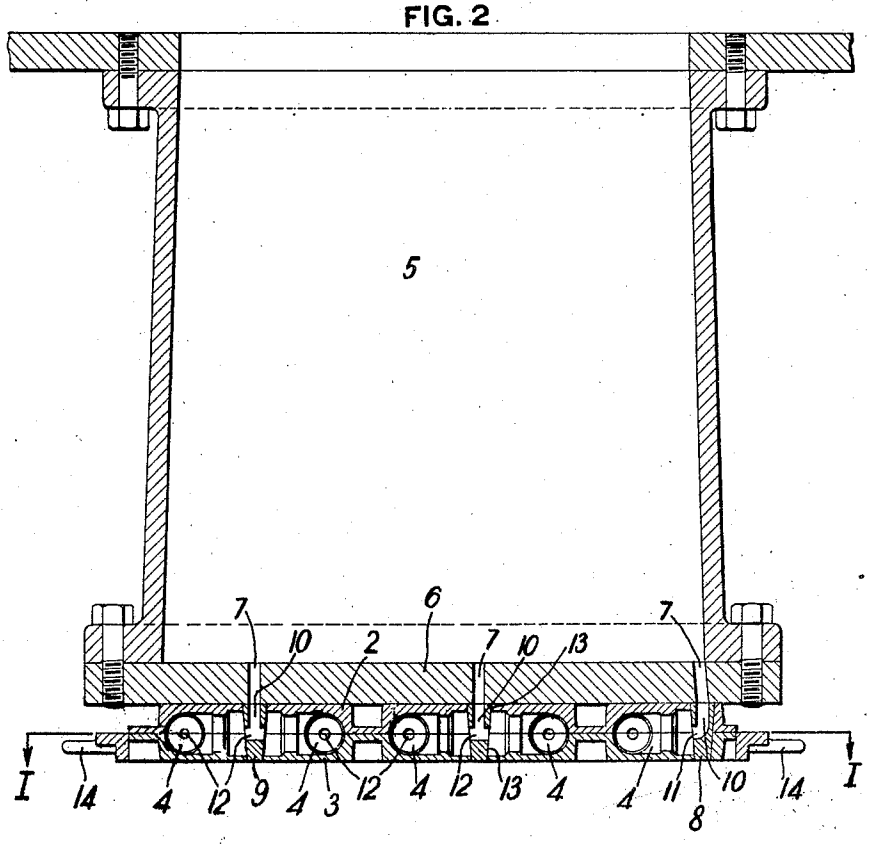
2 SHEETS—SHEET 2.

FIG. 2



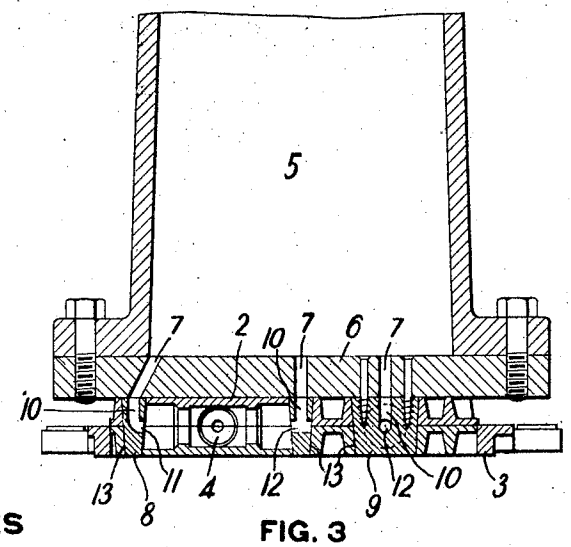


FIG. 3

WITNESSES

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METHOD OF AND APPARATUS FOR MAKING CORES.

1,034,335. Specification of Letters Patent. Patented July 30, 1912.

Application filed November 8, 1911. Serial No. 659,160.

To all whom it may concern:

Be it known that I, JOHN C. BANNISTER, a citizen of the United States of America, residing at Kewanee, in the county of Henry and State of Illinois, have invented a new and useful Method of and Apparatus for Making Cores, of which the following is a specification.

My invention relates to the manufacture of cores used in molding, and more particularly relates to a method of making green sand cores used later in the manufacture of castings such as pipe fittings and similar articles and to novel apparatus constructed and arranged for use in carrying out my improved method.

Heretofore, it has been attempted to manufacture green sand cores by means of an air blast or the use of air under pressure, but such attempts have been unsuccessful on account of inability to pack the sand uniformly within the core-boxes and the failure to obtain cores of uniform density. I have discovered the invariable failure of such methods of making green sand cores is on account of the sand being introduced into the core-box cavities through openings or holes extending transversely or at an oblique angle to the axes of the cores, and owing to the necessary change in direction of the flow of the sand after entering the core-box which prevents the desired equal packing and uniform density of the sand.

One object of my invention is to provide a novel method of making cores of green sand whereby the sand is compacted equally within the cavities of the core-box and by which cores of uniform density are made.

Another object of this invention is to provide a novel method of making green sand cores by the use of which a series of the cores can be simultaneously formed and later transferred from the core-boxes into position in the molds for the later casting operation.

A further object of my invention is to provide apparatus for making green sand cores by the use of which my improved method is employed and the manufacture of green sand cores is made possible.

Referring to the drawings, Figure 1 is a plan, partly in section, the section being taken on the line I—I of Fig. 2, showing a two-part core-box split lengthwise and having a plurality of core-forming cavities. Fig. 2 is a longitudinal section on the irregular line II—II of Fig. 1 showing the two-part core-box, as assembled and applied for use to the sand boot of a molding machine from which the molding sand is supplied in forming the cores in accordance with my improved method. Fig. 3 is a sectional end view on the irregular line III—III of Fig. 1 showing the apparatus illustrated in Figs. 1 and 2.

In the drawings, the numerals 2 and 3 designate the top and bottom sections of a sectional or two-part core-box which is divided or split lengthwise. The contacting faces of the sections 2 and 3 have a series of registering cavities forming a plurality of core-boxes 4 constructed and arranged for molding or forming cores, the particular cores shown being used in making pipe fittings known as tees. The multiple core-box formed of the sections 2 and 3 is arranged for use with the sand boot 5 of a molding machine and the bottom plate 6 of the sand boot 5 has a series of openings or holes 7 provided therein through which the sand in the boot 5 is discharged in being delivered into h core-box.

Secured on the lower face of the bottom plate 6 is a series of drop tubes 8 and 9, one for each vertical opening 7, having longitudinally inclined or tapered faces. The drop tubes 8 are arranged to extend downwardly so that the vertically inclined face thereon forms the end walls which determine the length of the cores formed in the core-box. The double drop tubes 9 also employed have opposite inclined faces arranged to determine the length of the branch on the type of core shown. The drop tubes 8 and 9 are secured on the lower face of the bottom plate 6 of the sand boot 5 and each tube has a vertically extending opening or passage 10 registering with one of the openings or passages 7 extending transversely through the bottom plate 6. The lower end of the passage 10 in the drop tubes 8 and 9 extends into transversely extending passages 11 or 12 on the lower end of the drop tubes, the transversely extending passages 11 on the tubes 8 and passages 12 on the tubes 9 being arranged to extend axially in lines parallel with the longitudinal axes of the core-box cavities and the cores formed therein.

It will be seen by reference to Figs. 2 and 3 that the passage extending through the drop tubes changes the direction of flow

of the sand in its passage from the sand boot 5 into the core-box cavities, so that the sand enters into and travels in the core-box in lines or paths substantially parallel to the longitudinal axes of the cores being formed.

The core-box sections 2 and 3 are provided with a series of openings or holes 13 spaced therein in such manner as to register with the drop tubes 8 and 9 extending downwardly therethrough from the lower or outer surface of the bottom plate 6 into the core-box. The bottom section 3 of the core-box is provided with handles or lugs 14 by which it is manipulated and transferred manually from place to place. The core-box section 3 is also provided with the dowel pin openings 15 in the lugs 16 to insure registration of this core-box section with the dowel pins on the flask in transferring the series of cores from the core-box to the mold.

In making green sand cores in accordance with my improved method, the sections 2 and 3 of the core-box are assembled or booked with the core-forming cavities in registering position. The upper surface of the top section 2 of the core-box is then brought into engagement with the lower surface of the bottom-plate 6 on the sand boot 5 of a molding machine. The drop tubes 8 and 9 on the bottom-plate 6 project through the openings 13 in the sections of the core-box so as to bring one face of a drop tube 8 or 9 opposite the end of a cavity forming each branch on the core for the pipe fitting or other article being made. The faces of the drop tubes are made tapering to facilitate removal after the cores have been formed and to afford a neat fit between the faces of the drop tubes and the openings 13 in the core-boxes into which they extend, the tubes substantially filling the openings or holes 13. The said boot 5 having been filled with sand which has been properly tempered or prepared, the sand is then forced or carried from the boot into the core-box cavities by means of air admitted thereto under pressure in accordance with the method of using the apparatus.

As the sand enters the series of openings or passages in the drop tubes the direction in which it passes is changed within the drop tubes 8 and 9. The sand is at all times caused to enter the core-box cavities from the drop tubes in paths substantially parallel to the longitudinal axes of the core-box and cores, the air entering the core-box, depositing the sand in the core-box, and passing therefrom through the crevices or openings between the engaging faces of the drop tubes. By so doing, the sand is uniformly distributed and equally packed within the core-box cavities and the cores formed thereof are of uniform density. It will be seen by reference to the drawings that the sand is built up in forming the cores from the center of the cores toward the end portions thereof and in this way the ends of the cores and any branches thereon are last formed, which assists in securing the desired uniform density.

The advantages of my invention will be apparent to those skilled in the art. By the peculiar manner of introducing or forcing the sand into the core-box cavities, cores made of green sand are formed which are of uniform density, a result not heretofore obtainable.

Modifications in the construction and arrangement of the apparatus for carrying out my improved method may be made without departing from the invention as defined in the claims.

I claim:—

1. The method of making green sand cores consisting in introducing the sand into a core-box by means of fluid pressure, said sand being introduced in paths parallel to the longitudinal axis of the cores from opposite ends thereof to thereby equally pack the sand and form cores of uniform density.

2. The method of making green sand cores consisting in introducing the sand under fluid pressure into core-boxes from the ends toward the common axial center of the cavities in which the cores are formed in paths parallel to the axes of the core cavities.

3. The method of making green sand cores consisting in introducing the sand under fluid pressure into a core-box from opposite ends of the cavities in which the cores are formed and in paths parallel to the axis of the cores.

4. In apparatus for making green sand cores, the combination with a core-box having a plurality of openings leading thereinto and a sand-boot to supply sand to said core-box, of means on said sand-boot arranged to deliver the sand through said openings into said core-box in opposite directions and in paths parallel to the longitudinal center of the core formed in said core-box.

5. In apparatus for making green sand cores the combination with a core-box having a plurality of core-forming cavities therein, and openings leading into said core-forming cavities and a sand-boot to supply sand to said cavities, of means on said sand-boot arranged to simultaneously deliver the sand through said openings into said cavities from the ends thereof in paths parallel to the longitudinal axes of the multiple cores formed in said core-box.

6. In apparatus for making green sand cores the combination with a core-box having a plurality of core-forming cavities therein, and opposite openings leading into said core-box cavities and a sand-boot to

supply sand to said core-box, of means on said sand-boot arranged to simultaneously deliver the sand through said openings into said cavities in opposite directions and in paths parallel to the longitudinal axes of the multiple cores formed in said core-box.

7. In apparatus for making green sand cores the combination with a core-box having an opening leading thereinto and a sand-boot to supply sand to said core-box, of a drop tube or blow plug on said sand-boot arranged to deliver the sand through said opening into said core-box in a path parallel to the longitudinal center of the core in making the core.

8. In apparatus for making green sand cores the combination with a core-box having a plurality of core-forming cavities therein and openings leading into said core-box cavities, and a sand-boot to supply sand to said core-box, of a plurality of drop tubes or blow plugs on said sand-boot arranged to simultaneously deliver the sand through said openings into said cavities in paths parallel to the longitudinal axis of the multiple cores formed in said core-box.

In testimony whereof, I have hereunto set my hand.

JOHN C. BANNISTER.

Witnesses:
FRED J. TALBOTT,
A. F. HARRISON.