June 13, 1944. D. J. CAMPBELL 2,351,482

METHOD OF DRYING CORES AND MOLDS

Filed Dec. 31, 1941 2 Sheets-Sheet 1

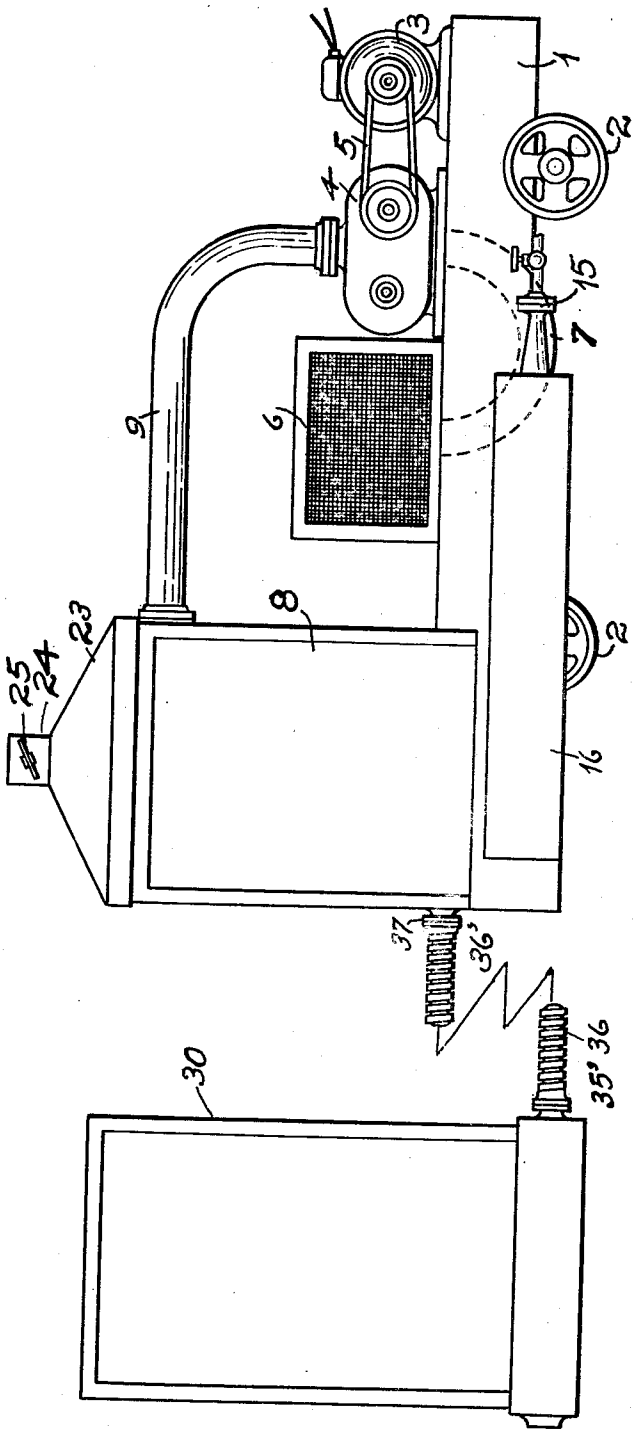


Fig. 1.

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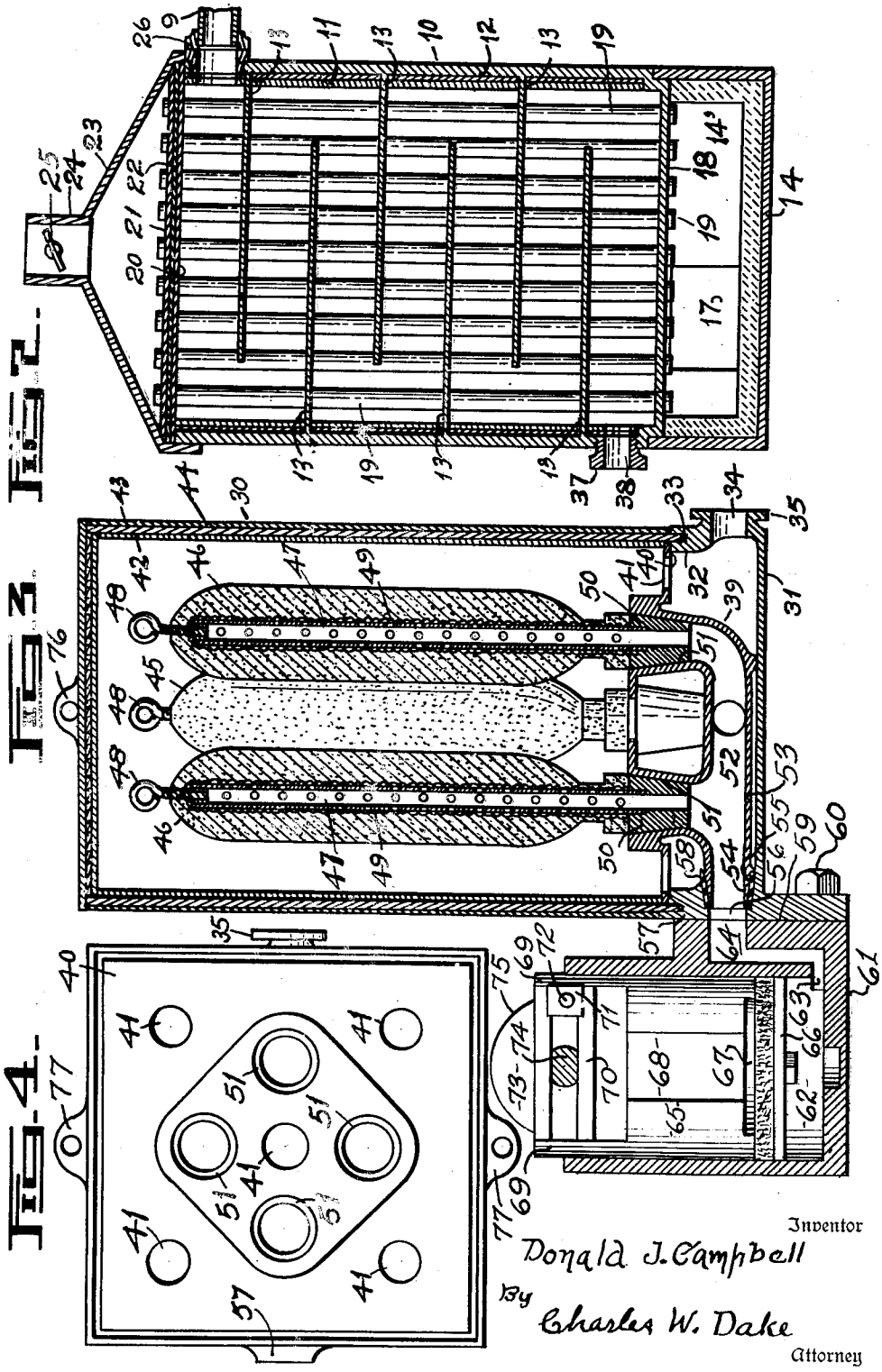


Fig. 2.

Fig. 3.

Fig. 4.

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METHOD OF DRYING CORES AND MOLDS

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3 Claims. (Cl. 34—15)

My present invention relates primarily to improvements in drying cores and molds, and particularly to the method of drying foundry employed cores and molds composed principally of granular material, and has for its objects; first, the provision of a method for drying said cores and molds more expeditiously; second, the provision of a method for drying said cores and molds considerably cheaper; third, the provision of a method for drying said cores and molds uniformly; fourth, the provision of a method for drying said cores and molds thoroughly; fifth, the provision of a method for drying said cores and molds without burning; sixth, the provision of a method whereby other porous granular members can be dried quickly, uniformly, and cheaply.

I attain these named objects and such other objects as may appear from a perusal of the following description, preferably by the employment of the apparatus illustrated by the accompanying drawings, in which—

Figure 1 is a side elevation view of the apparatus preferably employed in drying cores or molds, including the core drier.

Figure 2 is a vertical sectional view of the air heater and in which is illustrated the air training baffles and air heating tubes.

Figure 3 is a vertical sectional view of the core or mold drier in which is shown two cores in longitudinal cross section and the air pump for reducing the pressure within the cores.

Figure 4 is a top plan view of the core and mold drier base, the view illustrating the arrangement of holes through which the air from the air heater passes into the heating chamber of the heater and also two sockets in which the core arbors are set for supporting the core vertically in the drier.

Throughout the views of the accompanying drawings, similar numerals refer to similar parts or portions of the apparatus preferably employed in practicing my method of drying cores, and referring to the drawings:

Numeral 1 is a carriage supported by wheels 2 and having mounted thereon, at its rear, electrical driven motor 3, adjacent the electric motor, an air compressing blower 4 driven by said motor through V belts 5, adjacent the air compressor blower 4 is air filter 6 connected to the blower by air suction pipe 7, and at the front of the carriage is mounted air heater 8 connected at its top to blower 4 by conductor pipe 9 by which air is conducted from the blower to the air heater which preferably comprises an outer casing 10, an inner casing 11 with suitable insulation 12 packed between the casings. The inner casing 11 has heat training baffles 13 extending alternately from the front and from the back or from side to side whereby the air delivered from the blower 4 by air conductor pipe 9 is trained back and forth within the said casings from front to back or side to side in a downward course. Numeral 14 refers to the base of the air heater that serves as a distributor for the heated air conducted from the burner 15 by conductor flue 16 associated with opening 17 extending through two opposite side walls of the base refractory lining 14'. Extending over the lining of the base 14 is plate 19 provided with a plurality of holes having extending therethrough and welded to the plate, vertically disposed air heating tubes 19 extending upward through the baffles 13 and top plates 20 and 21 having between them, asbestos fibrous packing 22, the said plates 20 and 21, and packing having a plurality of holes through which the air heating tubes 19 extend and are free to expand longitudinally. Numeral 30 refers to the core or mold drier provided with hollow base 31 having in the top of its surrounding wall, packing groove 32 with fibrous packing 33 therein, the said surrounding wall having hot air inlet opening 34 with flange 35 at its outer end, and to which is secured flange 35' of the hot air conductor 36 having flange 36' attached to flange 37 of hollow bushing 38 extending into the lower end of the air heater adjacent the base 14. Within the base 31 and secured thereto is manifold member 39 having a flange 40 resting on the side wall of the base 31 with holes 41 extending through the said flange through which heated air passes from the base to the interior of casing 42 having an outer casing 43 surrounding it with insulation 44 between the said casings which enclose the cores 45 and 46 built on hollow perforated core arbor 47 having screw threaded in their upper end, eye bolts 48 for mechanically handling the cores from the time they are made until they are mounted in the mold, the arbor 47 before the core is built on it is wrapped with rope 49 and has at its lower end enlarged tapered base 50 extending into sockets 51 of the manifold member 39, the said sockets communicating with the cavity 52 of the manifold 39 which has hollow neck 53 having tapered end 54 extending into tapered portion 55 of the gas exit hole 56 extending through the wall of the base 31 and pump engaging flange 57, within the taper portion 55 of the hole 56 is composition packing 58 whereby leakage of heated air is prevented from

escaping from the base 31 past taper portion of the neck 53. Attached to the pump engaging flange 57 and downwardly extending flange 59, by cap bolt 60, is air pump housing 61 having cylindrical bore 62 from which extends ports 63 and 64 opening to hole 56 of the hollow base 31. Within the bore 62 of the air pump is suction piston 65 having follower member 66 for packing the leather or other suitable fibre packing 67 against the end of the piston and permitting air to pass to crescent cross-sectional shaped ports 68 opening at their upper ends into the recess between the upwardly extending side members 69 of the piston for supporting the yoke 70, in which slides crank pin block 71, forming a bearing for the crank pin 72 secured to the crank disc 73 on the shaft 74 of the electric drive motor 75. At the top of the core drier casing 43 is lug 76 having a hole extending through it to provide means for attaching a hoist for raising the casings 43 and 44 from the base 31, the base having at opposite sides lugs 77 whereby the base can be lifted by mechanical means, and the casing 43 secured to the base for resisting the pressure of the air created within the casing 42 by the pressure blower 4.

In practicing my method of drying foundry employed cores, I first provide the apparatus substantially as shown in the several views of the drawings including a core box in which to build the cores 45—46 around the hollow perforated arbor 47 having screwed into its end the eye bolt 48 whereby the arbor in conjunction with the enlarged tapered end 50 is held concentric in the core box while the granular sand core material is formed around the arbor which has rope 49 wrapped around it to provide for passage of gas and air to reach the perforations in the sides of the arbor. Having provided the core box and core arbor as described, I produce the core with the enlarged tapered portion 50 at one end and the eye bolt 48 at the other, and having provided the base 31 with the manifold 39 therein, I raise the cores separately by a hoist mechanism hooked through the eye of the eye bolt 48, to a vertical position, I then move the hoist mechanism directly over one of the tapered sockets 51 in the manifold 39 and then lower the core until the enlarged tapered end of the core arbor rests in the taper socket 50 of the base manifold and detach the hoist mechanism from the eye bolt. When a number of the cores, which is usually four, is mounted as just described, the casing is lowered over the cores until its lower edge rests on the packing 33 in the groove in the top of the base wall 32, the casing is then either clamped to the base or weighted sufficiently to resist lifting by the air pressure caused by the pressure blower 4 within the casing, the motor 3 is then started and by the V belts 5 drives the blower 4 which in turn draws air through the air filter 6 and blows air through the air heater 8 where it is heated to the desired temperature which for certain cores reaches 400 degrees Fahrenheit, the heated air continuing to flow by reason of the blower, passes through air conductor pipe 36 to the core drier wherein had been mounted the cores for drying as previously described, and wherein the cores are dried quickly, the time required being less than thirty per cent of the time required to dry similar cores by the usual core oven method. After the cores have been dried, they are given a coat of core wash, this core wash can be applied to the cores before they are placed within the core drier, or applied when the cores are partly or only skin dried. When the cores are thoroughly dried and given the coat of core wash, and the mold in which to cast the projectile has been provided, each core is raised by a suitable hoist by the eye bolt screwed into the end of the core arbor and lowered into the mold which has a bottom provided with similar tapered sockets to the sockets 51 of the manifold 39 in the drier base 31, when the cores are placed in the mold, they are anchored therein preferably by a stud screwed into the core arbor in place of the eye bolt 48 which is removed as soon as the cores are set in the mold and the hole extending into the arbor plugged by suitable means which may be the means of the anchor stud or silica sand having a binder mixed in it.

Having described my present method of drying cores and mold portions, I claim:

1. The method of drying foundry employed cores consisting in supporting said cores vertically on a hollow perforated arbor in an enclosing casing, subjecting the exterior of the cores to heated air having a pressure above the pressure of the atmosphere and the interior of the core to a pressure below the pressure of the atmospheric pressure.

2. The method of drying granular cores having a hollow perforated core arbor consisting in subjecting the core in the undried state to heated air under pressure and the hollow perforated core arbor to a lesser pressure whereby heated air is caused to pass from the exterior of the core to the hollow perforated arbor and to the atmosphere.

3. The method of drying granular cores supported by a perforated hollow core arbor consisting in subjecting the core in the undried state to heated air under pressure and the hollow perforated supporting core arbor to a lesser air pressure.

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