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2,509,396

DRYING APPARATUS FOR MOLDS

Filed March 26, 1945

2 Sheets-Sheet 1

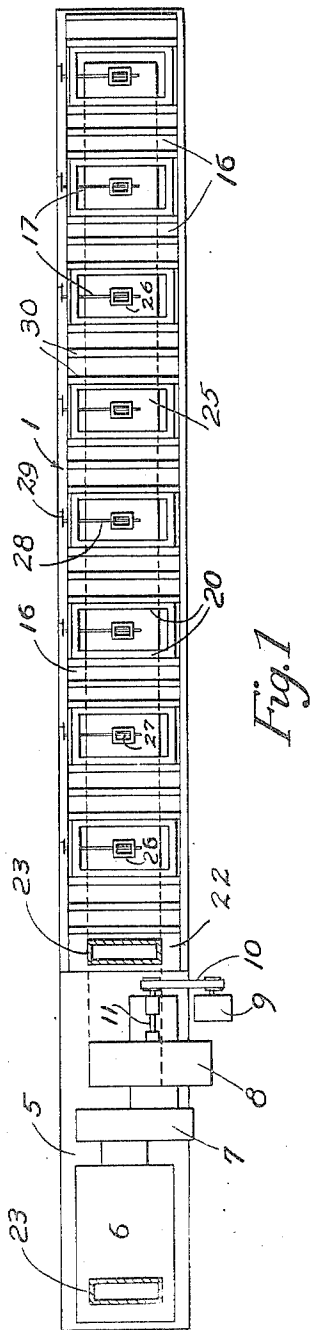


Fig. 1

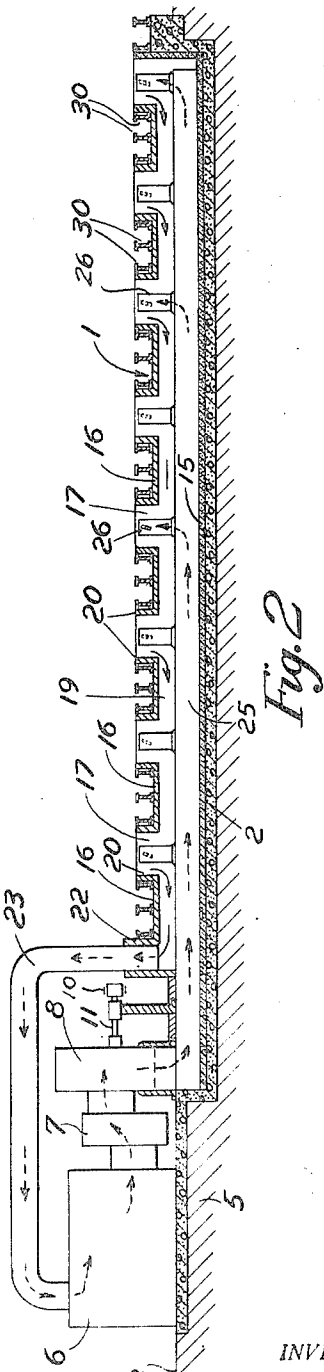


Fig. 2

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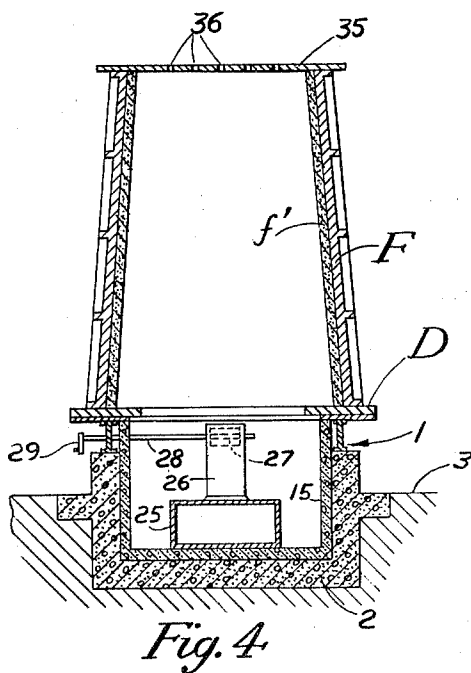
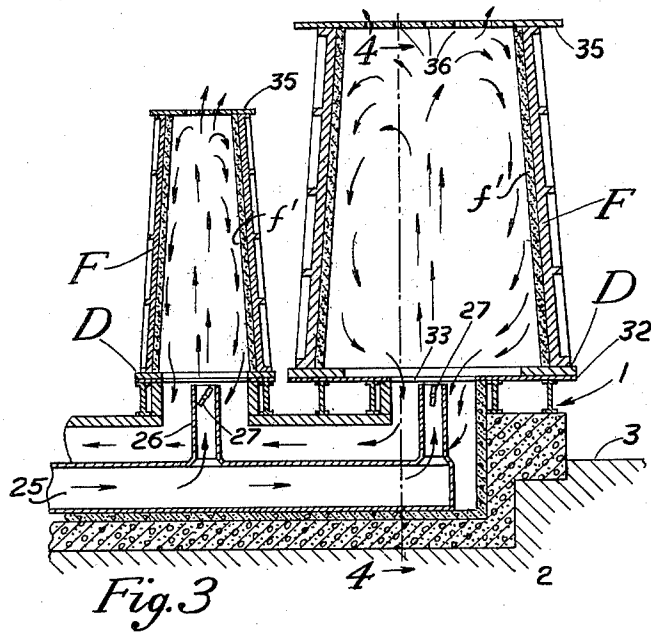
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DRYING APPARATUS FOR MOLDS

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11 Claims. (Cl. 22—87)

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This invention relates to drying apparatus, and it has to do more particularly with apparatus for drying freshly applied or "green" sand linings of ingot mold flasks or the like, and which, in its preferred form, may be termed a drying bench.

An object of the invention is to provide a drying apparatus having a relatively low flat bench-like section on which the flasks may be easily and quickly placed, as by means of a crane or hoisting apparatus using an overhead carriage, preparatory to drying the linings, and from which, after the linings are dried, the flasks may be removed with equal facility.

Another object of the invention is to provide drying apparatus of the aforesaid character that is very efficient, and is economical of operation, such operation being characterized by a recirculation and reheating of the drying fluid.

A further object is to provide drying apparatus of the character described including adapters by the use of which mold flasks of various sizes may be effectively handled; and to include means for apportioning the drying fluid among the flasks according to their sizes.

A still further object is to provide drying apparatus that is of simple design and construction, is compact and therefore occupies a small amount of space relative to its capacity.

The foregoing objects with others that will appear as this description proceeds are attained in the embodiment of the invention illustrated in the accompanying drawings wherein Fig. 1 is a plan view of drying apparatus constructed in accordance with the invention; Fig. 2 is a longitudinal sectional view thereof, with the fluid heater, fan and other parts shown in elevation; Fig. 3 is a fragmentary central longitudinal section through the apparatus, showing mold flasks of different sizes emplaced thereon for drying, and Fig. 4 is a transverse section on the line 4—4 of Fig. 3.

In the drawings, like reference characters are used to designate the corresponding parts in the several views, and in the form of the invention selected for illustrative purposes, the apparatus comprises an elongated bench-like structure designated generally by the reference numeral 1. The foundation of this structure desirably consists of a unit 2 of poured concrete, although it may be built up of other suitable material, and it is shown as extending a suitable distance above and below the plane of the floor 3.

An extension 5, at one end of the unit, provides a base on which is mounted a fluid heater of the circulating type, shown conventionally at 6, the

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outlet of which has connection, through conduit means 7, with the inlet of fluid impelling means 8 which, in the present instance, consists of a centrifugal blower. The blower may be driven by an electric motor 9 through a transmission belt or chain 10 that is engaged over pulleys or sprockets on the shafts of the motor and blower, the shaft of the latter being designated 11.

It is clear from Figs. 2, 3 and 4 that the unit 2 is generally of channel or trough formation, and a lining 15, which preferably consists of insulating cement, is applied to the bottom and sides thereof, as well as to the end wall remote from the heater 6. Top wall sections 16 extend across the top of the unit 2, and between said sections are inlet openings 17 that communicate with a chamber or tunnel-like passage 19 enclosed by the structure 1. The openings 17 are surrounded or defined by upward extensions of the side-wall linings 15 and shallow walls 20 that rise from the opposed edges of adjacent wall sections 16. At its end nearest the heater 6 the structure 1 is provided with a flue 22 to which is connected a duct 23 that leads to the inlet of the heater 6.

Extending substantially the full length of the chamber or tunnel-like passage 19, and shown as resting on the bottom thereof, is a casing or duct 25 that communicates at one end with the outlet of the fluid impelling means or blower 8. Rising from the casing or duct 25 centrally of each opening 17, is a discharge nozzle 26, shown as provided with a damper 27, the operating shaft 28 of which extends out through the side of the structure 1 and is equipped with operating means 29, shown as a crank.

On the top of the structure 1 are suitably arranged I-beams 30, the top surfaces of which are flush with the tops of the walls that define the openings 17. These I-beams, resting upon the relatively heavy walls of unit 2, sustain the weight of the mold flasks, as will hereafter more fully appear. I have already made mention of the fact that the apparatus is intended to handle mold flasks of different sizes, and while flasks, within a given range of sizes, may be placed, with their drags, directly upon the bench-like structure in register with the openings 17, in those cases where the end area of the flask is considerably larger than the area of an opening 17, or where the flask is so small that its longer end dimension is less than the corresponding dimension of such opening, I employ adapters 32 in the form of plates that are large enough to have marginal bearing on the I-beams and properly support the flask, or the flask and its drag, and which plates

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are provided with passageways or openings 33 through which the openings of the apparatus communicate with the interior of the flask.

Flasks, designated F, are shown in Figs. 3 and 4 as supported, through their drags D, on adapters 32, over the openings of the structure 1. The flasks are of the usual ingot mold type, open at both ends, and provided with sand linings f'. Applied to the open tops of the flasks are means 35 for partially closing said open tops, such means desirably consisting of perforated plates, the perforations being designated 36.

In the use of the apparatus, the adapters 32, where required, are placed on the structure 1 with their passageways 33 registering with the openings 17 of the apparatus. Now, by means of a crane or overhead hoist, the mold flasks are swung over the structure 1 and brought to rest upon the same with their interiors aligned with the openings of the structure.

It will be understood that the flasks have been freshly lined with moist sand, and it is the purpose of the operation to dry the green sand linings. In case a less number of flasks are to be treated than there are openings 17 in the bench-like structure 1, any opening or openings in excess of the number of flasks is or are closed by suitable means, as by the placing of a plate or plates thereover. When the flasks have been properly arranged on the drying bench or structure 1, their open tops are partially closed by the means 35. Assuming that the fluid heater 8 is in operation, electric current is supplied to the motor 9 through the usual conductors (not shown) and, thus energized, the motor drives the fluid impelling means 8. This results in hot air being drawn from the heater 8 through the conduit 7 and delivered under pressure to the casing or duct 25. With the dampers 27 open to the extent required, the heated fluid is discharged through the nozzles 26 centrally within the cavities of the flasks. The kinetic energy of the hot fluid issuing from the nozzles 26 causes said fluid to ascend directly to the top of the flask cavity, notwithstanding the fact that a downward flow is induced about the column of rising fluid by the suction prevailing within the chamber or passage 19. This latter condition, it may be explained, results from the fact that said chamber or passage is in constant communication, through the conduit 23, with the inlet of the fluid heater 8. Thus it will be seen that as long as the heater 8 and fluid impelling means 8 are in operation, the fluid is being circulated through the cavities of the flask in the general direction indicated by the arrows in Fig. 3. The hot fluid sweeping down along the side walls of the flask rapidly drive off the moisture from the green sand lining. While, in the interest of efficiency, it is essential that as much of the heated fluid as possible be conserved, it is equally important that a building up of an inert body of fluid at the top of the cavity be avoided, as such would prevent the incoming highly heated fluid from reaching the top portion of the lining. This difficulty is prevented by partially closing the open tops of the flasks by the previously mentioned means 35, consisting, in the present embodiment of perforated plates.

Having thus described my invention, what I claim is:

1. Apparatus of the class described comprising a structure on the top of which are adapted to rest freshly lined open-bottom mold flasks, a duct system having outlet openings discharging

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upwardly through said top and inlet openings in the top adjacent the former openings so that a flask may be placed on said structure with its open bottom over associated outlet and inlet openings, a fluid heater of the circulating type in circuit with said system, and fluid impelling means incorporated in the system for recirculating fluid therethrough.

2. Apparatus of the class described comprising a structure on the top of which are adapted to rest freshly lined mold flasks that are open at top and bottom, a duct system having outlet openings discharging upwardly through said top and inlet openings in the top adjacent the former openings so that a flask may be placed on said structure with its open bottom over associated outlet and inlet openings, means adapted to be applied to the open top of said flask for partially closing the same, a fluid heater of the circulating type in circuit with said system, and fluid impelling means incorporated in the system for recirculating fluid therethrough.

3. Apparatus of the class described comprising a structure on the top of which are adapted to rest freshly lined open-bottom mold flasks of different sizes, a duct system having outlet openings discharging upwardly through said top and inlet openings in the top adjacent the former openings, adapters for placement upon said top over associated outlet and inlet openings and having a passageway communicating with said openings, said adapters being provided for the support of mold flasks with the open bottoms of said flasks over said passageways, a fluid heater of the circulating type in circuit with said duct system, and fluid impelling means incorporated in the system for recirculating fluid therethrough.

4. Apparatus of the class described comprising a structure on the top of which are adapted to rest freshly lined open-bottom mold flasks, a duct system having outlet openings discharging upwardly through said top substantially centrally into mold flasks disposed thereover, the system having, also, inlet openings in the top between the former openings and the plane of the side walls of the flasks, a fluid heater of the circulating type in circuit with said duct system, and fluid impelling means incorporated in the system for recirculating fluid therethrough.

5. Apparatus of the class described comprising a structure on the top of which are adapted to rest freshly lined mold flasks that are open at top and bottom, a duct system having outlet openings that discharge upwardly through said top substantially centrally of a mold flask disposed thereover, the system having, also, inlet openings in said top between the former openings and the plane of the side walls of the flask, means applied to the open tops of the flasks for partially closing the same, a fluid heater of the circulating type in circuit with said duct system, and fluid impelling means incorporated in the system for recirculating fluid therethrough.

6. Apparatus of the class described comprising a hollow bench-like structure having a plurality of openings in its top, a fluid distributing casing enclosed within the structure in spaced relation to certain of the walls thereof so as to provide between said walls and the casing a fluid recovery chamber wherewith the aforesaid openings communicate, discharge nozzles rising from said casing into the aforesaid openings and stopping short of the plane of said top, said bench-like structure being adapted to support over each of said openings a freshly lined open-bottom

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mold flask, a fluid heater of the circulating type characterized by inlet and outlet openings, the former opening communicating with said recovery chamber and the latter opening with said casing whereby to provide a fluid circulating system including the heater, casing, recovery chamber, the interiors of the mold flasks, and fluid impelling means for recirculating fluid through said system.

7. Apparatus of the class described comprising a hollow bench-like structure having a plurality of openings in its top, a fluid distributing casing enclosed within the structure in spaced relation to certain of the walls thereof so as to provide between said walls and the casing a fluid recovery chamber wherewith the aforesaid openings communicate, discharge nozzles rising from said casing into the aforesaid openings and stopping short of the plane of said top, said bench-like structure being adapted to support over each of said openings a freshly lined mold flask that is open at top and bottom, means applied to the open top of each flask for partially closing the same, a fluid heater of the circulating type characterized by inlet and outlet openings, the former opening communicating with said recovery chamber and the latter opening with said casing whereby to provide a fluid circulating system including the heater, casing, recovery chamber and the interiors of the mold flasks, and fluid impelling means for recirculating fluid through said system.

8. Apparatus of the class described comprising an elongated bench-like structure enclosing a tunnel-like passage and provided with a series of openings in its top that communicate with said passage, a duct of lesser cross sectional area than said passage extending longitudinally thereof, discharge nozzles rising from said duct substantially centrally of said openings and stopping short of the plane of said top, freshly lined open-bottom mold flasks being adapted to be supported upon said structure, one over each of said openings, a fluid heater of the circulating type having an inlet communicating with the aforesaid passage and an outlet communicating with said duct, and fluid impelling means for recirculating fluid through the heater, duct, mold flasks and passage.

9. The combination defined by claim 8, plus: dampers in said nozzles, and means for operating the same extending exteriorly of the structure.

10. Apparatus of the class described comprising an elongated bench-like structure enclosing a tunnel-like passage and provided with a series of openings in its top that communicate

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with said passage, a duct of lesser cross sectional area than said passage extending longitudinally thereof, discharge nozzles rising from said duct substantially centrally of said openings and stopping short of the plane of said top, adapters for placement upon said structure over said openings, freshly lined open-bottom mold flasks of different sizes being adapted to be supported upon said adapters, the adapters having through passageways over which are disposed the open bottoms of the flasks, a fluid heater of the circulating type having an inlet communicating with the aforesaid passage and an outlet communicating with said duct, and fluid impelling means for recirculating fluid through the heater, duct, mold flasks and passage.

11. Apparatus of the class described comprising an elongated bench-like structure enclosing a tunnel-like passage and provided with a series of openings in its top that communicate with said passage, a duct of lesser cross sectional area than said passage extending longitudinally thereof, discharge nozzles rising from said duct substantially centrally of said openings and stopping short of the plane of said top, flow control means associated with said nozzles, adapters for placement upon said structure over said openings, said adapters being constructed to support freshly lined mold flasks of different sizes that are open at top and bottom, the adapters having through passageways over which the open bottoms of the flasks are intended to be disposed, means for application to the open tops of the flasks for partially closing the same, a fluid heater of the circulating type having an inlet communicating with the aforesaid passage and an outlet communicating with said duct, and fluid impelling means for creating a circulation of fluid through the heater, duct, mold flasks and passage.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
23,410	Thompson et al.	Mar. 29, 1859
154,006	Benson	Aug. 11, 1874
190,634	Smith	May 8, 1877
2,417,673	Barnett et al.	Mar. 18, 1947

FOREIGN PATENTS

Number	Country	Date
123,769	Great Britain	Oct. 2, 1919