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(54) Foundry flaskless moulds moulding installation.

(57) The moulding installation comprises an air impact and pressing moulding machine (1) having a small number of moulding boxes (2) such that the said boxes are only used at the pressing, striking, flattening, cores placement, tipping and closure stations, after which and with the assistance of a manipulator (7), the sand moulds (5) are removed from the boxes (2) and the latter return empty to the moulding machine (1) whilst the moulds, now flaskless moulds, move on to the casting (14), cooling (16) and striking (22) stages, it being envisaged that during the casting stage (14) and in order for the flaskless mould to remain closed against the ferrostatic pressure generated by the molten metal, each flaskless mould be provided with a counterweight or sleeve (12) fitted by a unit (11) and removed by another unit (15) just before entering the cooling area (16).

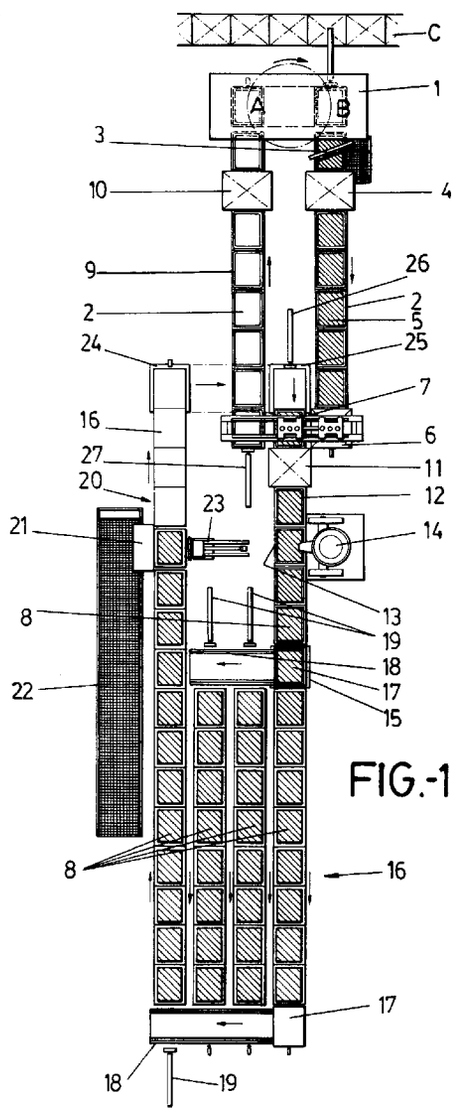

FIG.-1

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OBJECT OF THE INVENTION

The present invention relates to an installation used in moulding foundry motes, incorporating improvements designed to substantially reduce the costs in such installations, without impairing the performance or operating characteristics thereof.

BACKGROUND OF THE INVENTION

It is a known fact that in installations for casting metals in particulate moulds, for instance sand moulds, two groups are distinguished, one using moulding boxes and another where the mote or sand mould is obtained directly in the absence of a moulding box.

In the first instance, the sand mould remains at all times inside a metallic box, namely a moulding box, where the entire processing operation is effected, in other words producing the sand mould, striking, cores placement, casting, cooling, and so forth.

Such arrangement determines the need for installations of this sort and in order for the process to be continuous, that is without idle time, to have a large number of moulding boxes available, above all bearing in mind that the cooling time is long and that a large number of boxes accumulate in this area.

The large number of moulding boxes required and the high cost they entail means that their incidence in the investment overheads of the installation at issue is remarkable.

Another kind of installations for casting metals use extremely complex and costly machines, with highly sophisticated technology, to produce the sand moulds directly, without boxes, termed "motes" and provided in lines of pallets or the like which are handled directly throughout the foundry process.

Though this type of installations avoid the investment costs inherent in moulding boxes, these savings are set off by the cost of the machines producing the motes, which by far exceeds that of machines capable of manufacturing the moulds within moulding boxes, moreover supplemented with the cost of the complex and thorough maintenance which such mote producing machines demand.

DESCRIPTION OF THE INVENTION

The improvements subject of the invention fully solve the above problems, presenting a hybrid solution which initially uses air impact moulding machines of a rather low cost, above all as compared with the cost of a mote manufacturing machine, which air impact moulding machine is obviously provided with moulding boxes, but singular in that the said moulding boxes are used only at the pressing, striking, flattening, cores placement, tipping and closing stations, after which the mould continues to travel along the rest of the installation freely, that is as a mote, thereby to considerably lower the number of moulding boxes required, which number could even be twenty times smaller than that required for a conventional air impact moulding facililty.

Furthermore and in accordance with yet another feature of the invention, it is conceivable that upon eliminating the moulding boxes, the latter be replaced by metallic sleeves or cases, small in number inasmuch as they will also be in use for a short space of time, specifically at the stage when the molten metal is poured and until such a time as it solidifies and the ferrostatic pressure it exerts disappears, which can take up a further three or four steps in the installation's operating line, and thus nor do these sleeves bear a significant influence upon the cost thereof.

DESCRIPTION OF THE DRAWINGS

In order to provide a fuller description and contribute to the complete understanding of the characteristics of this invention, a set of drawings is attached to the specification which, while purely illustrative and not fully comprehensive, shows the following:

Figure 1.- Is a diagrammatic plan view of a given practical embodiment of a foundry motes moulding installation constructed in accordance with the improvements subject of the invention.

Figure 2.- Is a diagrammatic side elevation and sectional view of a special motes moulding box required to put the said improvements into effect.

Figure 3.- Is, finally, the view of figure 2 showing one of the counterweights or sleeves required to take up the ferrostatic pressure generated by the metal upon being poured from the casting ladle into the mould and until it solidifies.

PREFERRED EMBODIMENT OF THE INVENTION

In light of the above figures and in particular figure 1, it is clear that a foundry motes moulding installation constructed in accordance with the improvements subject of the invention is based upon a machine (1) for moulding sand in metallic boxes (2), as shown in detail in figure 2, which moulding machine can be provided with a rotatory table with two stations, station A where the mould is filled and compacted, and station B where pressing and striking take place, that is, the moulding plate is removed such that the upper and lower half-moulds are already provided with the basrelief or recessed figure which when placed over one another shall define the ultimate shape of the part to be obtained, the said moulding machines (1) being fitted with fast moulding plates changeover equipment C.

Right next to the moulding machine is an apparatus (3) for flattening the face opposite the indent or figure obtained in the mould. Next, a unit (2) is pro-

vided for tipping and milling the sprue. Next, a station (5) is provided for placement of cores, if required, in the lower half-box, which station takes up a small number of moulding boxes (2), in particular four or five.

A closing unit (6) is then provided, where the boxes are closed or assembled, and thus the mould is closed, specifically when the upper half-mould is placed over the lower half-mould, to which end the box incorporating the upper half-mould, which arrives at the sprue milling operation with the flat portion downwards, is naturally tipped in order that the figures in both half-moulds match and meet one another.

Up to this stage, the installation matches any conventional installation using an air impact moulding machine.

Next, and now in accordance with the improvements subject hereof, the installation turns from a casting installation working with boxes to a casting installation working with motes. In particular, at each station (7) a manipulator removes the sand mould, that is the mote (8) from the moulding box (2) such that the said empty moulding boxes (2) return along the line (9) to the moulding machine (1), a box tipping unit (10) standing in the way back (9), whereas the motes (8) move on to a unit (11) which provides the said motes with sleeves or counterweights (12), shown in detail in figure 3, from which unit the motes move towards the casting ladle (14), through the line (13), where they are provided with the relevant metal batch. The line (13) is relatively short, with only four or five spaces, enough for the metal to solidify and for the ferrostatic pressure generated thereby, and which tends to separate both half-moulds making up the mote (8), to disappear, which line (13) ends in a unit (15) which removes the said sleeve (12).

The motes (8), upon becoming such elements, that is when they leave the moulding boxes (2), are deposited upon pallets (16) and there provided with the sleeves (12), being supported by the same when such sleeves (12) are removed at the stripping unit (15), moving on to the cooling area (16) where they remain for a considerable space of time and which they enter with the assistance of transfer cars (17) mounted upon guides (18) and which are fitted with drivers (19).

At the exit from the cooling area (16) a line (20) is defined wherein a station (21) is provided for the motes to leave laterally towards a striking grate (22) driven by a lateral driver (23), whilst the empty pallets (16) continue to move forward towards a transfer car (24) which moves the same towards the entrance area (25) from which a driver (26) places the same under the manipulator (7) which shall again deposit a mote upon each pallet and in turn eliminate or release the moulding box in which the latter is located, whereupon the installation's working cycle comes to a close, that is whilst the pallet carrying the mote again moves to the line (12) to receive the discharge of the casting ladle (14), the empty moulding box (2) starts on the return path (9) driven by a driver (27).

It only remains to be said finally that, as shown in figure 2, the moulding boxes (2) used are special, cup-shaped in order to expedite their disengagement from the mote when activated by the manipulator (7) and that, similarly, the sleeve or counterweight (12) which must keep the mote closed against the metal's ferrostatic pressure, has the same cup shape, as can in turn be observed in figure 3.

We feel that the device has now been sufficiently described for any expert in the art to have grasped the full scope of the invention and the advantages it offers.

The materials, shape, size and layout of the elements may be altered provided that this entails no modification of the essential features of the invention.

The terms used to describe the invention herein should be taken to have a broad rather than a restrictive meaning.

Claims

1.- A foundry mote moulding installation, essentially characterised in comprising the use of an air impact and press moulding machine, but which is provided with a small number of special moulding boxes, cup-shaped to enhance their disengagement from the relevant mould, which disengagement takes place once the pressing, striking, flattening, cores placement, tipping and mould closure stations are left behind, whenceforth and with the assistance of a suitable manipulator the moulding boxes are relieved of the relevant moulds and return to the moulding machine, whilst the emergent moulds, now motes, run through the rest of the installation, in particular through the stages in which they are provided with the metal from the casting ladle and above all the cooling stage, which takes longest, in the absence of such moulding boxes, the provision of a supplementary unit being envisaged just before the casting ladle to place respective counterweights or sleeves upon the motes, holding the two half-moulds of the mote together against the ferrostatic pressure exerted by the liquid metal until it solidifies, which sleeves or counterweights are released from the motes just a few steps after the casting ladle by a stripping unit and recycled to the placement unit, the motes remaining upon pallets which are emptied after running through the cooling area onto a striking grate, whereupon the said pallets return to the area where the moulding boxes are disengaged from the respective motes.

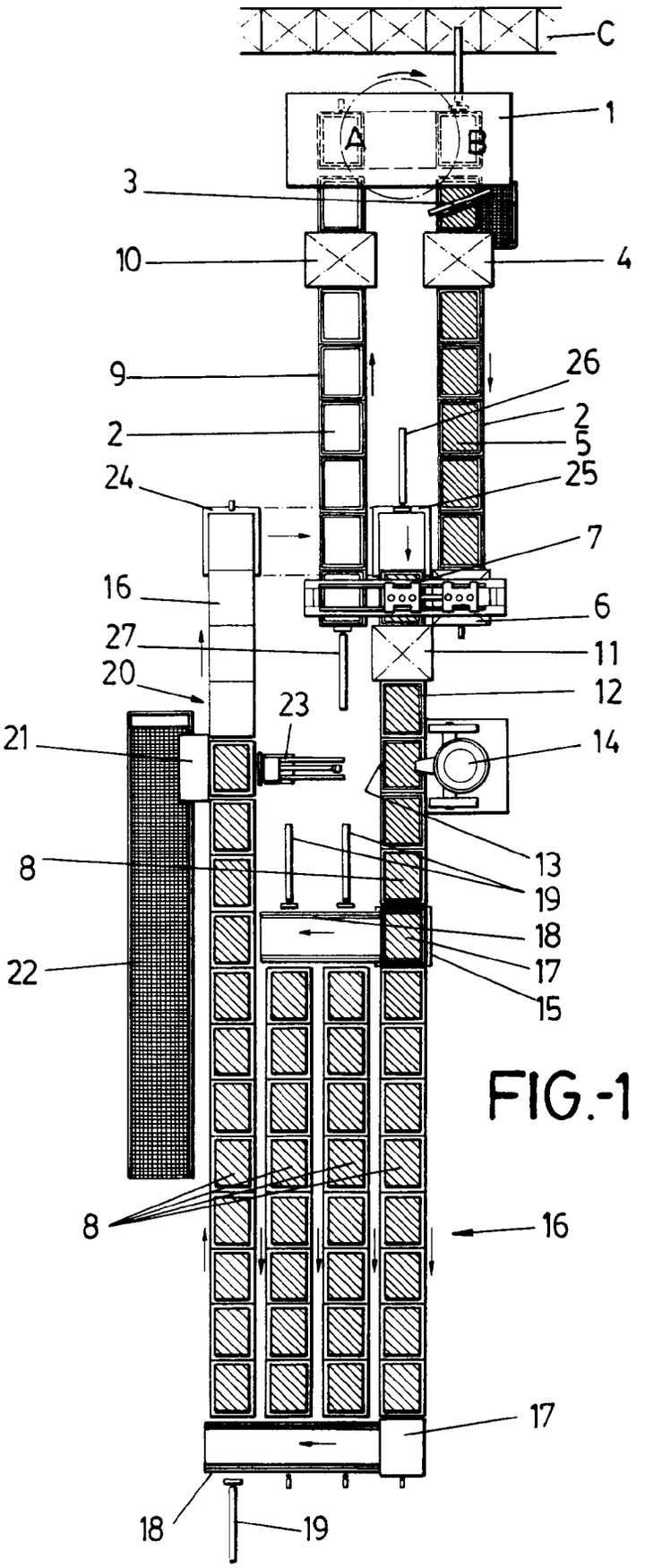
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FIG.-1

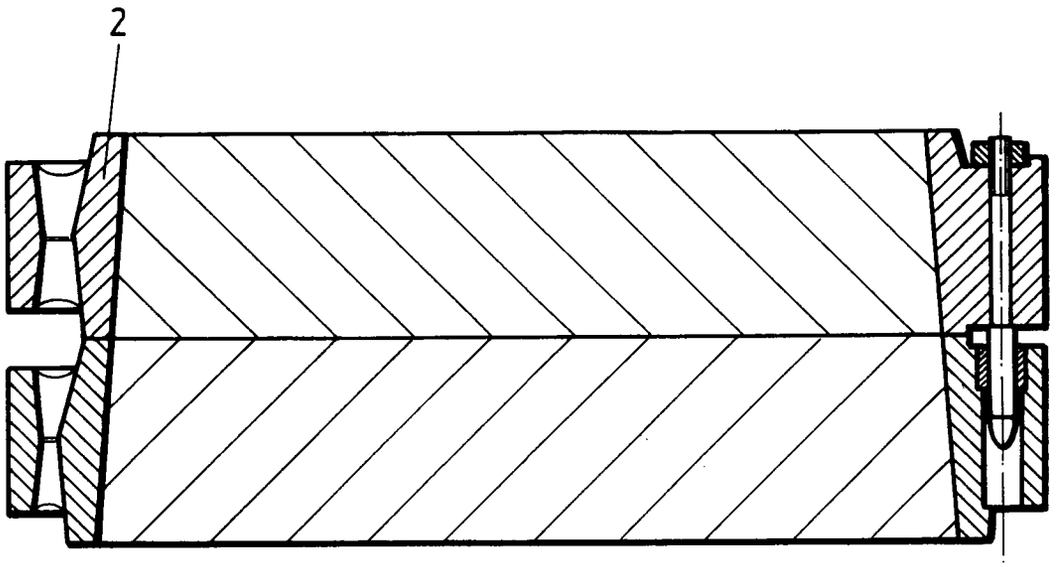

FIG.-2

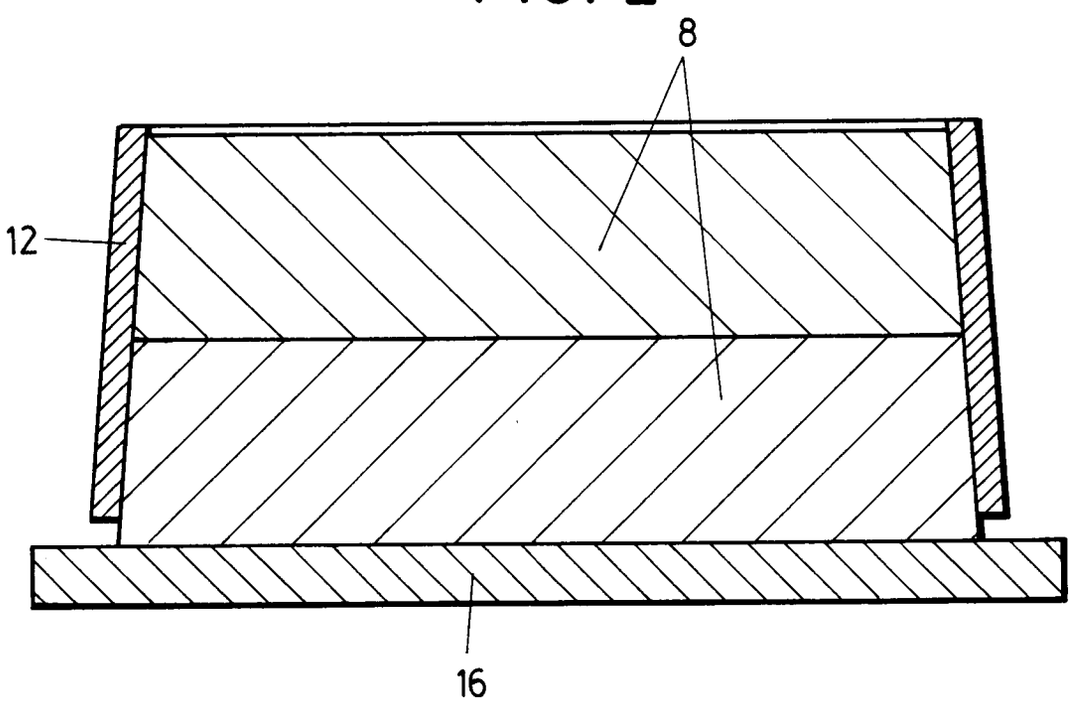

FIG.-3

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EUROPEAN SEARCH REPORT

Application Number

EP 92 50 0028

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A	FR-A-1 147 675 (PINCHON) 11 June 1957 * whole document *		B22D47/02
A	US-A-3 630 268 (HATCH) 28 December 1971 * abstract * * column 4, line 70 - column 5, line 65 * * figures 13-25 *		
A	DE-A-3 241 288 (BMD BADISCHE MASCHINEFABRIK DURLACH GMBH) 10 May 1984 * page 14 - page 18 * * figures *		
A	FR-A-2 635 702 (GEORG FISCHER AG) 9 March 1990 * page 1, line 20 - page 2, line 18 * * claims 1,4 *		
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			B22D B22C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	07 JULY 1992	RIBA VILANOVA M.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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