

J. C. DAVIS.
 APPARATUS FOR DRYING MOLDS.
 APPLICATION FILED SEPT. 9, 1907.

962,553.

Patented June 28, 1910.

FIG. 1.

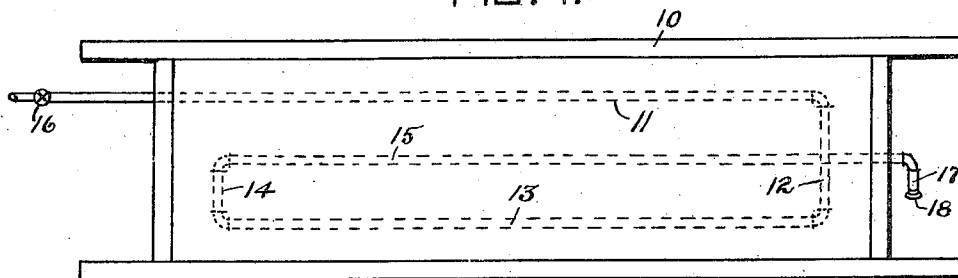


FIG. 2.

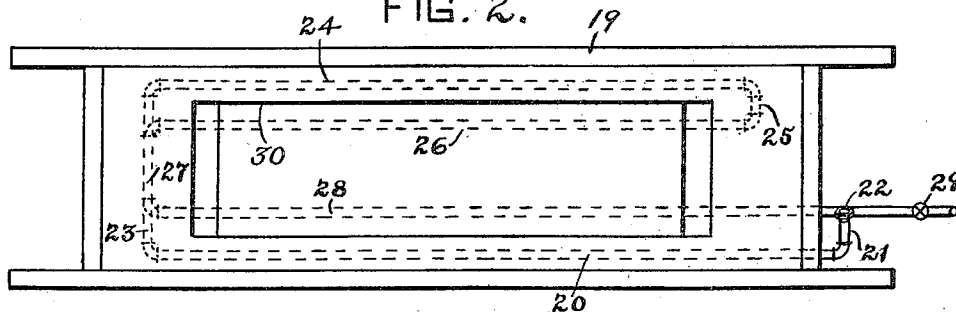


FIG. 3.

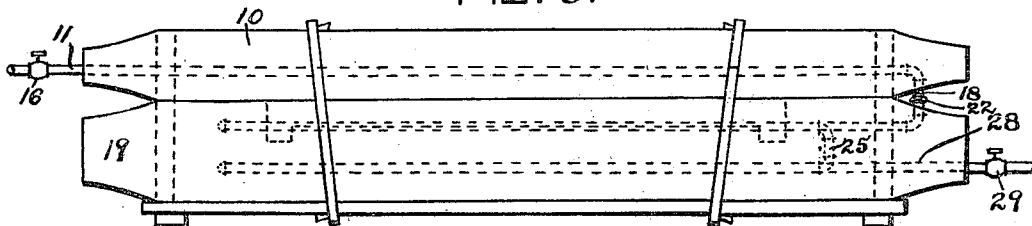
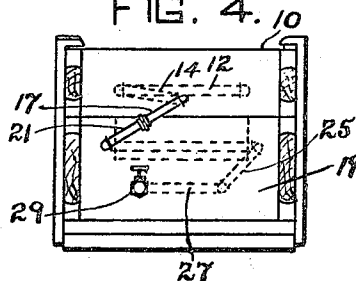


FIG. 4.



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APPARATUS FOR DRYING MOLDS.

962,553.

Specification of Letters Patent. Patented June 28, 1910.

Application filed September 9, 1907. Serial No. 391,961.

To all whom it may concern:

Be it known that I, JAMES C. DAVIS, a citizen of the United States, residing at Hinsdale, in the county of Dupage and State of Illinois, have invented certain new and useful Improvements in Apparatus for Drying Molds, of which the following is a specification.

My invention pertains to improvements in apparatus used for heating and drying molds employed in the casting and founding of metal bodies.

The usual and ordinary method of drying molds is to lift the mold on to a car and run the car and mold into a drying oven to which heat is supplied by any suitable fuel. It has been found, however, that molds transported and treated in this manner are likely to be shaken up and injured in their handling, that although the mold is dried hard on the surface, its interior is likely to be left moist, and that the drying is uneven, some parts of the mold being unduly heated, occasioning scorching or crumbling. When subjected to heat in a drying chamber in this manner the sand of the mold becomes "skin dried" forming a dry hard coating on the surface through which the moisture in the interior of the body of sand must pass or be driven in order to secure a thorough and complete elimination of moisture. The passage of the interior moisture through the dry external shell of the sand in its escape from the interior tends to weaken or deteriorate the binding of the sand particles of the surface one with another, thus rendering the mold of more or less inferior quality.

It is the object of my invention to dispense with this handling and transportation of the mold and to dry the same by supplying heat to the interior of the body of sand forming the mold whereby the drying will occur progressively from the interior outwardly, the moisture in its escape not being compelled to penetrate through a dry sand crust.

By my improved method the heat is supplied to the interior of the sand of the mold by means of steam or other heating element circulating through or fed to pipes embedded in the sand. Preferably the cope and drag each has a pipe coil or lengths of pipe in its sand, the ends of the pipes being joined when the drying occurs, whereby the steam, hot air, or the like admitted to the pipe of

one passes to the other. If desired, of course, the supply and circulation of steam and the pipes of the two parts of the mold may be quite distinct and separate. By the use of my improved apparatus the hot drying element, preferably steam, is brought to the mold instead of the mold being conveyed or carried to the drying chamber, as is usually done, and by applying the heat to the inside of the body of sand the mold is sure to be thoroughly dried throughout and not "skin dried" alone. By my improved process I am enabled to employ wooden flasks with dry sand molds, the advantage of which is obvious, whereas when the molds are dried in ovens or chambers metal flasks are required to withstand the high degree of heat used.

On the accompanying drawings, forming a part of this specification, I have illustrated my invention, and on said drawings Figure 1 is a plan view of the cope of the mold; Fig. 2 is a similar view of the drag; Fig. 3 is a side elevation of the parts of the mold assembled; and Fig. 4 is an elevation of the right hand end of the assembled mold shown in Fig. 3.

The cope 10 is of the usual and ordinary construction and has embedded in its sand the lengths of pipe 11, 12, 13, 14, and 15 united by elbows of the ordinary form. Pipe 11 extends outwardly through one end of the cope, and the protruding portion is equipped with a steam inlet valve 16. Pipe 15 extends through the other end of the cope and is connected by an elbow with a short length of pipe 17 having at its end one element 18 of a union which provides means for disengageably connecting the pipe 17 with a similar pipe of the drag if desired. It will be noticed from Fig. 1 that the pipes within the sand of the cope provide three lengths substantially the full length of the cope, whereby a complete and thorough heating of its sand and a progressive outward drying may be secured.

The drag 19 has embedded in its sand a pipe 20 which protrudes through one end of the drag and is connected by an elbow with a short pipe 21 on the free end of which is the other member 22 of a union. The other end of pipe 20 by means of a cross pipe 23 connects with another longitudinal pipe 24, which in turn by a short inclined cross pipe 25 is joined to another lengthwise

pipe 26 in a plane somewhat below the pipes 20 and 24. Pipe 26, by means of the connecting pipe 27, is joined to a long pipe 28 which projects through the right hand end of the drag and is equipped with a steam outlet or drip valve 29. It will be noticed that owing to these four long pipes 20, 24, 26, and 28 a thorough and complete drying of the sand of the drag is effected.

After the mold cavity 30 has been formed in the sand, the pipe of the cope is disengageably joined to that of the drag by connecting the union members 18 and 22 directly together, or by joining them by means of an interposed pipe, hose, tube, or the like. In Fig. 3 I have shown the cope superposed on the drag and clamped or fastened in position, but preferably their bodies of sand are dried before they are placed together, or if they are disposed one on the other during the drying they should be separated by intermediate blocks or the like to permit the escape of the moisture from the mold cavity 30. To effect the heating and drying operation, steam or other heating element, such as hot air, is admitted to the pipe of the cope through the admission valve 16, and on leaving the pipe, provided the cope and drag pipes have been joined, passes to the pipe embedded in the drag sand, the water of steam condensation dripping through the exhaust valve 29.

The method set forth in this application is described and claimed in my co-pending application, Serial No. 531,195, filed December 3, 1909.

Owing to the fact that the steam pipes are buried in the body of sand forming the mold, it is thoroughly heated and dried progressively outwardly, no skin drying alone being effected or deterioration of the surface of the mold occurring due to the escape of internal moisture through a dry surface crust. Inasmuch as the heating element such as steam may be readily conducted to the mold or parts thereof in any position or location, it is unnecessary to transport the mold to a drying chamber thereby risking injury during its handling. As will be obvious, a disconnection between the pipes 17 and 21 may be readily effected whereupon the cope can be easily separated from the drag. To those skilled in the art it will be apparent that the precise number of pipes or their location within the sand is quite immaterial, and that the structure shown on the drawing and described above may be varied considerably without sacrificing the advantages of my invention or departing from its substance.

The disposition, lengths, and diameters of

the steam pipes within the sand of the mold, as will be readily understood, may be varied to correspond to different shapes and sizes of mold cavities, but in any case the pipes containing the heating element would be buried within the sand and effect the drying operation as described above. I have deemed it unnecessary to illustrate the steam generator for the supply of steam to pipe 11, but it is to be understood that this pipe is connected by any suitable means with a boiler generating steam or to any other source of supply of a heating element. It is to be understood that the cope need not be placed on the drag with their pipes connected to carry on the drying process, but that their pipes may be joined with the parts of the flasks in various positions or locations. Steam, if desired, may be supplied to each part of the flask separately, or a considerable number of copes and drags may be connected in series relation or any other manner to secure a supply and circulation of the heating means.

I claim:

1. The combination of a mold, and a pipe embedded directly in the sand of said mold to which a heating element may be conveyed to heat and dry the sand of the mold, substantially as described.

2. The combination of a cope, a pipe embedded in its sand, a drag, and a pipe embedded in its sand, whereby a heating element may be conveyed to such pipes to heat and dry the sand of the two parts of the mold.

3. The combination of a cope, a pipe embedded in its sand, a drag, a pipe embedded in its sand, means to join together one end of each of said pipes whereby to form a continuous conduit, and means to convey a heating element to said united pipes to heat and dry the sand of the mold, substantially as described.

4. The combination with a mold casing, of a steam pipe carried thereby and extending through the sand therein in such manner as to secure a drying of such sand.

5. The combination with a mold casing, of a steam pipe carried thereby and extending through the sand therein in a series of coils.

6. The combination with a cope and drag, of a steam pipe extending through the sand in each of the members, and a coupling between adjacent ends of the two pipes.

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Witnesses:

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