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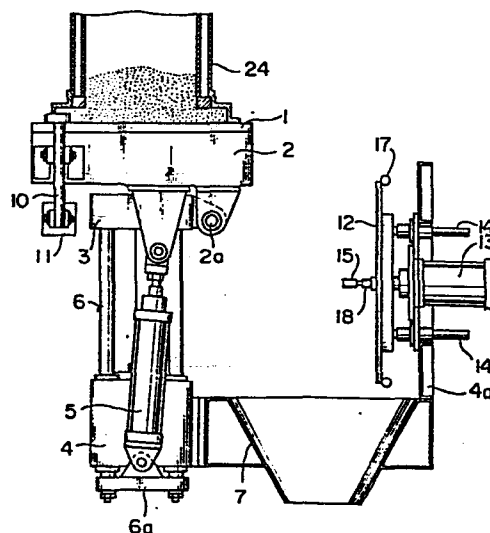
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54 An automatic cleaning device for a molding machine.

57 An automatic cleaning device for use in molding machine having a blow plate (1) comprises a turning frame (2) for holding the blow plate (1) and tipping sand from the plate (1) by turning the plate (1) through 90° on a fulcrum (2a) provided at one end of a lifting frame (3) provided with the lifting cylinder (9). A compressed air injection mechanism (12, 18; 21) is arranged opposite the fulcrum (2a) and is movable horizontally to a position in which it cleans the tilted blow plate.

FIG.1



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An automatic cleaning device
for a molding machine

This invention relates to an automatic cleaning device for a molding machine, embodying a blow plate 5 and/or blow nozzle.

In the molding operation where sand having a self-curing molding property is used, such as self-curing molding sand or cold box sand, the remaining sand is cured if it is left for a long period of time, so that 10 the sand remaining within the blow head and the blow nozzle after the molding operation must be immediately removed. In present day operation the remaining sand heaped up on the blow plate which is dismantled from the blow head is removed with a shovel, broom, air 15 duster or the like for the cleaning of the machine, but the sand remaining within the blow nozzle cannot be removed unless an air duster is used. In the case of a number of blow nozzles this is troublesome and takes a longer time to carry out a cleaning operation with a 20 duster gun for every blow nozzle, and results in a scattering of sand.

The inventor of this invention has made various studies and experiments to remove the various disadvantages of conventional systems, and as a result has 25 succeeded in developing a blow plate and/or blow nozzle automatic cleaning device for use in molding machines.

According to the invention there is provided an automatic cleaning device for a molding machine comprising a blow plate, characterised by a turning frame for 30 holding the blow plate which frame is turned on a fulcrum provided at one end of a lifting frame provided with a lifting cylinder, and a compressed air injection mechanism arranged to clean the tilted blow plate.

By using the automatic cleaning device of the 35 invention it is possible to collect sand remaining on the blow plate into a lower-positioned sand box in a shorter

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period of time without needing much labor, and by using a cleaning nozzle disposed opposite each blow nozzle of the blow plate, it is possible to remove the remaining sand completely in a single operation in which a
5 plurality of nozzles are cleaned. This successfully shortens time for cleaning of remaining sand and improves the working environment and is labor saving.

One way of carrying out the invention is described in detail below, by way of example, with reference to
10 drawings which illustrate only one specific embodiment, and a modification of that embodiment, and in which:-

Figures 1, 2 and 4 are elevations, partly in section, which show the sequence of operation of an automatic cleaning device for removing sand on the blow plate of
15 a molding machine,

Figure 3 is a side view of the cleaning device in the state shown in Figure 2,

Figure 5 is a front view which shows the cleaning of a blow nozzle,

20 Figure 6 is a detail sectional view of a cleaning nozzle, and

Figure 7 is a detail sectional view of a cleaning jacket.

Figures 1 to 6 describe in order one operational
25 mode of an automatic cleaning device of this invention.

A molding machine comprises a blow plate 1 which is detachably mounted on a blow head 24 in known manner.

A turning frame 2 is provided, as shown in the drawings, with a plurality of respective blow plate holding hooks
30 10 and cylinders 11 for operating the holding hooks. A lifting frame 3 is supported by a plurality of lifting guide bars 6 inserted through a fixed frame 4, and by a lifting cylinder 9 provided in the frame 4, which lifting cylinder 9 raises and lowers the frame 3.

35 The turning frame 2 is pivotally mounted on a fulcrum 2a at one end of the frame, in such a manner that it is tilted by more than an angle at which the sand on the

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blow plate may fall. The fulcrum 2a is provided at the compressed air injection mechanism side of the lifting frame 3 referred to below. The frame 2 is turned through an angle of, for example 60° to 90° , and the turning operation is carried out by the actuation of turning cylinders 5. In the device shown in the drawings by way of example, the turning cylinders 5 are mounted on a plate 6a connecting the lifting bars 6, but the turning cylinders 5 can be optionally positioned without being limited to this position.

Provision is made at the fulcrum 2a side for turning the turning frame 2 through 90° , which is necessary at intervals, and the compressed air injection mechanism disposed opposite to the blow plate automatic sand-removing, cleaning device is constructed as follows.

A vertical blow plate cleaning plate 12 is provided with a plurality of cleaning nozzles 18 which at least correspond with the number of blow nozzles 16 arranged in the blow plate 2, and a rubber end 15 is fitted on the end of each of the cleaning nozzles 18. The blow plate cleaning plate 12 is fixed to one end of a cylinder rod of a push-out cylinder 13 of the blow plate cleaning plate, which cylinder 13 is mounted in a vertical portion 4a of the fixed frame. By actuation of the cylinder 13, guide bars 14 slide to advance or retract the blow plate cleaning plate 12.

A sand discharging chute 7 is provided in the extension of the fixed frame, and is arranged directly under the turning position of said turning frame 2, and leads to a sand discharge box 8.

The automatic cleaning operation of the blow plate and/or blow nozzle will now be explained.

When removing the remaining sand within the blow head 24, the lifting cylinder 9 is actuated to raise the lifting frame 3 and the turning frame 2 until the frame 2 comes to a close contact with the lower surface of the blow plate 1, in order that, as shown in Figure 1, the blow plate attached to the blow head 24 of the molding

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machine can be dismantled. Then the blow plate 1 is removed from the blow head 24 of the molding machine on to the turning frame 2, and the blow plate holding hook cylinder 11 is actuated so that the blow plate 1 is held 5 at the turning frame 2 by the blow plate holding hooks 10.

The lifting cylinder 9 is then operated, see Figure 3, to lower the blow plate 1 from the position of Figure 1 to its cleaning position shown in Figure 2. That is, as shown in Figure 2, the remaining sand within the blow 10 head 24 is taken out to the cleaning position on the upper surface of the blow plate 1. When the turning cylinders 5 are operated the blow plate 1 held by the turning frame 2 is turned through 90° as shown in Figure 4 so that all the remaining sand on the blow plate 1 15 falls for collection down into the sand discharge box 8 provided beneath the sand discharging chute 7.

When only the sand on the blow plate is removed, a 60° turn of the frame 2 will be sufficient for the discharge of the sand.

20 The operation of removing remaining sand from the blow plate 1 may not remove sand remaining in the blow nozzles 16 provided in the blow plate 1. In the present device the remaining sand in the blow nozzles 16 is completely removed by means of the compressed air injection mechanism which is disposed opposite to the turned 25 blow plate 1 and is movable horizontally.

While gradually advancing the cleaning plate 12 by actuating the blow plate cleaning plate push-out cylinder 13 to the position shown in Figure 4, compressed air is 30 injected from the cleaning nozzles 18, which are fitted with the rubber ends 15. Even a small amount of sand remaining adhered to the surface of the blow plate 1 is completely removed by the injected air. If the cleaning plate 12 is further advanced and the compressed air supply 35 is continued for injection, the rubber ends 15 of the cleaning nozzles 18 closely contact each blow nozzle 16 of the blow plate 1 as shown in Figure 5, and sand remaining within the blow nozzles 16 is quickly and

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completely discharged into the sand discharge box 8 as shown in Figure 6. It is added that in the case of a blow plate in which the position of the blow nozzles 16 is a little different from the present device it is possible to conform the cleaning nozzles 18 to the blow nozzles 16 by somewhat displacing the cleaning nozzles by making the holes 23 for mounting the cleaning nozzles as elongated holes H as shown in Figure 6.

Figure 7 is a fragmentary sectional view which shows another operational mode of the invention, in which instead of the cleaning nozzles, a cleaning jacket 21 and a flexible plate 20, such as rubber plate, are attached to the blow plate cleaning plate 12. The cleaning jacket 21 communicates with an air intake pipe 17 and has an air hole 22 at the same position as a hole in the rubber plate 20. The operational method in this embodiment is the same, but with this system, there is no requirement for positional adjustment of the air hole 22 even if the blow nozzles are differently positioned and even when the blow plate has a different arrangement of a plurality of blow nozzles 16 they can be cleaned in common.

Additionally, though not shown, it is possible to divide the circuit of the air supplied to said cleaning nozzles 18 into a plurality of systems to remove in order the sand remaining within the blow nozzle in each division. That is, when there are many blow nozzles 16, a large amount of air is needed to clean all the nozzles simultaneously. This means that the air pressure is considerably lowered and the injection power of the air is weakened. The divided circuit makes possible efficient cleaning without weakening the injection power by the air supplied in regular succession into respective divisions.

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The automatic cleaning device of the invention is capable of thoroughly removing automatically and in a shorter period of time than hitherto, the sand remaining in both the blow head and blow nozzles. The sand is not
5 scattered, and therefore both in terms of working environment and labor saving there are distinctive advantages which cannot be obtained from conventional systems. Moreover, it is possible, by using the cleaning device of the invention to replace a blow plate
10 efficiently and in a shorter period of time, which is necessitated by the replacement of a mold.

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Claims:

1. An automatic cleaning device for a molding machine comprising a blow plate (1), characterised by a turning frame (2) for holding the blow plate (1) which frame (2) is turned on fulcrum (2a) provided at one end of a lifting frame (3) provided with a lifting cylinder (9), and a compressed air injection mechanism arranged to clean the tilted blow plate.
2. A device as claimed in Claim 1, characterised in that the turning frame (2) can be turned through 90° on the fulcrum (2a), and the compressed air injection mechanism is arranged opposite to the fulcrum side of the frame (2) and is movable horizontally.
3. A device as claimed in Claim 2, characterised in that the compressed air injection mechanism consists of a vertical blow plate cleaning plate (12) which carries two or more cleaning nozzles (18) having rubber ends (15), and a cylinder (13) for moving said cleaning plate (12).
4. A device as claimed in Claim 2, characterised in that the compressed air injection mechanism consists of a cleaning jacket (21) which is provided with flexible plate (20) having an air injection hole (22), and a cylinder for moving the cleaning jacket (21).
5. A device as claimed in Claim 3, characterised in that the air supply to the cleaning nozzles (18) is divided into a plurality of air supply circuits.

FIG. 1

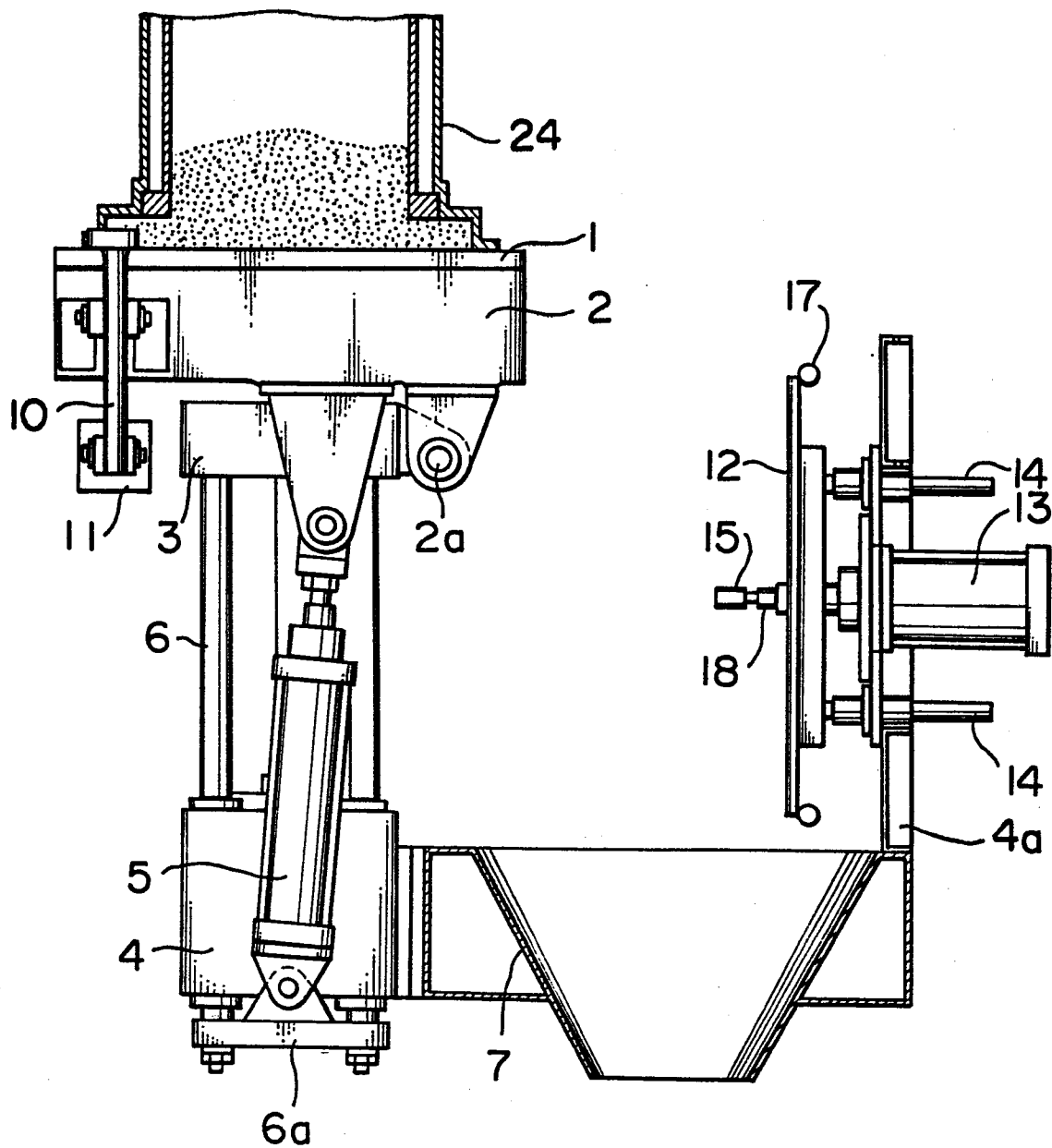


FIG. 2

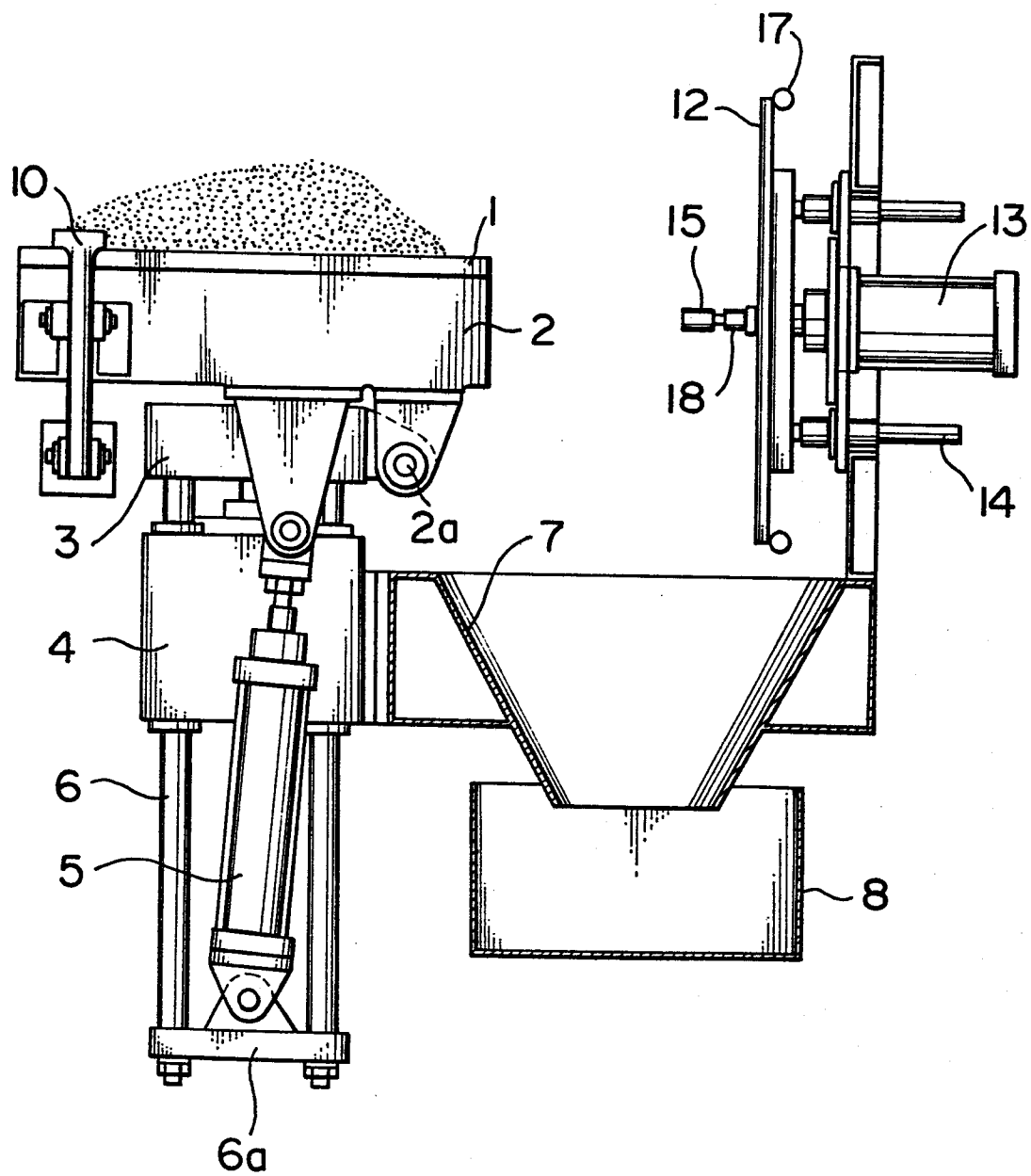


FIG. 3

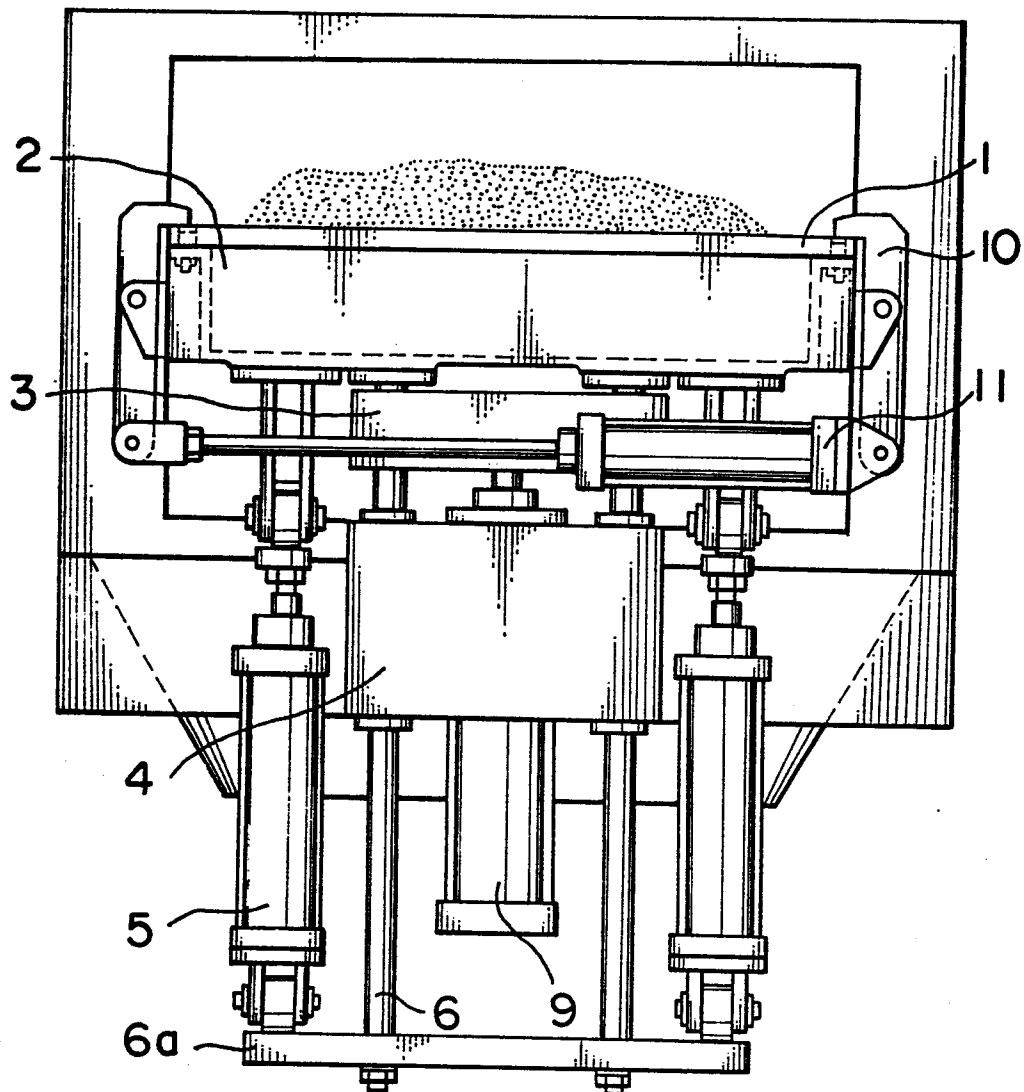


FIG. 5

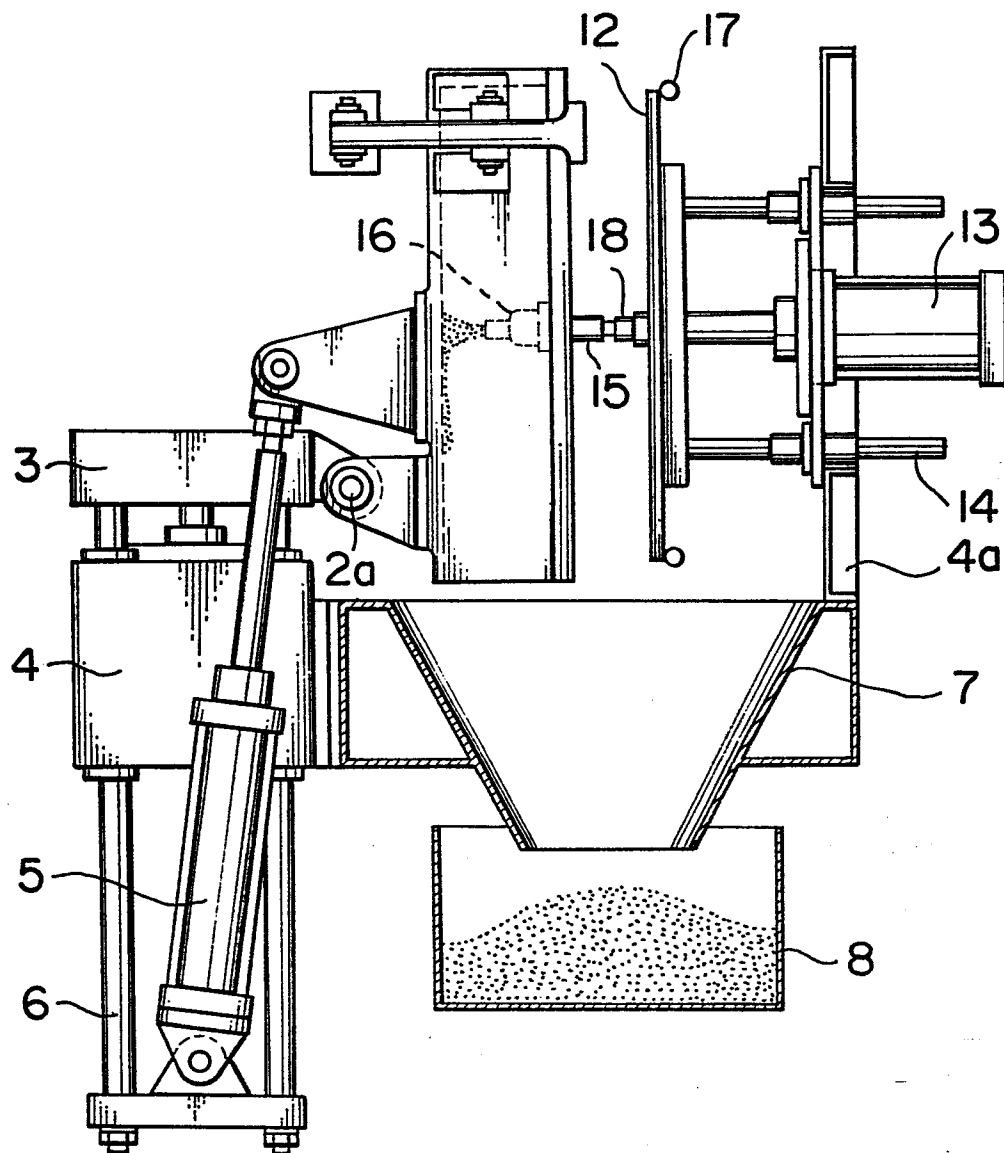


FIG. 6

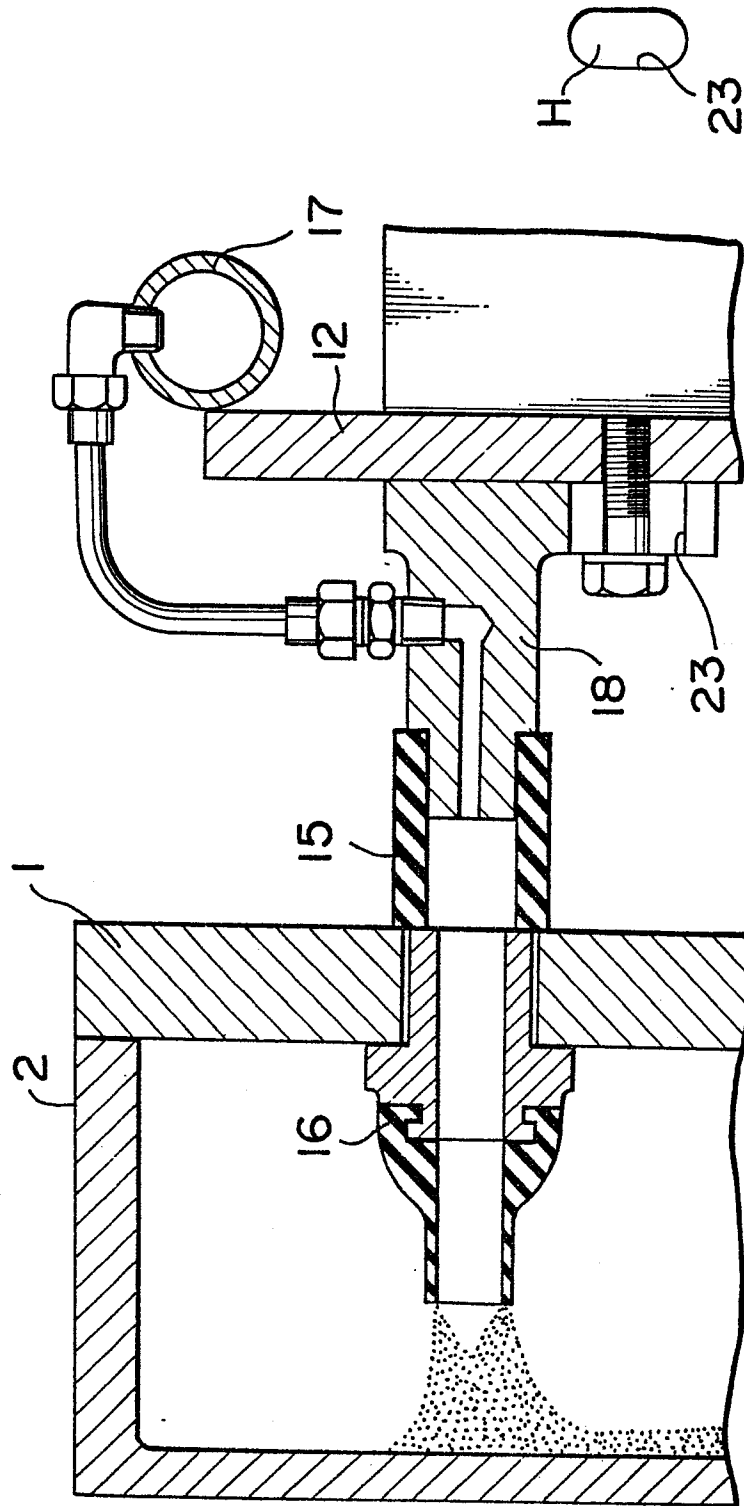
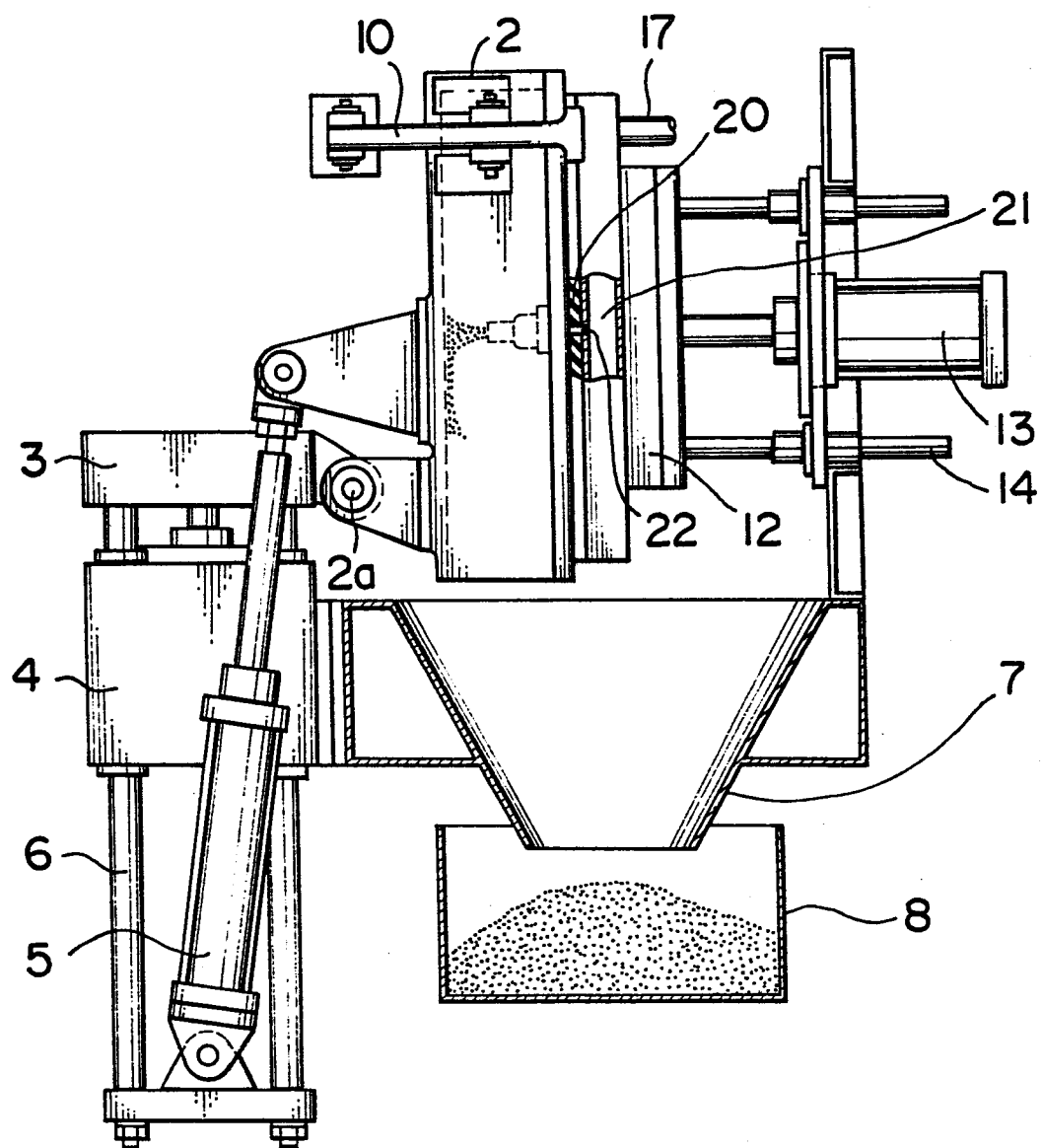


FIG. 7





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)
A	GB-A-2 001 268 (ACME-CLEVELAND CORP.)		B 22 C 15/24
A	US-A-3 899 019 (B.I. LANGNE)		
A	GB-A-2 046 152 (ACME-CLEVELAND)		
A	US-A-3 966 174 (V. DEVE)		
			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 17-07-1984	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	