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W. B. JAY
CORE BOX VENT

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2 Sheets-Sheet 2

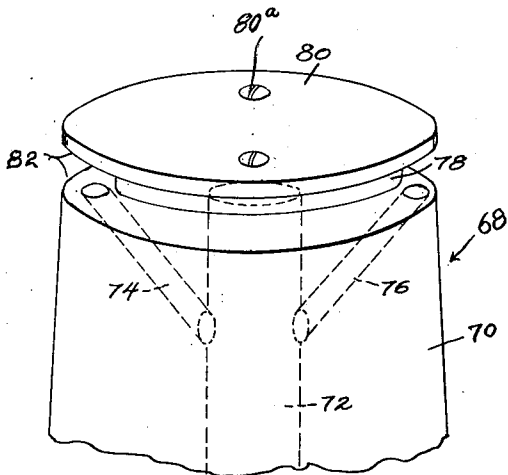


FIG 3

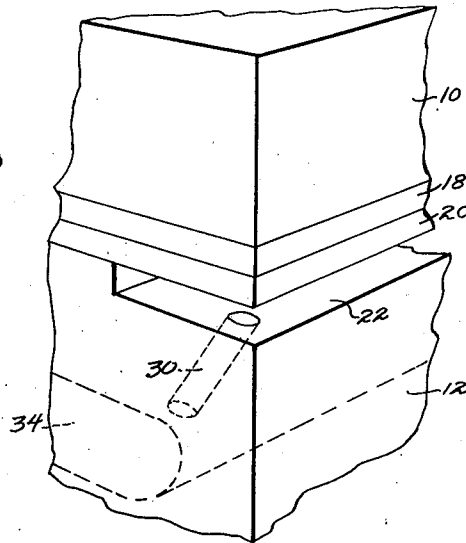


FIG 4

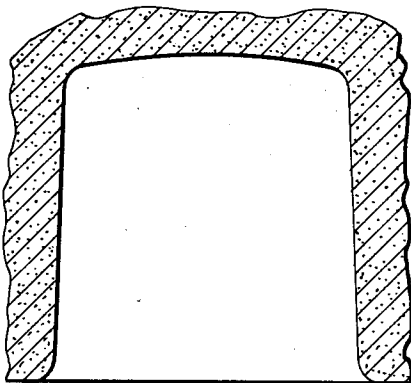


FIG 5

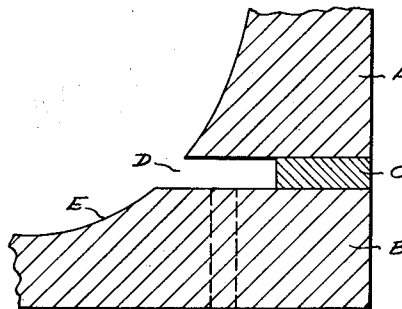


FIG 6

INVENTOR

WILLARD B. JAY

BY

Rufus Lemmon

ATTORNEY

1

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CORE BOX VENT

Willard B. Jay, Dearborn, Mich.

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8 Claims. (Cl. 22—13)

The present invention relates to a vent construction, and more particularly to a vent construction for incorporation in a core box to permit the escape of air from the core box while preventing the escape of sand.

It is common practice to provide a plurality of screens throughout a core box so that when sand and air are blown into the cavity of the core box, the air can escape but the sand is held within the cavity of the core box. Many types of screens have been developed in an attempt to provide an effective venting device. Various types of screen patterns have been used such as woven and slotted patterns. However, all such screen constructions present difficulties, and have not proven successful. It has been found that the use of such screens prevents a completely smooth finish on the core which is produced. For instance, if a screen is used on the side of a print in the core box, sand will pack tightly against the screen and form a compacted convex hard layer adjacent the screen. Then when the core is removed, this hard layer is sheared from the core and adheres to the screen, leaving a rough spot on the core.

Another difficulty is that when such screens are used on curvate cavity contours, it is impossible to maintain the proper cavity contour with a screen of sufficient size to be effective. A woven screen with six or eight openings is not sufficient to permit the effective escape of air. A larger screen will upset the contour which must be maintained. The approach which has been consistently used in an attempt to solve this problem is to provide several openings over a large surface, and this has not been successful.

Therefore, it is a primary object of the present invention to provide a vent construction particularly adapted for use with core boxes, which is simple and efficient and which will provide for the effective escape of air without disturbing the core being formed.

It is another object of the present invention to provide such a vent construction which is economical and practical to manufacture and which can readily be used for any type of cavity contour without upsetting the same.

It is a further object of the present invention to provide a core box construction which is efficient in operation and which requires a minimum amount of maintenance over a long service life.

Other objects of this invention will appear in the following description and appended claims, reference being had to the accompanying drawings forming a part of this specification wherein like reference characters designate corresponding parts in the several views.

In the drawings:

Fig. 1 is a side elevation of a core box utilizing the vent construction of the present invention, a portion being broken away to reveal the internal structure.

Fig. 2 is a sectional view taken along the line 2—2 in the direction of the arrows, Fig. 1.

Fig. 3 is an enlarged fragmentary perspective view of the centrally located core box boss shown in Fig. 2.

Fig. 4 is an enlarged fragmentary perspective view of a portion of the left side of the core box shown in Fig. 2.

Fig. 5 shows a section of the print or opening left in the sand core by the boss shown in Fig. 3, and

2

Fig. 6 is a fragmentary sectional view of a portion of a core box, illustrating the adaptability of the present invention to a small curved opening in the core cavity.

Before explaining the present invention in detail, it is to be understood that the invention is not limited in its application to the details of construction and arrangement of parts illustrated in the accompanying drawings, since the invention is capable of other embodiments and of being practiced or carried out in various ways. Also, it is to be understood that the phraseology or terminology employed herein is for the purpose of description and not of limitation.

Referring to the drawings, the number 10 indicates the upper section of a core box construction and the number 12 indicates the lower section. A blow plate 14 is affixed to the upper section 10, and a base plate 16 is affixed to the lower section 12. Steel face plates 18 and 20 are provided between the core box sections at the parting of the core box. As shown in Figs. 2 and 4, slots 22 and 24 preferably about .008 inch in width, are formed into the edge of one of the core sections, in this instance the lower section 12. This provides openings at the inner portions of the slots 22 and 24 which are approximately .008 inch in size. These openings are sufficient to permit the escape of air into the slots without also admitting sand, since none of the sand grains used in such a process are less than .0010 inch in size. Outlet passages 30 and 32 are provided in the lower section 12 of the core box and these communicate with the openings 34 and 36 in the core box construction. Thus, air may escape from the core cavity 38 through the slots 22 and 24, the passages 30 and 32 and the openings 34 and 36 to the atmosphere, but the slots 22 and 24 will not pass particles of sand.

Entrance passages for the entry of the sand and air mixture are indicated at 40 and 42. Suitable conduits and couplings are affixed to these passages when the core box is in operation. This is a desirable place to provide for an air vent, and such a vent is shown in Fig. 1 of the drawings. An inlet tube is indicated at 44, and this tube extends through the blow plate 14 into the upper box section 10. The end of the tube 44 opens into the top of a pocket or print of the core form. Two plates 46 and 48 are disposed adjacent the top of the print and are held together by suitable means such as the bolts 50 and 52. Shims 54 and 56 are disposed around the bolts between the plates to space the plates 46 and 48 the proper distance to provide the desired vent. One or more passages such as the passage 58 are provided which communicate with the vent opening provided by the spaced plates and the atmosphere.

Another place where the vent is provided in the print or pocket is demonstrated by the provision of the inserts 60 and 62 which are provided completely around the core cavity. These inserts are shaped to fit the print configuration and are spaced by shims 64. The inserts are affixed together by riveting or spot welding and are affixed in the print by suitable pins or bolts. Several passages, one of which is shown at 66, connect the vent provided by the spaced inserts 60 and 62 with the atmosphere.

Another part of the core box construction wherein the vent construction can be used to good advantage is around a boss. A boss is indicated generally at 68 in Figs. 2 and 3. This boss includes a body portion 70 having a central passage 72 drilled therethrough. A pair of branch passages 74 and 76 lead from the central passage 72 to a point at the top of the boss 68. A piece of shim stock 78 is placed at the top of the boss 68 and a cap 80 is fitted over the top of the boss 68 by suitable means such as fastening pins 80a. Thus, there is a peripheral vent opening 82 adjacent the top of the boss which

3

is large enough to permit the escape of air but small enough to prevent the escape of sand. Thus, air will pass through the peripheral opening 82 into the branch passages 74 and 76, into the central passage 72, and out the opening 84 near the bottom of the core box.

A vent is also provided at the bottom of the boss 68. Two plates 86 and 88 are provided adjacent the bottom of the boss body 70 and are spaced by a shim 90. This provides a peripheral vent 92 which communicates with passages 94 and 96 through the plate 88 and the lower core section 12.

The drawings illustrate embodiments of the vent of the present invention in critical portions of the core box construction. The single opening vent construction of the present invention is readily adapted to any part of the mold box.

By providing a shim and plate construction, applicant is able to maintain single opening vents as small as .008. With slotted screens it has not been practical to attempt to reduce the opening size smaller than 0.16 to .020 inch because a tool for producing a slotted screen of smaller size is not available. With mesh screens, the opening size has necessarily been .028 inch. Small grains of sand can readily be blown through such screens, whereas they cannot be blown through my vent construction. This blowing of the sand through the screens causes a cutting operation and enlarges the openings further, often destroying the screens.

In some instances where the sand is closely packed in the enlarged openings before it can be blown through the screens, the sand will compact because it is not practical to provide a sufficient number of screens in the critical areas to exhaust the air. When the screens thus become plugged, air and sand are blown out around the parting of the core box, and this causes damage to the face steel. This is a common cause for repair of core box constructions.

Fig. 6 of the drawings illustrates the adaptability of the present invention to various locations in a core box which would be impossible to vent with the use of a conventional screen, such for example, as adjacent a small curved opening in the core cavity. In this figure, A and B illustrate adjacent portions of a core box spaced by a shim C to provide a vent slot D of a width to permit the escape of air but small enough to prevent the escape of sand. It will be noted that this vent D is located with its inlet opening contiguous with the curved profile E of the core cavity. Obviously, a conventional screen could not be used in this location since it would not fit the contour of the opening D.

I have provided a simple and practical solution to the problem presented by prior constructions and have found under test that the results produced with my construction are far superior to results produced by screen constructions. The single opening vent of small size may be run along an appreciable surface without disturbing core cavity configuration so that there is adequate venting without plugging or blow-through of the sand.

Having thus described my invention, I claim:

1. In a core box construction including complementary sections forming a core cavity, at least one of said sections being provided with a blow hole directed into said cavity; a venting construction formed from said complementary sections and comprising two spaced vent forming members, respectively having slot forming surfaces which when juxtaposed jointly define a venting slot, said surfaces being so disposed with respect to said blow hole that said slot lies in a plane which is out of the direct path of flow of sand and air from said blow hole, said members being carried by and forming portions of the normal core defining contour of the core box, and a conduit in one of said members connecting said slot with the atmosphere.

2. In a core box construction including complementary

4

sections forming a core cavity, at least one of said sections being provided with a blow hole directed into said cavity; a venting construction formed from said complementary sections and comprising two separable, spaced vent forming members, respectively having slot forming surfaces which when juxtaposed jointly define a venting slot, said surfaces being so disposed with respect to said blow hole that said slot lies in a plane which is out of the direct path of flow of sand and air from said blow hole, said members at least partially forming the surface which defines the boundaries of the slot and defines a portion of the core box confines, and a conduit in one of said members connecting said slot with the atmosphere.

3. A core box venting construction as claimed in claim 1, including a plurality of sets of spaced vent forming members, respectively disposed with respect to the normal core defining contour of the core box, to effect a distribution of venting and each being carried by and forming a portion of said core defining contour.

4. A core box construction as claimed in claim 1, including a plurality of sets of spaced vent forming members, certain of which are located at the parting of the core box sections.

5. A core box as claimed in claim 1, wherein said vent forming members are maintained in selected spaced relation by means of a shim interposed therebetween.

6. In a core box construction including complementary sections forming a core cavity, at least one of said sections being provided with a blow hole directed into said cavity, a venting system including a first venting construction formed from said complementary sections and comprising two spaced vent forming members, respectively having slot forming surfaces which when juxtaposed jointly define a venting slot, said surfaces being so disposed with respect to said blow hole that said slot lies in a plane which is out of the direct path of flow of sand and air from said blow hole, said members being carried by and forming portions of the normal core defining contour of the core box, a conduit in one of said members connecting said slot with the atmosphere, a boss affixed to one of said sections, extending into the core cavity, a cap overlying the top of said boss, a shim of reduced lateral dimensions interposed between said cap and boss to provide a peripheral slot forming a second venting construction, and a conduit in said boss connecting said peripheral slot with the atmosphere.

7. In a core box construction including complementary sections forming a core cavity, at least one of said sections having a blow hole directed into said cavity, and a boss affixed to one of said sections, extending into said cavity; a venting construction comprising a cap overlying the top of said boss, a shim of reduced lateral dimensions interposed between said cap and boss to provide a peripheral venting slot, and a conduit in said boss connecting said slot with the atmosphere.

8. In a core box construction having separable core defining members forming a core cavity and having irregular acute angle portions, an elongated slot at the apex of said irregular portions having a width as small as .008 inch, and a conduit in one of said core members connecting said core cavity with the atmosphere.

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