Aug. 4, 1936. E. A. BLAKE 2,049,732

APPARATUS FOR VENTING CORE BOXES AND THE LIKE

Filed March 18, 1933

Fig. 1

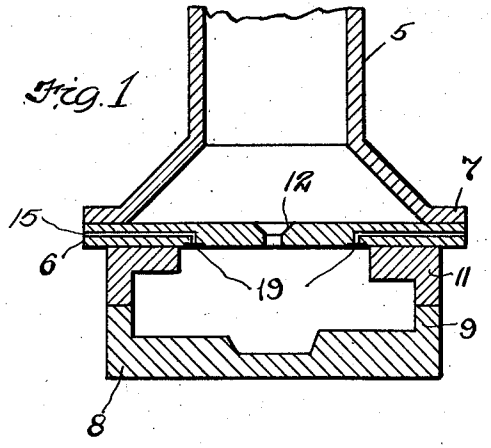
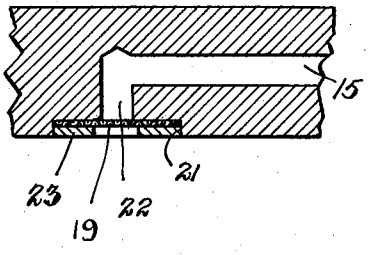


Fig. 3



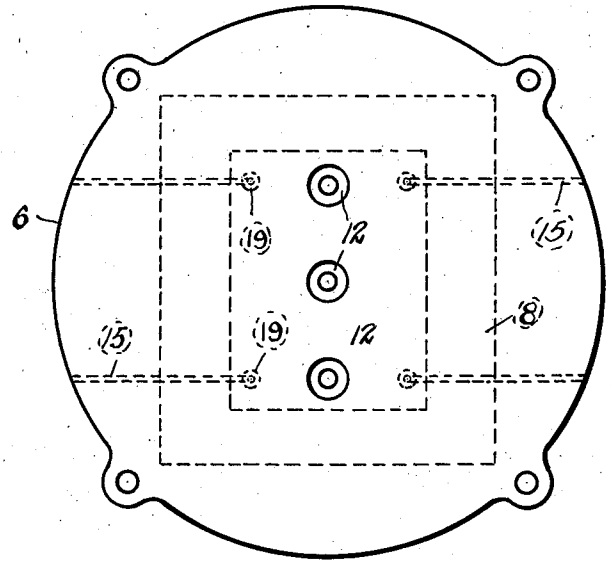


Fig. 2

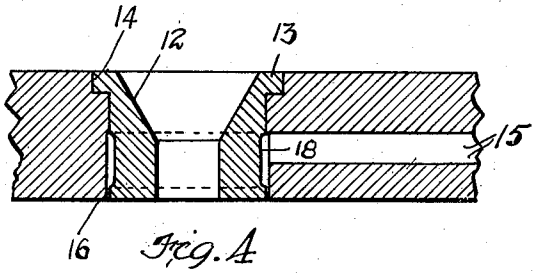


Fig. 4

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Patented Aug. 4, 1936 2,049,732

UNITED STATES PATENT OFFICE

2,049,732

APPARATUS FOR VENTING CORE BOXES AND THE LIKE

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Application March 18, 1933, Serial No. 661,622

2 Claims. (Cl. 22—36)

The present invention relates to a method and apparatus for venting structures in which a molded article is formed by flowing sand or the like, together with a binder, thereinto under considerable fluid pressure. More particularly, the invention relates to a method and apparatus for venting coreboxes wherein foundry cores are formed by forcing sand and a binder into the coreboxes under pressure of air. It is also applicable to the analogous operation of blowing molds, as is sometimes done.

An example of the process and mechanism with which the present invention is useful is seen in United States Patent No. 1,801,654, dated April 21, 1931. Therein sand is placed in a chamber and this chamber is brought over the coreboxes, communication being had between the two by means of a blowplate. This blowplate is provided with blowholes, through which the sand is forced into the coreboxes by applying air pressure or other fluid pressure to the sand in the sand chamber. The sand is, consequently, forced through the blowholes with considerable velocity and is rammed into the cavities of the corebox by the air pressure. However, means must be provided to relieve this pressure to preserve a pressure difference between the sand chamber and the coreboxes and difficulty has been experienced in properly venting the boxes so that portions of the cores will not be blown too soft due to the pocketing of air at certain points. It is customary to vent coreboxes by means of holes or channels in the box itself involving cutting up an expensive corebox and also involving extra work due to the fact that this is only a trial and error method, because holes, after being made, are sometimes found not to be properly located to vent the corebox and must be plugged and new holes made. The same is true of channels for this purpose, which require to be soldered up, if not properly located, and new channels cut. Such a method is obviously wasteful and inefficient and the disadvantage is magnified owing to the multiplicity of coreboxes used and the necessity for venting each and every one of a large number. Such a method should obviously be avoided as much as possible although it cannot be wholly dispensed with.

It is, accordingly, an object of the present invention to provide a new and improved means for venting coreboxes or other structures in which an article is molded by blowing sand into a mold. Another object of the invention is to provide an improved method of venting such structures. To the accomplishment of the foregoing and related ends, said invention, then, consists of the means hereinafter fully described and particularly pointed out in the claims.

The annexed drawing and the following description set forth in detail certain structure embodying the invention, such disclosed means constituting, however, but one of various structural forms in which the principle of the invention may be used.

In said annexed drawing:—

Fig. 1 is a vertical section through a blow chamber and a corebox in operative relation; Fig. 2 is a top plan view, somewhat enlarged, of the blowplate shown in Fig. 1; Fig. 3 is an enlarged fragment of the section shown in Fig. 1; and Fig. 4 is a fragmentary section through a modified form of the apparatus.

Referring to the drawing, the blow chamber 5 may be of any conventional form and is adapted to be filled with sand from a hopper and is also equipped with a source of air pressure or other fluid pressure. Carried by the bottom of the blow chamber 5 is a blowplate 6 which may be attached to the flange 7 of the blow chamber. A corebox 8 is positioned below and against the blowplate and consists of two halves 9 and 11, as is customary. Of course, the line of parting may be vertical as well as horizontal, and coreboxes adapted to produce cores of various shapes may be used.

In the blowplate 6, as seen most clearly in Fig. 1 of the drawing, is a blowhole 12, which is usually flared toward the oncoming sand, and may conveniently be formed either directly in the plate or in a bushing 13 of steel or other suitable material which can be pressed into a corresponding aperture 14 in the blowplate. Of course, other means of forming the blowholes may also be used. These blowholes may be one or more in number as required to force the sand into all parts of the corebox.

Vents 15 are formed in the blowplate and may either pierce the underside of the blowplate to communicate with the interior of the corebox, as seen in Fig. 1, or may communicate with the aperture 14 into which the blowhole bushing is fitted, as seen in Fig. 4. The outlet of the vent is preferably at one edge of the blowplate, communication thus being had directly with the atmosphere surrounding the apparatus. Where the vent communicates with the aperture provided for the blowhole bushing, a slight clearance or relief 16 is provided between the bushing 13 and the lower part of the wall of the aperture 14, thus connecting the horizontal part 17 of the vent with

the interior of a corebox. In this modification of the venting means, as shown in Fig. 4, the blowhole bushing will be grooved as at 18 opposite the horizontal part 17 of the vent to insure a clear passage for the escaping air. However, this groove terminates short of the bottom of the bushing so that, for a short distance, the air must pass through the restricted opening afforded by the clearance or relief between the bushing and the blowplate, which may be on the order of .005 inches, so that sand cannot escape along with the air.

Where the vent communicates directly with the interior of the corebox, as shown in Fig. 1 of the drawing, exclusion of sand is preferably attained by inserting a screen vent-plate 19 before the intake of the vent, this construction being illustrated most clearly in Fig. 3, the screen permitting the escape of air or other gases, but retaining any sand which may tend to be blown out along with the air. The screen vent-plate may be located in a recess 21 provided in the surface of a blow-plate at the termination of the vertical intake portion 22 of a vent and may be held in place by a washer 23 forced into the recess 21, or other suitable retaining means may be used.

The provision of vents in the blowplate has been described above both in connection with blowing holes and apart from such blowing holes, the modification in which the vents are provided independently of the blowholes making it possible to use these vents in numbers not dependent on the number of blowholes employed. Thus, a blowplate may be provided with a given number of blowholes for blowing air into a corebox or other mold, and vents may then be provided in the plate as a substitute for additional blowholes where it is found that certain portions of the corebox are being blown too soft. That is to say, the packing of sand into the core is facilitated almost as much by providing means for removing air as by the provision of additional blowholes for driving sand into the various portions of the corebox. Should a particular portion of the corebox be blown too soft, a screen vent may be made in the blowplate at a point corresponding to the soft place in the core and the easy exit of air thus provided avoids the formation of an air pocket which would resist densifying of the sand even though the latter is driven in through the blowholes under considerable pressure.

Venting coreboxes and the like through a blowplate or at a point adjacent the means for blowing sand into the corebox, e. g., blowholes, not only lessens the cutting up of expensive coreboxes as mentioned above, and reduces the necessity of using the cut and try method of forming holes or channels in the corebox and having to plug these up when not properly positioned, but also takes the air out of the pockets in a more efficient manner. The sand passing from the sand chamber to the corebox enters the latter in a straight line from the blowing hole and goes first to the bottom of the corebox, accompanied by the air which is used for imparting pressure to the sand. At the bottom of the corebox the sand and air spread out and gradually fill up the box, swirling upward toward the blowhole. Thus the area adjacent the blowhole is the last to be filled and, if the venting means are located near the blowhole, will also be the last free place from which air escapes from the interior of the box. It will be apparent that this is a more efficient way of venting coreboxes or other molds into which sand is blown, than is the case where the corebox is vented at the side or at other points remote from the point of entry of the sand since there is less likelihood of air pockets being formed and the vent is more likely to be properly positioned to relieve air from portions of the core tending to be blown too soft.

Other modes of applying the principle of my invention may be employed instead of the one explained, change being made as regards the means and the steps herein disclosed, provided those stated by any of the following claims or their equivalent be employed.

I therefore particularly point out and distinctly claim as my invention:—

1. A mold or core box having a cavity provided with an opening for discharge of sand and air thereinto and with openings from the cavity to atmosphere, and a woven wire screen covering the said openings to atmosphere.

2. A mold or core box having a mold cavity provided with an inlet for sand and air under pressure and with outlet openings to atmosphere, and a woven wire screen covering the outlet openings at approximately the junction thereof with the cavity.

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