United States Patent [19]

Young

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[54] **FOUNDRY MOLD MAKING APPARATUS**

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[52] **U.S. Cl.**.....**164/207,** 164/226

[51] **Int. Cl.**.....**B22c 15/02**

[58] **Field of Search**.....164/169, 207, 226, 164/227, 37, 170, 171, 182, 183, 192, 193, 194, 206, 385, 409, 213, 214, 157, 186, 403

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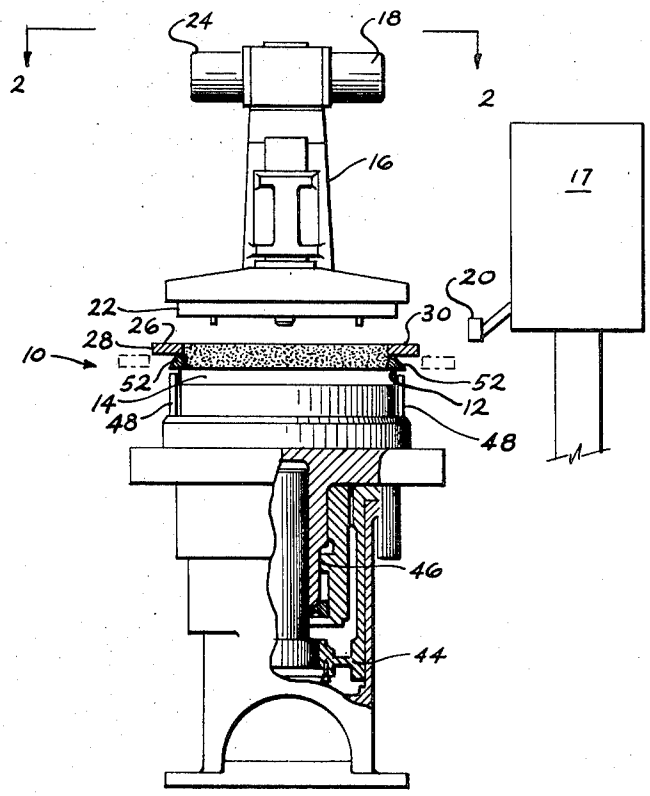
[57] **ABSTRACT**

Foundry mold making apparatus including a two-piece upset member which in a first position forms an upset positioned above a circular flask, and in a second position is pivoted laterally of the flask, to permit compaction of the sand within the flask, and means for stripping the finished mold from the lower pattern.

4 Claims, 4 Drawing Figures



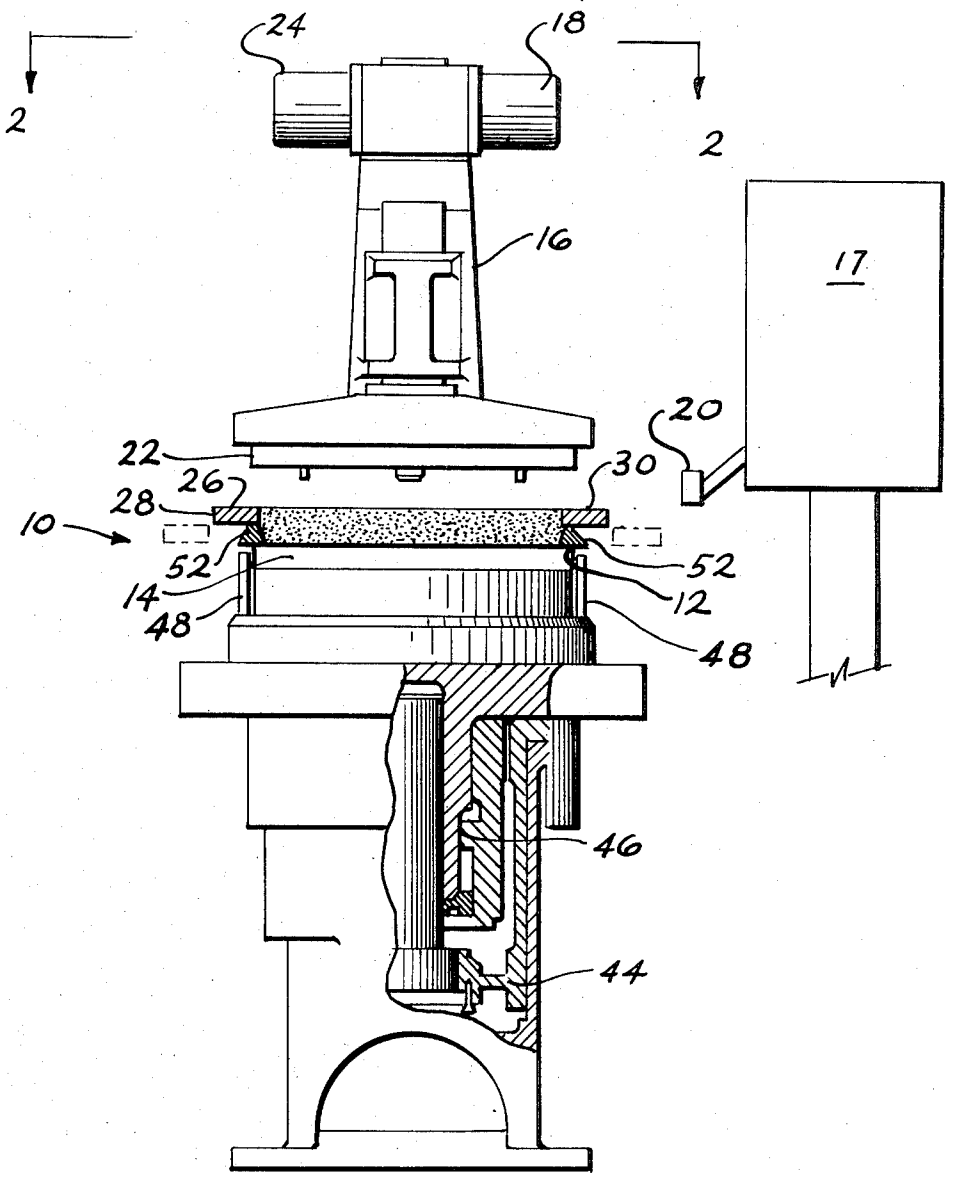


FIG-1

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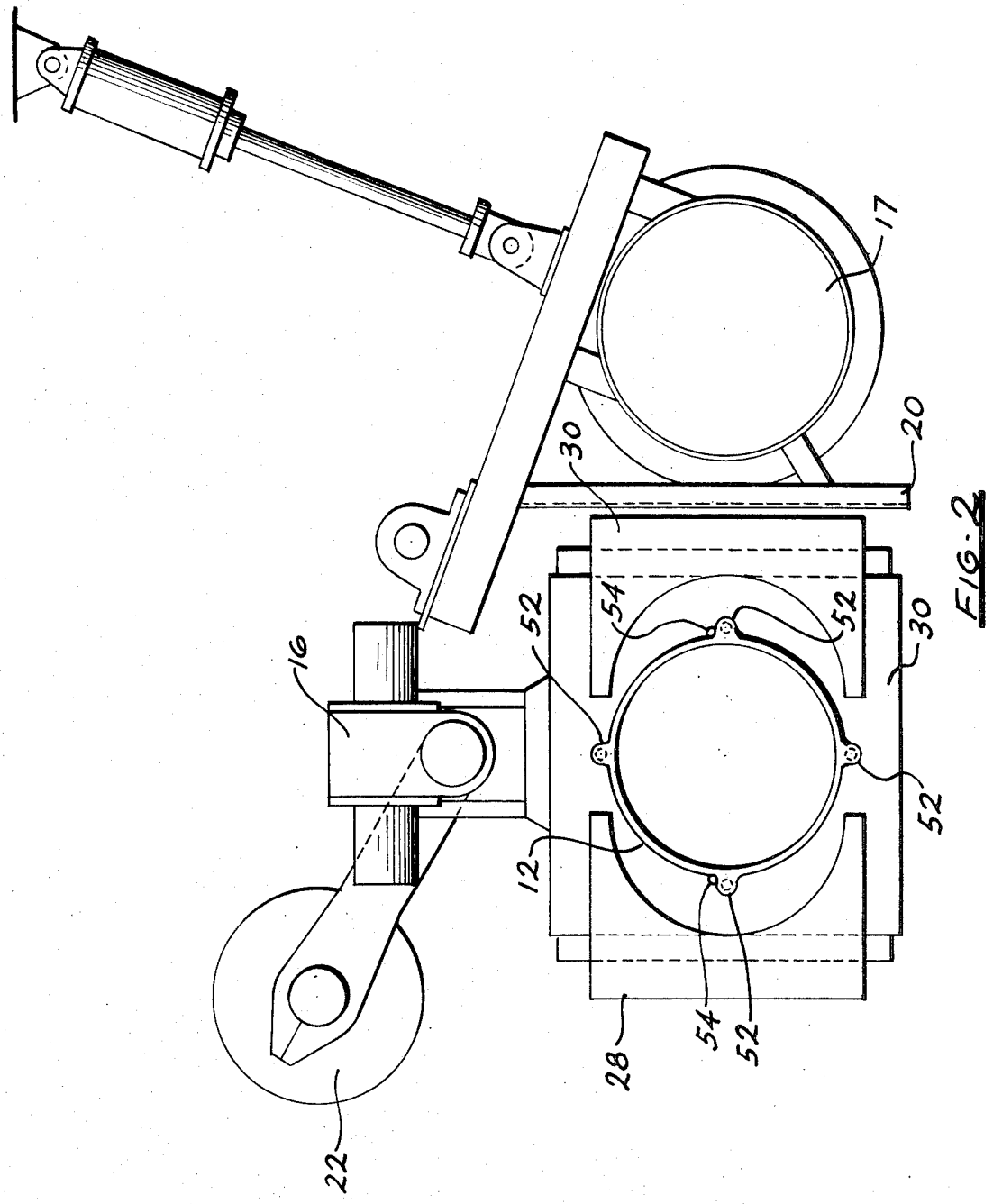

FIG. 2

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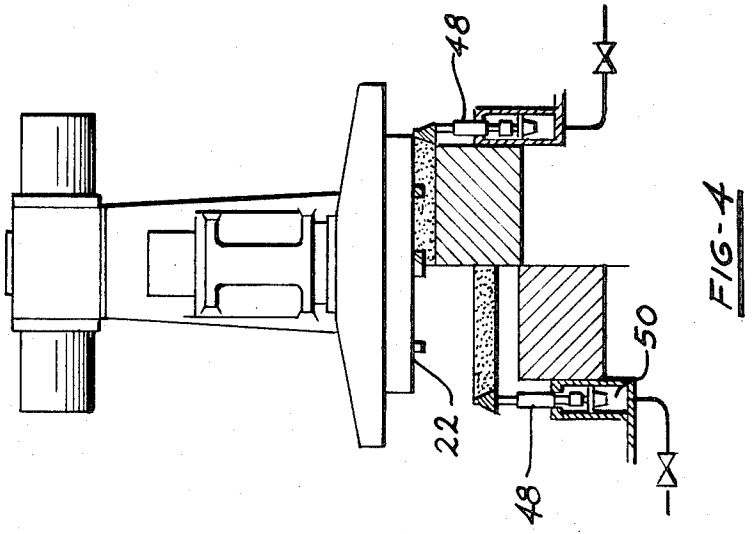

FIG-4

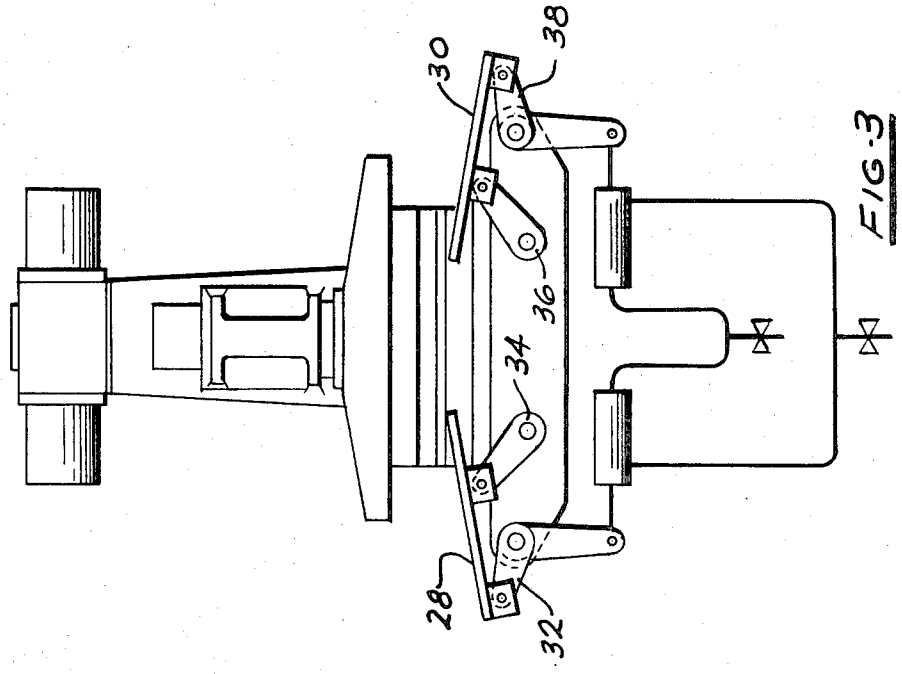

FIG-3

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FOUNDRY MOLD MAKING APPARATUS

BACKGROUND OF THE INVENTION

Attempts are presently being made to automate as much as possible the process for making sand molds. This eliminates costly labor, and increases the efficiency and economy of mold manufacture by increasing the production capacity.

SUMMARY OF THE INVENTION

The present invention provides mold making apparatus where a flask is initially placed on a base, and filled with sand. By use of an upset member positioned above the flask, an oversupply of sand is placed in the flask. The sand is then squeezed and vibrated, causing compaction thereof. The upset member is of two-piece construction, with each piece being pivotably mounted such that in a first position they form a walled retainer placed on top of the flask, and in a second position they are pivoted laterally out of the way of the squeeze head which is used to compact the sand, A novel stripping pin arrangement is also provided for separating the finished mold from the lower pattern.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a front view, partially in section, of a mold making machine constructed in accordance with the invention;

FIG. 2 is a plan view of the machine shown in FIG. 1;

FIG. 3 is a partial, enlarged view showing the split upset member; and

FIG. 4 is a enlarged partial view showing the stripping pins.

DESCRIPTION OF THE PREFERRED EMBODIMENT

Looking now to FIG. 1 of the drawings, 10 designates a foundry mold making machine. A base 14 carries a lower pattern plate thereon. A circular flask 12 is positioned on the upper surface of the base 14. A sand hopper 17 is rotatably mounted such that it can be used to fill the flask 12 with sand when desired.

Rotatably mounted on post 16 is a squeeze head 22. The squeeze head 22 is actuated by a motor 24 between a first position above the flask 12, and a second position located to the left of and in back of flask 12. Squeeze head 22 carries a top pattern plate thereon.

Positioned above the flask 12 when the machine is in sand filling position is a split upset member 26. The upset member is comprised of two halves 28 and 30 (FIG. 3). In a first position, these parts are positioned above flask 12 as shown in FIG. 1, so that they confine an oversupply of sand initially deposited by the sand filling device. A scraper blade 20 traversing across the top surface of upset member 26, removes excess sand, so that the flask and upset member are filled to the top. Each of the upset halves 28 and 30 are mounted on two pairs of pivot members 32, 34, 36, and 38 (FIG. 3). The outer pairs 32 and 38 are connected to pneumatic motors so members 28 and 30 can be moved outwardly to positions laterally spaced from the flask, as shown in solid lines in FIG. 3, and in broken lines in FIG. 1.

The upper portion of base 14 is mounted on a pneumatic motor 44, which is used for raising flask 12 into

contact with squeeze head 22 during the sand compaction step of the mold forming process. A pneumatic motor 46 is used for vibrating or rapping the flask when it is being pressed against the squeeze head 22. This causes good compaction of the sand, so that the sand originally contained within the upset 26 is squeezed down into the confines of the flask 12. The rapping or vibrating action is caused by rapid, intermittent supply and discharge of air to opposite sides of the piston within the motor 46, as is well known in the art.

Incorporated in base 14 beneath the flask 12 is a plurality of pins 48, which can be moved upwardly a limited amount when plenum chambers 50, shown in FIG. 4, are pressurized. These pins 48 coact with tabs or protrusions 52 extending from flask 12. Thus when base 14 (and flask 12) are raised against squeeze head 22 during the sand compaction step, plenum chambers 50 are pressurized, causing pins 48 to extend partially and coact with tabs 52, forcing flask 12 against squeeze head 22.

Upon completion of the squeezing operation, pneumatic motor 44 descends lowering base 14 as pressurized pins 48 extend further, holding flask 12 against squeeze head 22, separating the bottom face of flask 12 from the top face of base 14 when pins 48 are extended to their maximum fixed stroke limit. Flask 12 resting on and supported by pins 48 separates from squeeze head 22 by continued descent of the base 14 as shown in the e left hand portion of FIG. 4. The finished mold can then be removed by the operator. As best seen in FIG. 2, a plurality of pins 54 are secured to the upper surface of base 14 to enable the operator to accurately position the flask 12 at the start of the mold forming operation. These positioning pins should not be of a greater height than the flask, or they will interfere with the operation of the upset.

From the above, it can be seen that the two piece upset member can be easily and rapidly moved into and out of its operating position, to enable a faster and more efficient mold making process. The stripping pins, by operating to initially hold the mold firmly in contact with the upper pattern plate carried by the squeeze head, makes certain that the mold separates from the lower pattern plate in a level position, preventing the mold from becoming cracked or broken. If the mold were not held against a solid upper structure, such as the upper pattern plate, during the stripping operation, it would separate from the lower pattern plate unevenly (one side forced loose before the other). This could cause breakage of the mold.

What is claimed is:

1. Mold making apparatus including a base, a flask positioned on the upper surface of the base, an upset member positioned above the flask, means for filling the flask and upset member with sand, a squeeze head positioned above the base, means for raising the flask and upper surface of the base into contact with the squeeze head, to cause compaction of the sand, the upset member being made of two parts, these parts having first positions wherein they form an open ended container above the flask positioned on the upper surface of the base during the sand filling operation, and second positions wherein the parts are located laterally on opposite sides of the flask during the sand compaction operation, and pivot members for moving the two parts between their first and second positions.

2. Mold making apparatus including a base, a flask positioned on the upper surface of the base, an upset member positioned above the flask, means for filling the flask and upset member with sand, a squeeze head positioned above the base, means for raising the flask and upper surface of the base into contact with the squeeze head to cause compaction of the sand, the upset member being made of two parts, these parts having first positions wherein they form an open ended container above the flask positioned on the upper surface of the base during the sand filling operation, and second positions wherein the parts are located laterally on opposite sides of the flask during the sand compaction operation, pivot members for moving the two parts between their first and second positions, a plurality of protrusions extending laterally from the outer edges of the flask, a plurality of stripping pins carried on the base for coacting with the protrusions, the stripping pins having first positions beneath and out of contact with the protrusions second positions where they are in contact with the protrusions while the sand in the flask is being compacted, and third positions where they are in contact wit the protrusions after the base has been lowered, lifting the flask and associated mold clear of the upper surface of the base, and means for actuating all of the stripping pins simultaneously between their first, second, and third positions.

3. Mold making apparatus including a base, a flask positioned on the upper surface of the base, an upset member positioned above the flask, means for filling the flask and upset member with sand, a squeeze head positioned above the base, means for bringing the flask and squeeze head into contact with each other, to cause compaction of the sand, the upset member being made of two parts, these parts having first positions wherein they form an open ended container above the flask positioned on the upper surface of the base during the sand filling operation, and second positions wherein the parts are located laterally on opposite sides of the flask during the sand compaction operation, and means for moving the two parts between their first and second positions.

4. Mold making apparatus including a base, a flask positioned on the upper surface of the base, means for filling the flask with sand, a squeeze head positioned above the flask, motor means for bringing the flask and squeeze head into contact with each other to cause compaction of the sand, said motor means also causing the flask and squeeze head to separate after the sand has been compacted, a plurality of protrusions extending laterally from the outer edges of the flask, a plurality of stripping pins movably carried on the base for coaction with the protrusions, the stripping pins having first positions beneath and out of contact with the protrusions, second positions where they are partially raised and are in contact with the protrusions while the sand in the flask is being compacted while the flask and squeeze head are in contact with each other, and third positions where they are fully raised and in contact with the protrusions after the flask and squeeze head have been separated by the motor means, lifting the flask and associated mold clear of the upper surface of the base, and fluid actuated means for moving all of the stripping pins simultaneously with respect to the upper surface of the base from their first positions to their second positions, and also moving all of the stripping pins simultaneously with respect to the upper surface of the base from their second positions to their third positions.

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