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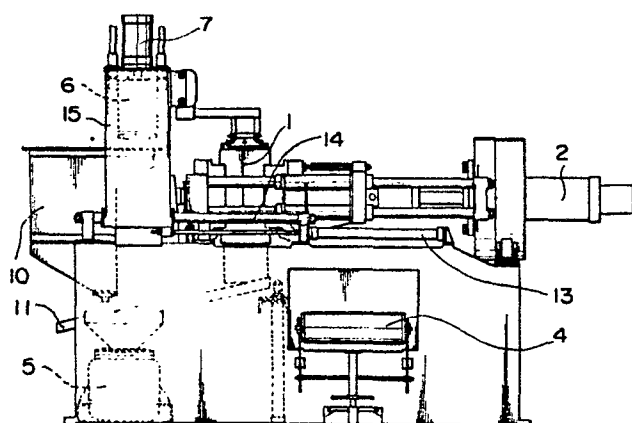
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54 **Machine à mouler par soufflage, laissant à découvert la partie supérieure d'une boîte à noyaux et son mécanisme de remplissage de sable de moulage faisant usage de l'action de dépression de la tête de tir.**

57 A top-blow molding machine wherein the upper portion of the core box assembly (1) is always opened, and a blow head (6) is pressed against the upper surface of said core box assembly only when the molding sand is top blown. The sand feeding mechanism comprises a sand feeding tank (5) communicating with a compressed air supply through a duct having a feed and exhaust valve (9) and is coupled, through a flexible hose (12) or a fixed duct, with a blow head communicating with said compressed air supply through a duct having a blow valve (8). The molding sand can be automatically fed to the blow head by taking advantage of the difference of internal pressure between the blow head and the sand feeding tank, without providing a molding sand hopper on the above of the machine frame.

FIG.1



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A TOP-BLOW MOLDING MACHINE OF THE TYPE ALWAYS OPENING THE UPPER PORTION OF A CORE BOX ASSEMBLY AND A MOLDING SAND FEEDING MECHANISM OF USING AN EXHAUSTING ACTION OF THE BLOW HEAD

This invention relates to a top-blow molding machine of the type in which the upper portion of a core box assembly is always open without being equipped with an upper frame or any other mechanisms, and to a molding sand feeding mechanism of using an exhausting action of the blow head.

(1) Mechanically, known molding machines are always provided in their upper portion of a core box assembly with an upper frame, a press cylinder, a molding sand hopper and the like, and the blow head travels being suspended by rails or the like provided on the upper frame, between the sand feeding position and the lower portion (the upper portion of the core box assembly) of said press cylinder, and the blow head is pressed against the upper surface of the core box by the press cylinder thereby carrying out a blowing operation.

(2) In the molding technics of molds the molding system such as roll-over system (or damping system) has already become a classic system. As another classic system is known a shell molding machine in which the core box assembly is additionally provided with a molding sand tank, the mechanism is turned 180° to effect a molding, and any mechanism is not provided above the core box assembly.

Since in the system (1) above structure always exists above the core box assembly it is difficult to replace the core box. To solve this problem, there were designed a mechanism where the core box assembly or the entire vise apparatus is traversed in the lower portion of the upper frame, and other various mechanisms. However, it is known that not only the mechanism becomes complicated but also it necessitates a large area for installing the molding machine thereby presenting various problems.

On the other hand, the system (2) above is a roll-over system, it is not applicable to all kinds of molding systems, it has demerits in sand feeding and other matters, and it is unsuitable for a continuous molding operation.

We, the inventors of this invention, have made extensively our research and experiments in an attempt to solve the abovementioned problems, and as a result we have been successful in developing the present invention. The technical constitution of the invention lies in a top-blow molding machine of the type always opening the upper portion of a core box assembly, characterized in that the upper portion of the core box assembly is always opened, and only when the molding sand is top blown the blow head can be pressed against

the upper surface of said core box assembly. Further, the present invention is characterized by a mechanism in which a sand feeding tank communicating with a compressed air supply through a duct having a feed and exhaust valve is connected through a flexible hose to the blow head communicating with the compressed air supply through a duct having a blow valve, and the molding sand can be automatically fed to the blow head while taking advantage of the difference of internal pressure between the blow head and the sand feeding tank, without providing a molding sand hopper on the above of the machine frame. This automatic feeding mechanism of molding sand can be applied to other types of molding machines, not limited to said molding machine.

The invention will now be described more in detail, by way of one embodiment, with reference to the accompanying drawings in which

Fig. 1 is a front view showing one embodiment of the molding machine of the invention;

Fig. 2 is an elevation of the right side in Fig. 1;

Fig. 3 is a plan view of Fig. 1; and

Fig. 4 is a flow sheet for feeding molding sand and of a top-blow mechanism.

The molding machine as shown is a vertically-split molding machine of the turning, sand-discharging type. Reference numeral (1) designates a core box assembly consisting of a fixed side core box and a movable side core box, reference (2) a clamping cylinder, reference (3) a downward cylinder of the movable side core box, and reference (4) an unloader apparatus, respectively. These devices are operated in known manners.

Reference numeral (15) designates a traverse frame of reversed U-model for a blow head, on the upper surface of which frame (15) a press cylinder (7) is placed, and in the bottom surface of the reversed U-model of which frame (15) there is supported, as shown, a blow head (6) which vertically moves by the press cylinder (7). Further, both the legs of the traverse frame (15) of said reversed U-model are placed slidably and traversably on blow head traverse guide rods (14) provided in parallel at both the sides of the core box assembly, the traverse frame (15) of the reversed U-model is transferred to the above of said core box assembly (1) by the action of a blow head traverse cylinder (13) whereby said frame (15) is fixed there, and the blow head (6) is pressed against the upper surface of the core box by the action of the press cylinder (7) to allow the top-blow operable. Then, the blow

head (6) is retracted from the upper portion of said core box assembly when the upper portion is made open (a state where any member of the present molding machine does not exist) whereby replacement of the core box and other necessary working can be accelerated.

One embodiment of the above mechanism of the present molding machine will now be schematically described below.

The core box assembly (1) is opened and closed by the clamping cylinder (2). A core is discharged by directing the movable side core box downward by the downward cylinder (3) thereby to shift the mold to the unloader apparatus (4). An intermittent pressurizing blowing is adopted as a blowing system, the sand feeding tank (5) and the blow head (6) are coupled by a flexible hose (12) of large aperture, and then sand is charged and the blowing is pressurized by air. The blow head (6) and the press cylinder (7) are transferred to the upper portion of the core box assembly by the action of the blow head traverse cylinder (13), then the blow head (6) is pressed against the core box by the press cylinder (7) when sand is blown (top-blow system) into the core box by the action of a blow valve (8), and a mold is molded according to ordinary process.

By actuating the blow valve (8) after the finishing of the blowing the blow head is internally exhausted and it is raised and traversed for retraction to its waiting position. At the exhaustion time of the blow head (6), molding sand is fed under pressure into the blow head (6), by air stream, from the pressure-continuing sand feeding tank (5), and sand is thus supplemented.

Fig. 4 shows a flow sheet of molding sand feeding and a top-blow mechanism. The blow head (6) is communicated with the sand feeding tank (5) through the flexible hose (12), and further, the blow head and the sand feeding tank are communicated with a compressed air supply (not shown) through the blow valve (8) and the feed and exhaust valve (9) respectively. By exhausting only the blow head (6) sand is automatically fed from the sand feeding tank (5) under pressure. Preferably, the interior of the sand feeding tank (5) is released from pressurizing by using a timer-control mechanism or the like after the completion of sand feeding to the blow head (6).

Though sand is fed from a hopper (10) into the sand feeding tank (5), the interior of the sand feeding tank is maintained under atmospheric pressure at the time of this sand feeding.

The sand which has been reversed and discharged from the core box is returned to the sand feeding tank (5) by a molding sand discharging chute (11).

In the above embodiment, the flexible hose

(12) is used for the communication between the blow head (6) and the sand feeding tank (5). However, in the case of a molding machine of such construction that the blow head is fixed while the core box assembly is movable, said flexible hose can be a fixed duct. Additionally, the present molding sand feeding mechanism is not limited to use to a molding machine having a top-blow mechanism and it can be applied even to a molding machine having a side-blow or under-blow mechanism with a little modification to the arrangement of said members.

As described above, according to the present invention, sand is fed from the lower portion to the blow head by taking advantage of the difference of pressure between the blow head and the sand feeding tank at the exhaustion time of the interior of the blow head, so that it is possible to install the hopper (10) comparatively at a low position thus enabling the mechanism to be simplified over known sand feeding mechanisms.

The invention has been described above in respect of one embodiment of the shell molding machine. However, it will be clear to the skilled in the art that the invention is applicable to molding of not only shell molding system but also dry sand system or wet sand system, by slightly modifying the mechanism suited for each system.

Furthermore, in the above embodiment the invention has been described with reference to an "intermittent pressurizing" system, but it is possible to apply the present molding machine even to a molding by blowing under an always-pressurizing system, by modifying and changing a little the blowing system of molding sand.

The effects of the invention can be mentioned as follows:

(1) Since the upper portion of the core box assembly is open, core boxes can be easily mounted or dismantled for replacement by hoist crane or the like by suspending them without any trouble to allow the replacing working of core boxes to be easily and efficiently done.

(2) The radiant heat from the heated core box is smoothly radiated whereby the heat does not stay within the machine. Thus, even thermalaffection upon associated elements and members can be avoided and the machine need not be specifically cooled by water, and therefore the machine can be mechanically simplified.

(3) Needless to mention, the height of the machine becomes low, it naturally becomes easy to feed the molding material, the maintenance of the machine is released from working at high place, and in addition, the machine can be conveyed or installed under less restricted conditions.

(4) Since sand is fed directly from a sand feeding tank of pressurizing type to a blow head

the sand feeding mechanism is simplified over known systems.

Revendications

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(1) A top-blow molding machine of the type always opening the upper portion of a core box assembly, characterized in that the upper portion of the core box assembly is always opened, and a blow head is pressed against the upper surface of said core box assembly only when the molding sand is top blown. 10

(2) A top-blow molding machine of the type always opening the upper portion of a core box assembly, according to Claim 1, wherein in a molding machine having a vertically-split core box assembly, the blow head equipped with a press cylinder is shifted by a traverse mechanism to the above of said core box assembly so as to be usually positioned there, and said blow head and a sand feeding tank are communicated with each other through a flexible hose. 15 20

(3) A top-blow molding machine of the type always opening the upper portion of a core box assembly, according to Claim 1, wherein said blow head is mounted to a traverse frame of the blow head, which traverses above a guide rod provided at both the sides of a vise apparatus. 25

(4) A blowing machine of the mechanism in which a sand feeding tank communicating with a compressed air supply through a duct having a feed and exhaust valve is coupled, through a flexible hose or a fixed duct, with a blow head communicating with said compressed air supply through a duct having a blow valve, and the molding sand can be automatically fed to the blow head by taking advantage of the difference of internal pressure between the blow head and the sand feeding tank, without providing a molding sand hopper on the above of the machine frame. 30 35 40

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FIG.1

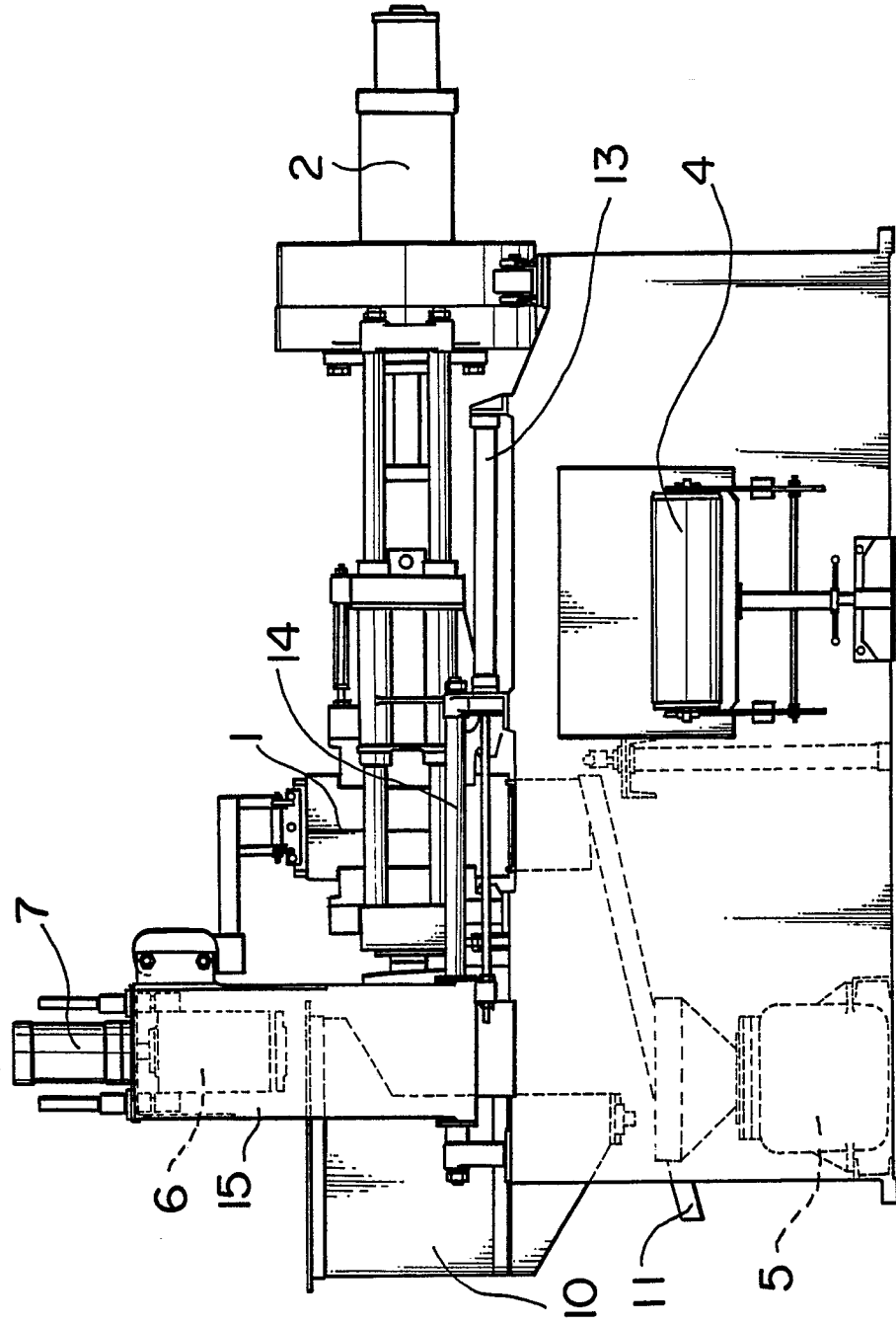


FIG. 2

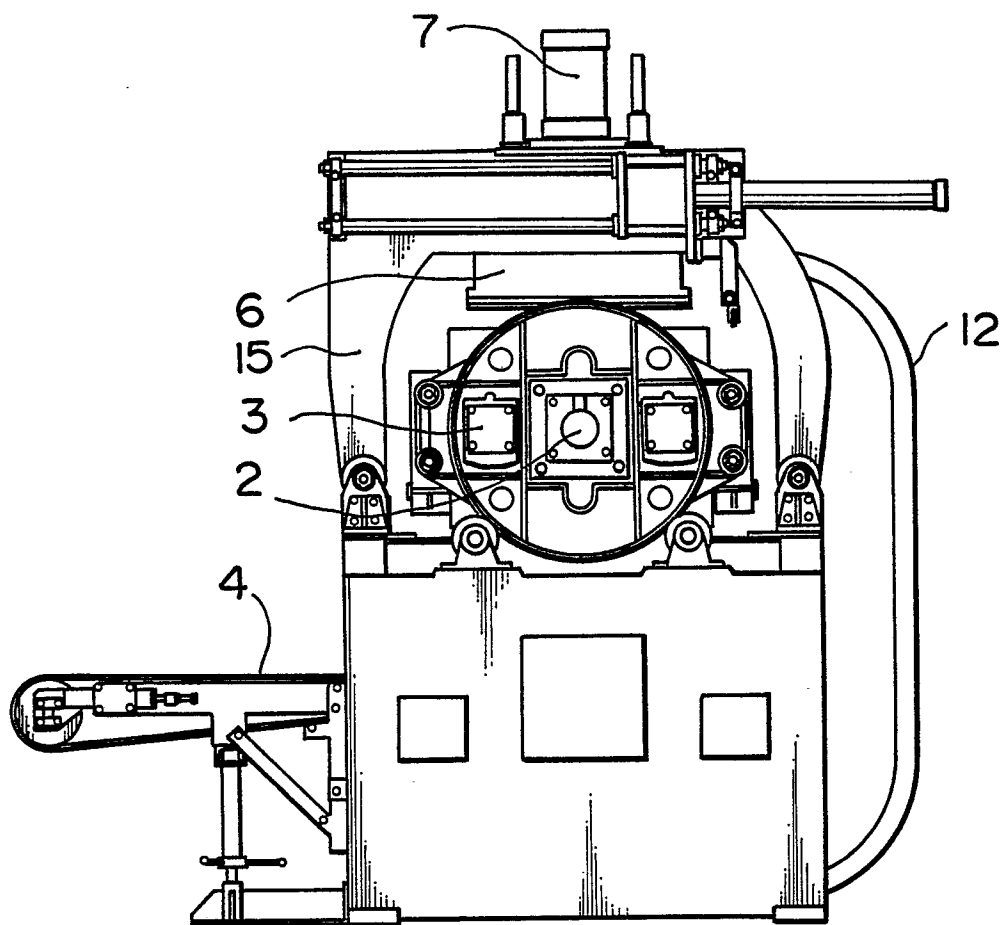


FIG.3

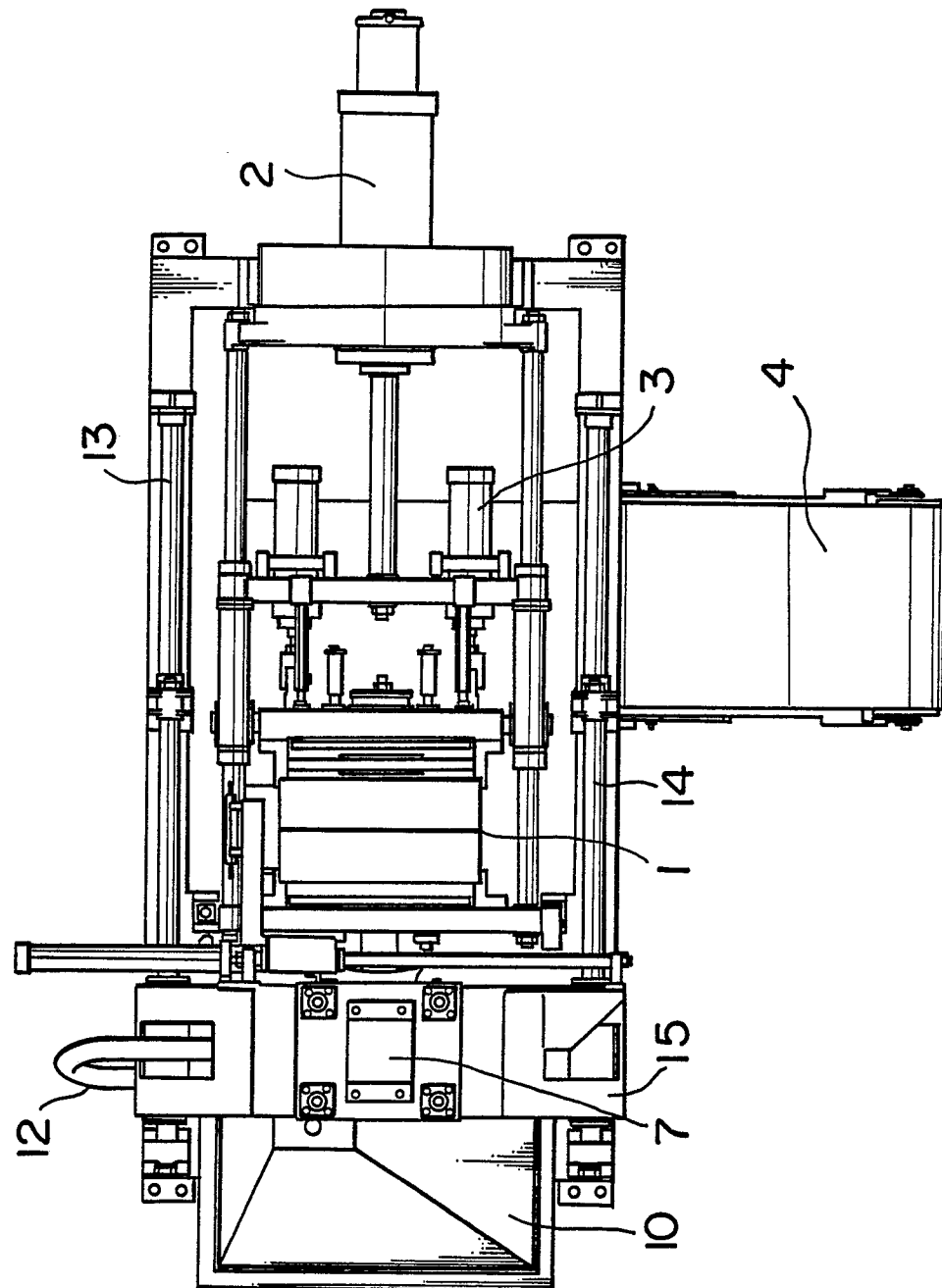
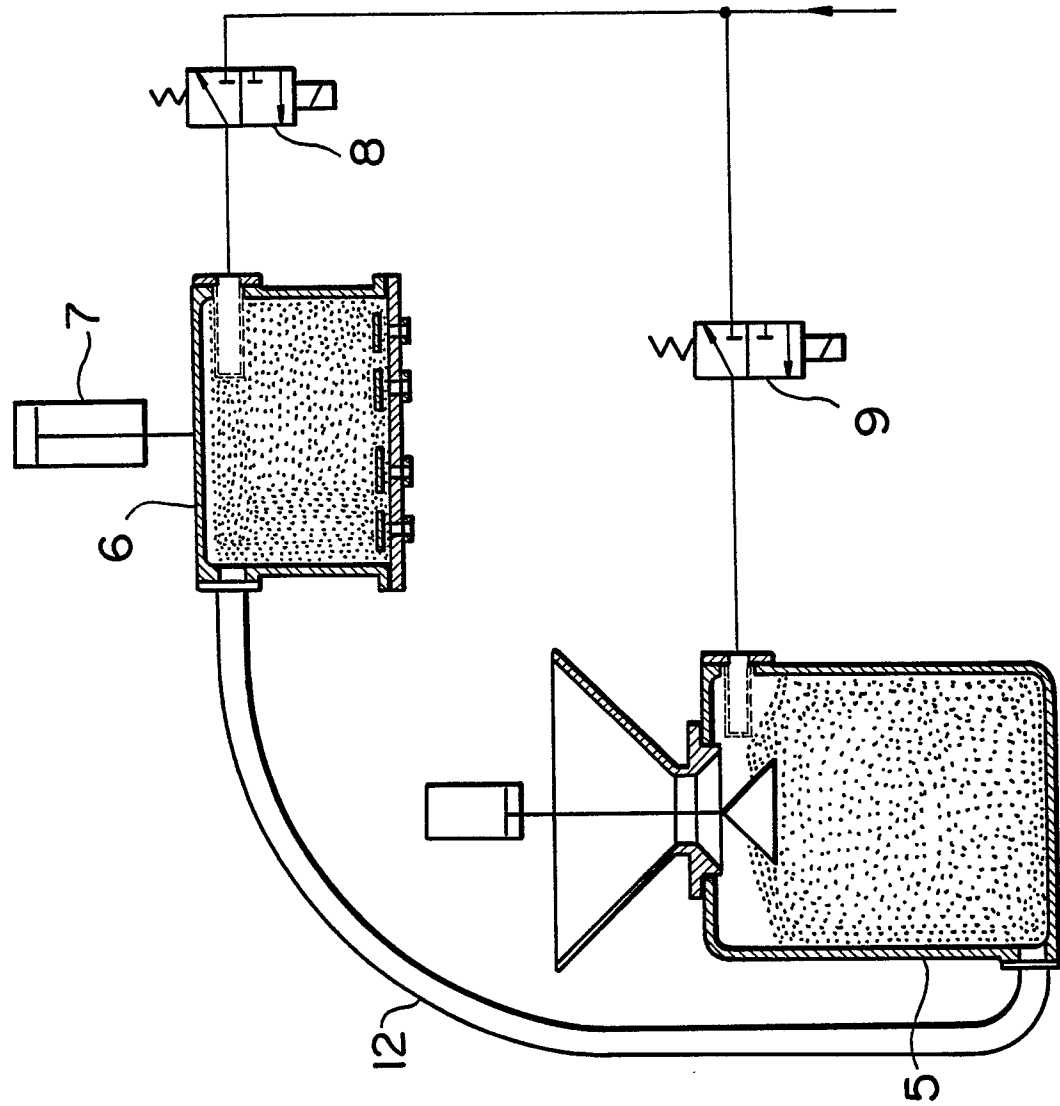


FIG.4





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.3)
E	PATENT ABSTRACTS OF JAPAN, vol. 13, no. 60 (M-796)[3408], 10th February 1989; & JP-A-63 264 249 (NANIWA SEISAKUSHO K.K.) 01-11-1988 ---	1,2,3	B 22 C 15/24
X	GB-A-2 069 900 (A. ARANA ERANA) * Figures 1-4; page 1, line 116 - page 2, line 65 * ---	1,2,3	
X	US-A-1 717 325 (D.J. RYAN) * Figures 1,2; page 3, line 30 - page 4, line 30 * ---	1,2,3	
X	PATENT ABSTRACTS OF JAPAN, vol. 6, no. 56 (M-121)[934], 13th April 1982; & JP-A-56 168 935 (SHINTO KOGYO K.K.) 25-12-1981 * Abstract * -----	1,3	
			TECHNICAL FIELDS SEARCHED (Int. Cl.3)
			B 22 C
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 29-05-1989	Examiner MAILLIARD A.M.
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ----- & : member of the same patent family, corresponding document			