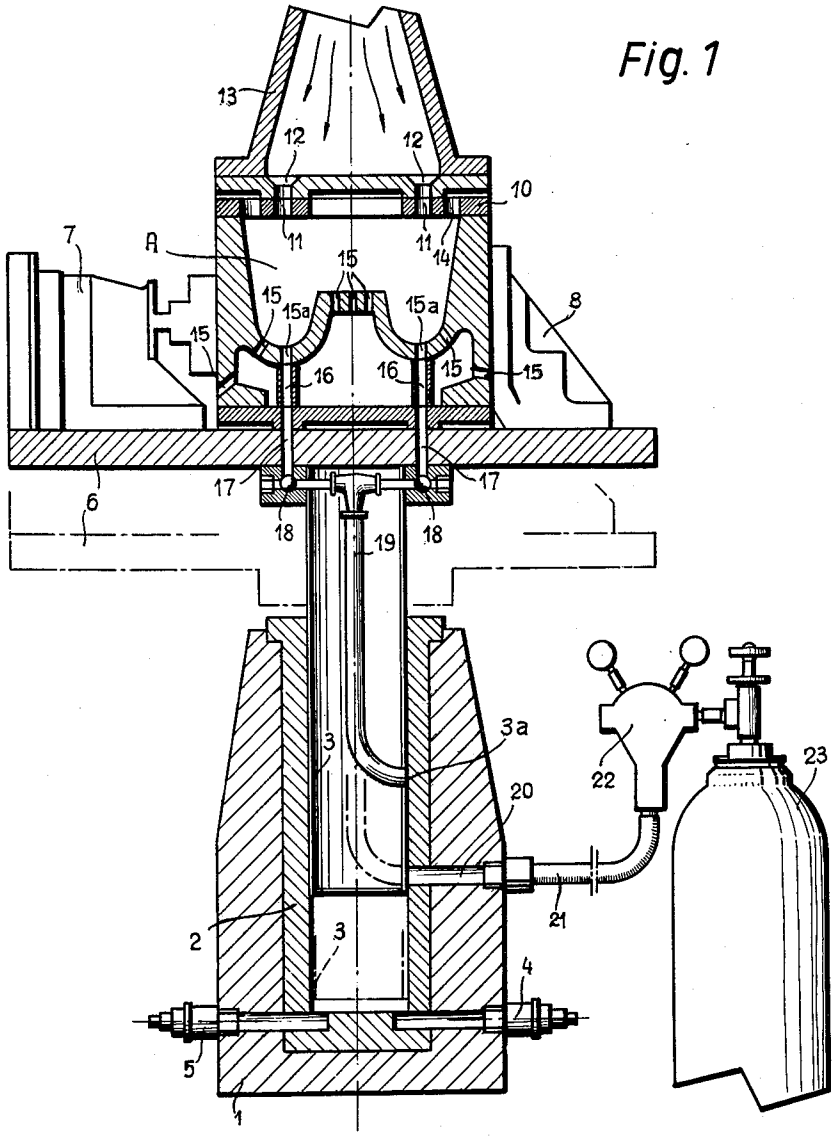
April 24, 1962 C. CHIABOTTI 3,030,675

FOUNDRY MACHINE

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Fig. 1



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FOUNDRY MACHINE

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Fig. 3

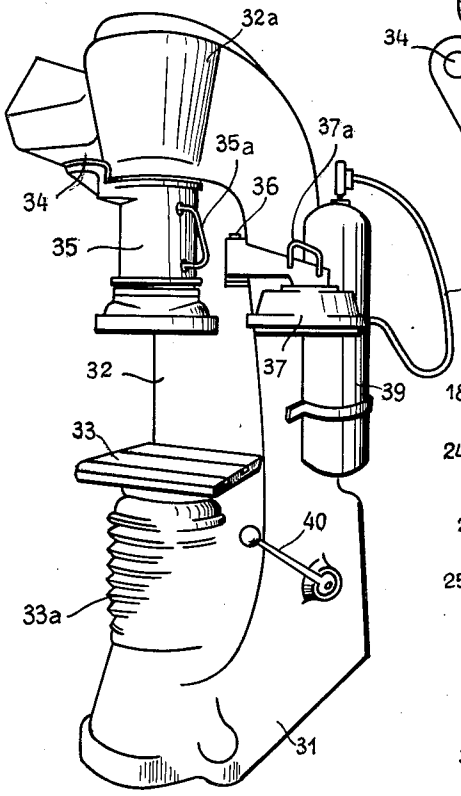


Fig. 4

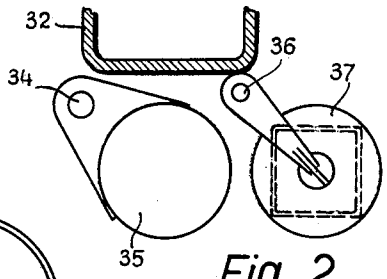


Fig. 2

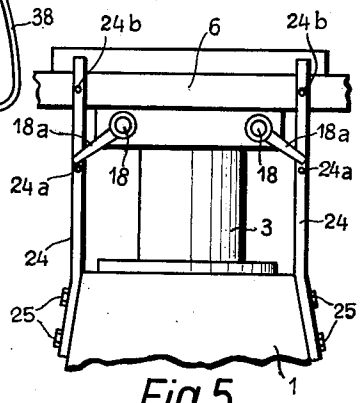
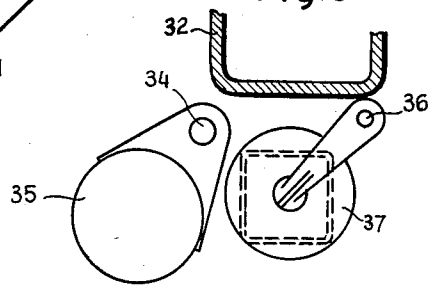


Fig.5



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FOUNDRY MACHINE

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Fig. 6

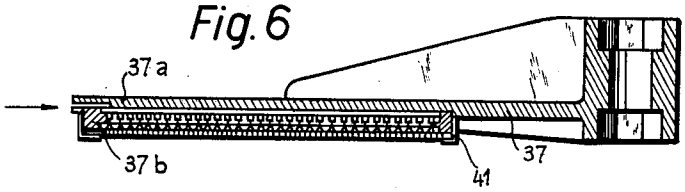


Fig. 7

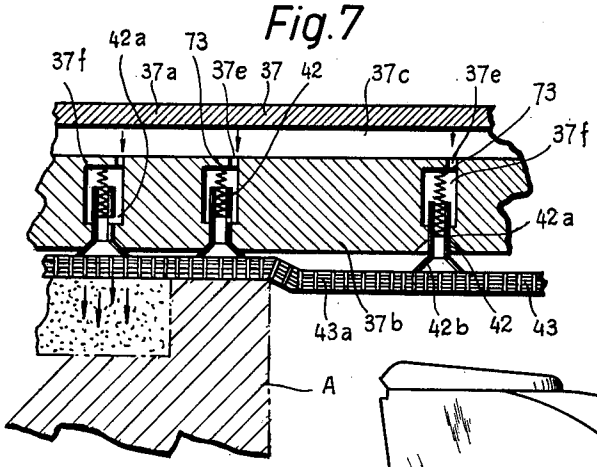
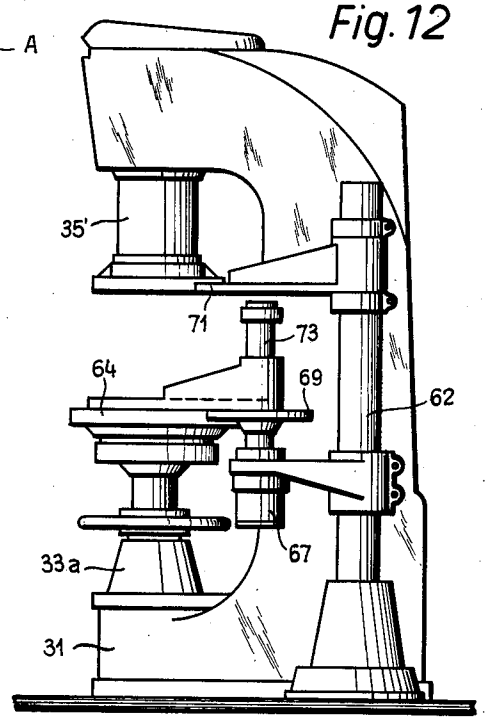


Fig. 12



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FOUNDRY MACHINE

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Fig. 9

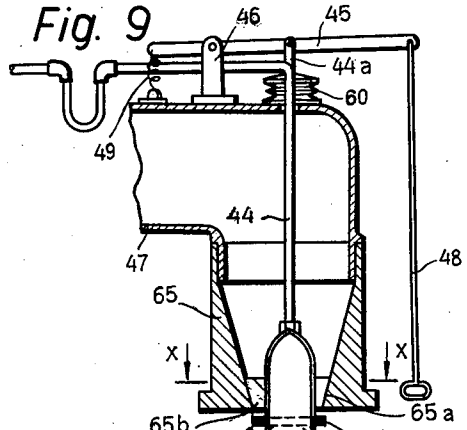


Fig. 8

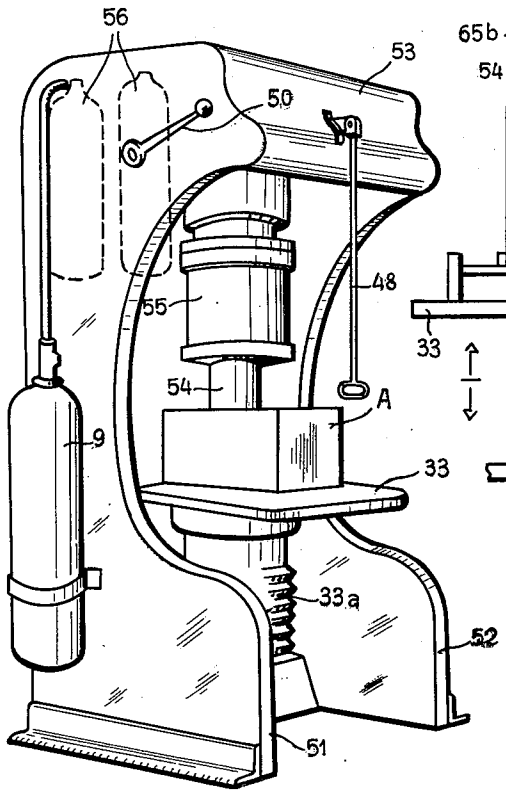
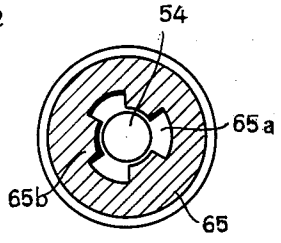


Fig. 10



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Fig. 11

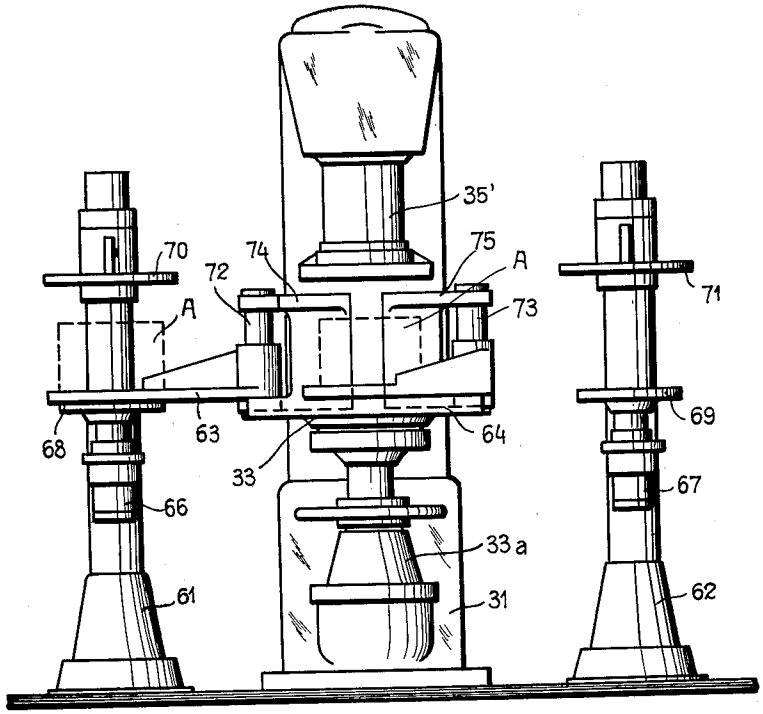
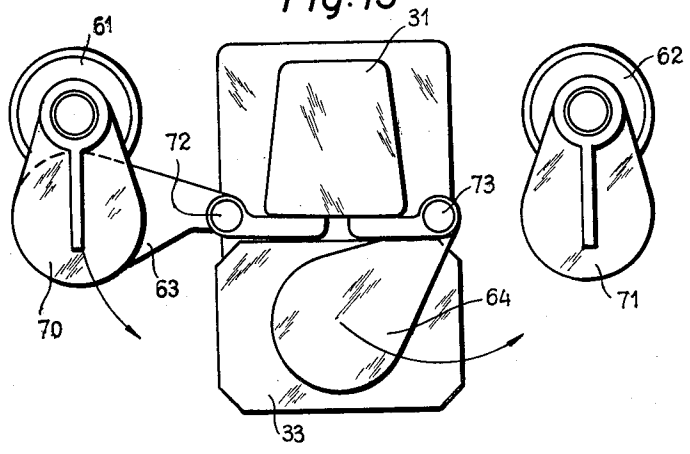


Fig. 13



United States Patent Office 3,030,675 Patented Apr. 24, 1962

3,030,675

FOUNDRY MACHINE

Cesare Chiabotti, Turin, Italy, assignor to Applicazione Lavorazione di Basi Oleochimiche S.p.A., S. Ambrogio, Via Pautassi, Italy, a corporation of Italy

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Claims priority, application Italy Oct. 22, 1954
2 Claims. (Cl. 22—36)

This machine relates to a machine for moulding foundry cores and moulds of the type employing sand admixed with substances hardening as they come into contact with fluids chemically combining therewith.

It is the object of this invention to perform successively on one or more core boxes the steps of blowing the sand by compressed air jets and rapidly hardening the core or mould by instantaneous diffusion of said active fluids in the admixed sand in a fully automatic synchronised manner, thereby effecting a considerable saving in time, work and equipment as compared with methods presently in use for performing the said steps.

The active fluids normally comprise substantially carbon dioxide, to which reference shall be made hereafter.

The invention shall be described with reference to the accompanying drawings given by way of non limiting example, wherein:

FIGURE 1 is a part vertical cross sectional view of a first embodiment,

FIGURE 2 is a detail view of FIGURE 1,

FIGURE 3 is a perspective view of a second embodiment,

FIGURES 4 and 5 show in horizontal cross section a detail of FIGURE 3 in two different operating conditions,

FIGURE 6 is a cross sectional view of the device for blowing carbon dioxide into the moulds,

FIGURE 7 is a detail view of FIGURE 6 on an enlarged scale,

FIGURE 8 is a perspective view of a third embodiment of the machine according to this invention,

FIGURE 9 is a cross sectional view of a detail of FIGURE 8,

FIGURE 10 is a cross sectional view of FIGURE 9 on line X—X,

FIGURE 11 is a front view of a fourth embodiment,

FIGURE 12 is a side view of FIGURE 11, and

FIGURE 13 is a plan view of FIGURE 11.

Referring to the construction shown in FIGURES 1 and 2, 1 denotes the foundation of the machine in which a piston 3 is slidably mounted in a cylinder 2. The piston is driven by compressed air from an inlet 4 which is discharged through an outlet 5.

The piston 3 carries at its upper end a platform 6 carrying clamps 7 and 8 for clamping the core box A. The core box A has superimposed thereto a delivery plate 10 formed with a plurality of bores cooperating with bores 12 in the head of a bell 13 which supplies under the powerful action of compressed air sand mixed with suitable binders to the core box. The plate 10 is formed with a further set of bores 14 discharging air to the outside, while retaining the sand. The core box A is further formed with bores 15 for discharging air.

Out of the bores 15 the bores 15*a* connect through conduits 16 in the core box and conduits 17 in the platform 6 with cocks 18 which according to their position establish communication between said ports and the outside or a collector pipe 19 within the piston 3 connecting with a port 3*a* in the lateral surface of the piston.

In the position shown in full lines on the drawing, in which the platform 6 is lifted, the bore 3*a* is covered by the wall of cylinder 2; in the position shown by dash-and-dot lines, in which the platform 6 is lowered, the port 3*a* registers with the orifice of a conduit 20 extending through the cylinder 2 and foundation 1. The conduit connects with a piping 21 leading over a pressure reducing valve 22 to the bottle 23 filled with carbon dioxide.

In the embodiment shown the conduits 16 discharge air during injection of sand by means of compressed air and blow in carbon dioxide. Alternatively, separate conduits could be provided for filling these two purposes.

The cocks 18 can be automatically controlled by the device shown in FIGURE 2.

Rods 24 are secured by means of screws 25 to the sides of the foundation 1, each rod 24 being provided with a lower pin 24*a* and a top pin 24*b* adapted to cooperate with levers 18*a* keyed to the shaft of the three-way cocks 18.

In the position shown on the drawings, conduit 16 connect with the outside. On lowering of the platform the pins 24*a* engage levers 18 and cause the cock spindle to rotate, whereby conduits 16 are connected with the conduit 19. On rising of the platform 6 the pins 24*b* engage levers 18*a* and rotate them back to the position shown in FIG. 2.

Of course, when conduits 16 do not perform the double task of discharging air and injecting carbon dioxide, the three-way cocks 18 could be replaced by ordinary cocks which merely control the flow of carbon dioxide to the core box.

The machine operates as follows.

During the first step (blowing sand) the platform 6 is in its lifted position and compounded sand is injected into the inner chamber in the core box A.

Compressed air is discharged to the outside through ports 14, 15 as well as through ports 15*a* over conduits 16, 17 and cocks 18.

During the second step (quick setting of the mould) the platform 6 is lowered, on discharging air from the cylinder 2 through the outlet 5.

At the end of the downward movement of the platform, that is, in the position shown by dash-and-dot lines, the automatic controls shown in FIGURE 2 have already switched on the two three-way cocks 18, thereby connecting conduits 17 to the pipe 19. At the same time the bore 3*a* in the cylinder 3 comes opposite the conduit 20, whereby carbon dioxide from the bottle 23 after undergoing a reduction in pressure by the valve 22 reaches through ports 15 the inner chamber in the core box A, and rapidly hardens the core which on being removed from the core box A is ready for use in casting.

In the embodiment shown in FIGURES 3 to 5, 31 denotes a foundation carrying a column 32 cast integrally therewith.

33 denotes a platform carrying the core box capable of vertical displacement with respect to a standard 33*a*. The displacement of the platform 33 is effected from an operating lever 40 by means of devices not shown, as they are similar to those described with reference to FIGURE 1.

A bell 35 adapted to blow the sand mixture into the core box resting on platform 33 and a delivery plate 37 adapted to supply carbon dioxide admixed with other gases, if desired, are mounted for oscillation about vertical pivots 34, 36 on the head 32*a* of the machine. The plate 37 is connected by a hose 38 to a pressure gas reservoir 39.

The bell 35 and delivery plate 37 are provided with handles 35*a*, 37*a*, respectively, for oscillating them about pivots 34, 36.

In the position shown in FIGURES 3 and 4 the bell 35 is superimposed on the core box and compounded sand can be blown. On completion of blowing the platform 33 is lowered by acting on the lever 40, the bell 35 and

plate 37 are swung to bring the delivery plate 37 over the core box which is raised again.

Gas from reservoir 39 is now supplied to the core box, thereby readily hardening the mixture therein contained.

FIGURES 6 and 7 are cross sectional views of an embodiment of the delivery plate 37. The plate is divided, the plate halves 37*a*, 37*b* being held in position by means of bracket 41 with a clearance 37*c* therebetween to which carbon dioxide is supplied by means not shown on the drawing. The plate half 37*b* is formed with a plurality of holes 37*e* connecting with chambers 37*f* in which valve members 42 slide against the action of springs 73.

The valve members 42 are hollow, a hole 42*a* being bored in the wall thereof. The valve members 42 end by a bell-shaped portion 42*b*.

A sheet 43 of flexible permeable material, such as semi-hard rubber or Vinylite having holes 43*a* bored therethrough is arranged underneath the bell-shaped portions 42*b* of the valve members 42. When the core box A comes into contact with the sheet 43 on rising of the plate 33, the sheet 43 is raised together with the valve members 42. The gas from the clearance 37*c* is now free to flow through holes 37*e*, chambers 37*f*, holes 42*a*, bells 42*b*, holes 43*a* and is injected into the sand mass.

With this arrangement carbon dioxide is automatically injected into the foundry sand and one and the same delivery plate can be employed for different core boxes, on account of the fact that carbon dioxide merely escapes through the holes bored in the portion of sheet 43 abutting the sand mass.

The modification shown in FIGURES 8 to 10 relates to a machine which can be used for manufacturing cores of considerable weight, which can be lightened by providing a central hollow. The machine comprises two sheet metal side walls 51, 52 of curved profile and a head 53 carrying the control lever 50.

The device for delivering the hardening gas comprises a plug 54 extending through the bell 65 blowing the sand mixture.

The plug 54 in addition to supplying gas forms a lightening recess in the core contained in the core box A secured, as in the previously described constructions, to the platform 33 capable of vertical upward movement.

The plug 54 carries a packing 55 of soft rubber or the like which, on completion of the blowing of sand mixture seals against the fitting for the gas blowing device before hardening of the core starts.

The packing 55 is also adapted to seal by a small lift the injection ports 65*a*, thereby keeping the hardening gas against reaching the inside of the bell 65 and hardening the fresh sand mixture which would prevent further operation of the machine.

The plug 54 is guided by means of wings 65*b* formed within the port 65*a* and is controlled by a tube 44 provided with a wing 44*a* pivoted to a beam 45 pivotally connected to a bracket 46 mounted on an inlet conduit 47 for the compressed air-sand mixture.

The beam 45 is manually operated by means of a rod 48 and is held in a position in which the packing 55 seals ports 65*a* through a spring 49.

A bellows 60 seals the opening through which tube 44 passes.

The head 53 encloses a decarbonating drying device 56 for the compressed air employed for blowing the sand mixture.

The purpose of this device is to remove carbon dioxide from air by an alkaline washing step and further to remove moisture carried along during washing by a low-grade alkaline solution. This avoids a further cause for hardening of the sand mixture in the bell, which might prejudice operation of the machine.

The modification shown in FIGURES 11 to 13 affords an improved efficiency of the machine, inasmuch as during blowing of carbon dioxide into a mold, sand is blown into a further mould.

With this object in view the machine comprises as usual a foundation 31, a table or platform 33 and mechanism 33*a* for lifting the said platform. The sand blowing device 35′ is secured in this case to the machine foundation.

Two injection plates 70, 71 for the carbon dioxide are provided and are fixedly held in the pillars 61, 62.

The machine further comprises members 74, 75 for supporting columns or rods 72, 73 respectively on which platforms or supports 63, 64 carrying core boxes are pivotally mounted capable of vertical displacement axially of the rods and oscillation hereinafter described.

The platforms 63, 64 can be oscillated between a position in which the core box carried thereby is underneath the sand blowing device 35′ and a further position in which the core box is under the carbon dioxide blowing device 70 or 71.

The core boxes are brought into contact with the sand blowing device by means of a hydraulic jack 33*a* or with the carbon dioxide blowing devices by means of hydraulic jacks 66, 67 and which lift tables 68 and 69 respectively. It being understood that the supports 63 and 64 are oscillatable between positions overlying the table 33 so that they can be raised thereby and when lowered the supports 63, 64 can be positioned overlying their respective tables 69, 68 for lifting thereby.

In the embodiment shown the platforms 63, 64 are oscillated by hand and automatically lifted along pillars 72, 73. Alternatively, in a manner within reach of experts in the branch the platforms could be automatically oscillated and means could further be provided for automatically performing the successive steps of sand blowing and carbon dioxide blowing.

What I claim is:

1. Machine for molding foundry cores and molds by means of sand admixed with substances hardening as they come into contact with active fluids chemically combining therewith, comprising a pair of boxes for molding the cores and molds, an inlet for the sand mixture in each box, means for blowing sand into said inlet, a pair of platforms each adapted to carry a box, vertical pivot means supporting each platform for sliding and oscillating thereon, means for raising said platforms to bring the box carried thereby into cooperating relationship with the sand blowing means, a pair of columns arranged on opposite sides of said sand blowing means, a blowing device for the active fluids carried by each column, a bearing surface for each column, means for vertically lifting said bearing surface, each of said platforms being capable of performing a vertical translation movement and of oscillation between a position in which the box carried thereby underlies the sand blowing means and a position in which said box underlies one of said blowing devices, the platform in the latter position being supported by said bearing surface.

2. In a core and mold blowing apparatus comprising, in combination, a first standard having a table thereon operable between a lowered and a raised position, at least a second standard disposed spaced from said first standard and having a second table operable between a lowered and a raised position, a plurality of like boxes for molding cores and molds therein, at least one core box support for releasably supporting individual boxes thereon disposed pivotally mounted on said first standard and movable to a position overlying the first table and to a position extending outwardly of said first table and said first standard and overlying said second table, means on said first standard comprising a rod for pivotally mounting said support thereon with said support being disposed thereon for upward and downward movement axially of said rod alternatively under control of said first and said second table, a sand blowing device on said first standard disposed over said first table and vertically spaced therefrom, said device having an opening for blowing a hardenable sand mixture therethrough into a core box when lifted with said support by said first table into engage-

ment with said device so that said opening registers with the core box on the support, means operable for blowing a hardenable sand mixture into the core box when said first table is in a raised position lifting said support and the core box thereon, means for selectively operating said first table between said lowered and raised positions to raise the table with an empty core box for filling with sand and to lower it subsequent to its being filled thereby to position said support in a lowered position so that it can be moved to a position overlying the second table while in a lowered position and with a sand filled core box thereon, means on said second standard for blowing carbon dioxide into a filled core box subsequent to its being filled with sand to harden the sand mixture therein, said last mentioned means being disposed spaced vertically from and over said second table, means for selectively operating said second table independently of said first table and for operating it from a lowered position with said support overlying it with a sand filled core box

thereon to a raised position so that said filled core box engages said carbon dioxide blowing device thereby to blow carbon dioxide into the sand filled core box while in said raised position.

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