

Aug. 18, 1959

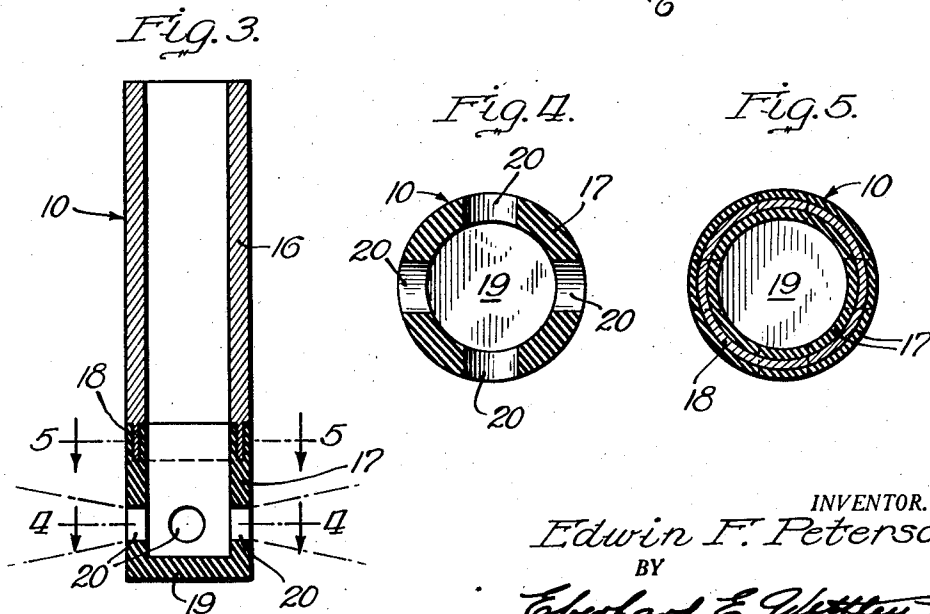
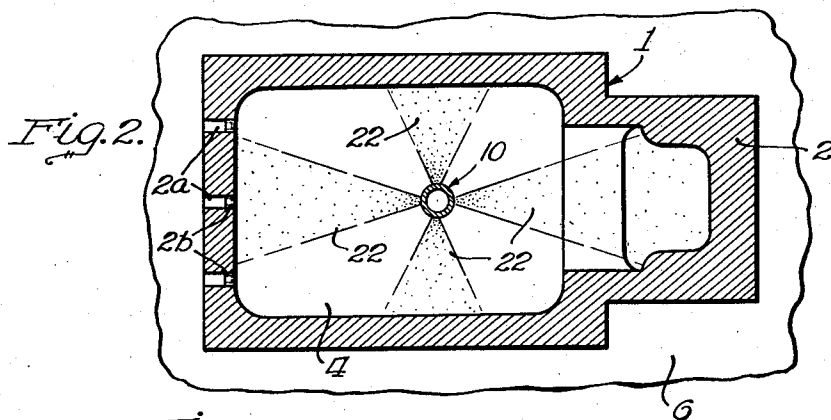
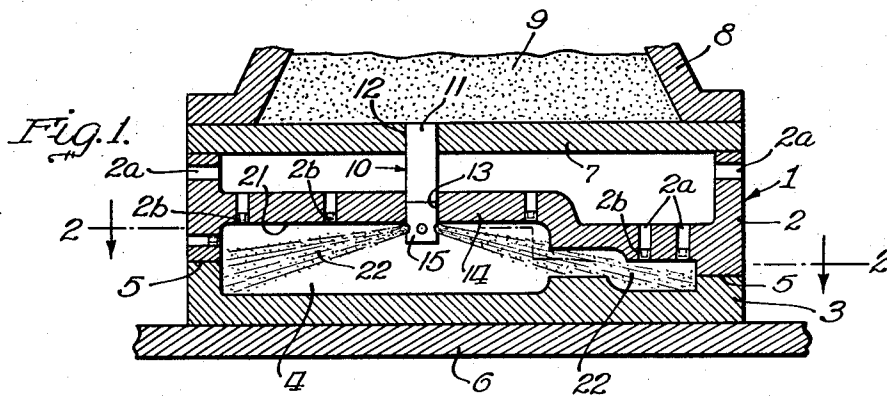
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2,899,724

BLIND END CORE BOX BLOW TUBE

Filed Aug. 29, 1955

3 Sheets-Sheet 1



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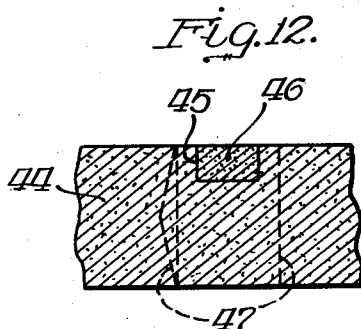
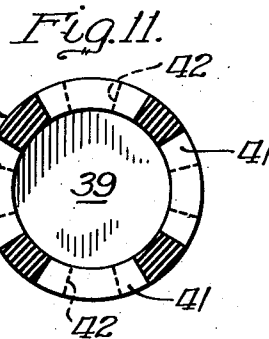
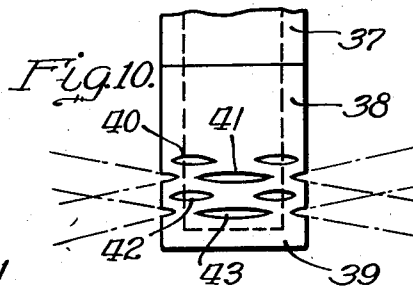
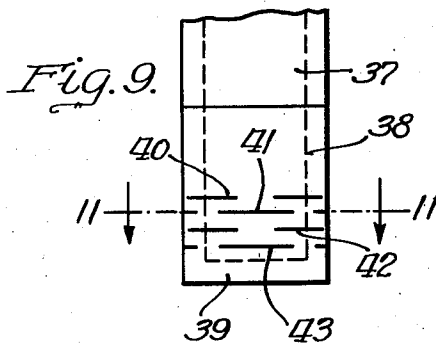
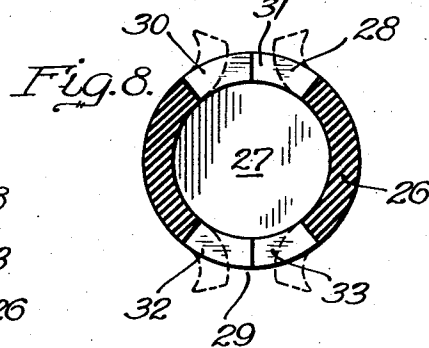
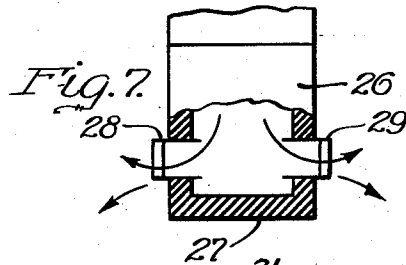
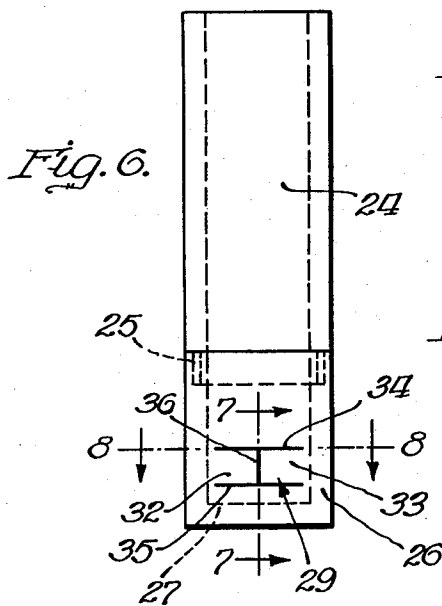
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BLIND END CORE BOX BLOW TUBE

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3 Sheets-Sheet 2



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BLIND END CORE BOX BLOW TUBE

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3 Sheets-Sheet 3

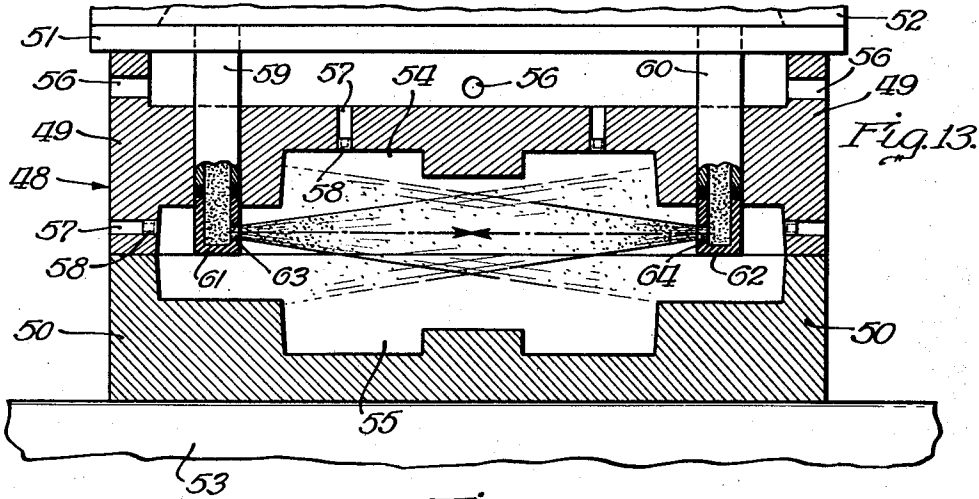


Fig. 14.

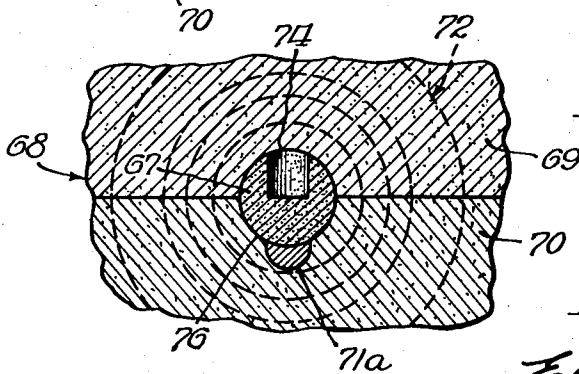
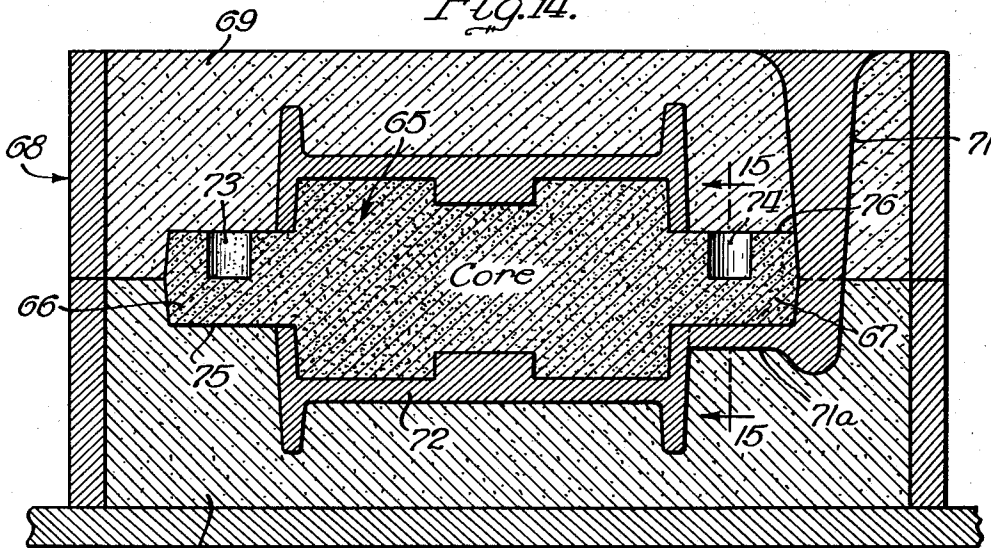


Fig. 15.

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BLIND END CORE BOX BLOW TUBE

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3 Claims. (Cl. 22—10)

This invention relates generally to sand conducting tubes of the character used between a core sand supply source of a core blowing machine and a core box and to a method of making sand cores.

More specifically the blow tube of the present invention is directed to a composite structure blow tube for conducting sand into a core box from a sand supply box and which comprises a new and novel construction in a predetermined arrangement of metal and wear resistant parts that are apertured to produce a new and desirable result in making sand cores in a core making machine.

It has been one of the objectionable features in prior practice in core making that the blow tubes were definitely directional in their sand discharging capacities with resulting damaging wear to core boxes and particularly to the areas disposed in the path of the discharging core sand stream in core boxes. This holds true whether blow tubes are employed or whether sand conducting bores were used to direct the sand into the core boxes.

Although there were various means devised to counteract such undesirable wear in core boxes, such remedial means were at best expensive and added considerably to the cost of the original core box constructions. One such arrangement is shown in my Patent No. 2,659,119 issued on November 17, 1953.

It is one of the objects of the present invention to devise a blow tube of a new and novel arrangement that will efficiently and fully fill a core box with core sand and which will eliminate the use of concentrated sand streams to definitely increase and prolong the life of a conventional construction of core box without adding to the normal expense of manufacturing such a unit or to the maintenance thereof.

It is another object of the present invention to provide a closed or blind end core box blow tube which will definitely prevent direct discharge of core sand against an opposite surface of the core box that is disposed in the normal axial direction of the sand blowing tube.

As a further object the core box blow tube of this invention is provided with a closed end rubber tip arranged with one or more radially disposed openings that function to divide the main sand stream under pressure into a plurality of streams that are directed generally radially of the tube and laterally within a cavity of a core box using the present tube.

Still other objects of the present invention are to provide various forms of openings that are radially disposed about the resilient end of the blow tube to establish directed radial distribution of the core sand coming through the blow tube from the core sand supply source.

And as another object of the present invention a sand core is formed through a method using coating opposed sand streams in a core box cavity that create a compact sand core quickly and without core box wear.

The blow tube of the present invention is constructed as shown in the preferred embodiments disclosed so as to be more specifically adapted for use in discharging dry fully flowable sand or for the other conventional

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mixes of green strength sands used in making sand cores in the core making industry. In other words, the tubes must be capable of handling core sand ranging from "hour glass" sand to very tough and gummy mixtures.

Other objects and advantages relating to the core box blow tube of this invention shall hereinafter appear in the following detailed description having reference to the accompanying drawings forming a part of this specification.

In the drawings:

Fig. 1 is a vertical cross sectional view of a functional arrangement of sand blowing head of a core making machine or the like servicing a core box, this arrangement incorporating a sand blowing tube constructed according to the principles set forth by the present invention;

Fig. 2 is a plan sectional view of the core box arrangement illustrated in Fig. 1, but as viewed substantially along the plane of the line 2—2 indicated in Fig. 1;

Fig. 3 is a vertical cross sectional view taken axially of the blow tube illustrated in Fig. 1 to show certain details of the construction thereof;

Fig. 4 is a transverse cross sectional view taken substantially along the plane of the line 4—4 in Figure 3;

Fig. 5 is another transverse cross sectional view taken substantially along the plane of the line 5—5 indicated in Fig. 3;

Fig. 6 is a side elevational view of a modified form of blow tube incorporating the principles of the present invention;

Fig. 7 is a vertical cross sectional view taken substantially along the plane of the line 7—7 in Fig. 6 showing certain parts of the tube disposed in operative positions;

Fig. 8 is a plan sectional view taken transversely of the blow tube in Fig. 6 and substantially along the plane of the line 8—8 therein;

Fig. 9 is a fragmentary side elevational view of the discharging end of a blow tube illustrating another form of the present invention and as this tube appears when inert and without pressure acting within the tube;

Fig. 10 is another side elevational view as Fig. 9 generally illustrating the appearance of the tube when subjected to core sand under pressure and as it appears in its operative sand discharging condition;

Fig. 11 is a plan sectional view taken transversely of the tube shown in Fig. 9 as viewed substantially along line 11—11 therein;

Fig. 12 is a fragmentary view of a portion of a formed core developed by the sand tube of the present invention and for purposes of further explanation of the use of the present sand blowing tube.

Fig. 13 is a vertical cross sectional view taken through a core box setup using opposed sand stream discharging tubes providing a new and novel method of forming a sand core unit;

Fig. 14 is a sectional view of a flask providing a mold that receives the sand core formed according to Fig. 1, and further illustrating the disposition of the blow tubes to leave impressions in the core print sections of the sand core; and

Fig. 15 is a fragmentary cross sectional view taken substantially along the line 15—15 indicated in Fig. 14 to show further details of construction as employed.

Referring to Figs. 1 and 2 the construction herein illustrated consists of a two piece core box 1 comprising one or more upper sections 2 and one or more lower sections 3 outlining a core forming cavity 4 with the sections being matched along the parting line 5 of the core box to provide the means to produce a core of a predetermined peripheral contour as is the normal practice in core making. The core box sections 2 and 3 are clamped to the adjustable supporting table 6 and to the blow plate 7 of the core sand supply box 8, respec-

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tively. Box 8 contains the usual supply of core sand 9 which may be either of dry sand consistency or of green sand consistency depending upon the specific conditions of use. One of the sections 2 carries air vents 2a and vent plugs 2b as is the usual practice.

The blow tube of the present invention is illustrated generally at 10 and this tube has its upper end 11 secured within a close fitting opening 12 in the blow plate 7 and the tube projects through an opening 13 formed in the upper wall 14 of the upper section 2 of the core box 1. It should be noted that the lower end or tip 15 of the blow tube projects downwardly into the chamber 4 a predetermined amount to carry out the sand blowing operation of the present tube construction.

Referring now more specifically to Figs. 3, 4 and 5 the blow tube of the present construction comprises a composite unit having a metal tube section 16 and a wear resistant or rubber tube section 17 which sections are fixedly bonded together at 18 through the interrelated annular flange construction shown in Figs. 3 and 5. It should also be noted that the metal tube 16 and the extended portion comprising the wear resistant tube section 17 are of identical thickness with the inner and outer walls of both being contiguous and smooth as best shown in Fig. 3.

The wear resistant or rubber section 17 comprises a closed or dead end construction having a solid radial or transverse wall 19 closing off the blow tube at the very location that is normally open for full stream sand discharge as is normally done with blow tubes now used in the core making industry. Spaced upwardly from the closure wall 19 are one or more radial openings 20 formed about the periphery of the dead end rubber tube section described.

With a tube of this construction it is possible to use and feed reasonably dry granular sand or the usual green core making sand because in either case the sand will be trapped in the bottom end of the tube by the dead end wall 19 thereof building up a flow stop resistance. With the air pressure relieved, very little if any of the dry sand would feed out of radial openings so that this tube can be employed to discharge various types of sand used in the operation of a core making machine.

The tube of the described construction is installed and used in the manner shown and illustrated in Figs. 1 and 2. Here the bottom tip end 15 of the tube projects below the upper inner surface 21 of the upper wall 14 of section 2 of the core box to bring the one or more radial openings 20 of the rubber section 17 into clearance positions within the cavity 4 of the core box 1. The core sand under pressure may now be fed in one or more streams such as 22 into the far reaches and connected cavities of the core box until all of this sand is backed up to the tube location to completely fill the core box cavity 4.

With this particular action and distribution of the core sand discharged by the blow tube 10 of the present invention the sand entry into a core box is distributed over wide areas of the interior surface of the core box to diversity and minimize the concentration of said feed and thus to substantially eliminate objectionable wear on the interior surfaces of the core box sections 2 and 3.

Referring to Figs. 6, 7 and 8, another form of blow tube is shown that is constructed according to the principles of the present invention which comprises a metallic tube 24 that is suitably bonded at 25 to a rubber tip 26 in much the same manner as the blow tube previously described and illustrated in Fig. 3. In the modified construction of Figs. 6 to 8, the rubber tip 26 again includes a dead end wall 27 that closes off the end of the tube. Spaced upwardly from the dead end wall 27 are one or more composite slit arrangements in reclining H forms as shown at 28 and 29 that divide circumferential wall portions of the tube into pairs of coacting doors 30—31 and 32—33.

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For example the slit arrangement 29 on the tube tip 26 illustrated in Fig. 6 includes axially spaced transverse slits 34 and 35 joined intermediate their lengths by a longitudinally placed slit or cut 36 which forms a coacting door arrangement. Under normal inactive operative conditions the door units will be closed to retain sand within the tube. Under pressure conditions, however, this tube will operate with open doors and discharge sand into the core box in the same manner as previously described in connection with Fig. 1, but the sand will be discharged through the door constructions 30—31 and 32—33.

The tube shown and illustrated in Figs. 9, 10 and 11 includes a metal sleeve 37 and a rubber tip 38 having a dead end bottom 39. This tube arrangement provides longitudinally spaced rows of annularly formed slits 40, 41, 42 and 43 which are staggered circumferentially as shown in Fig. 9 and as further illustrated in Fig. 11. This tube under pressure will normally be closed as shown in Fig. 9, but under the action of sand under pressure introduced into the tube the rubber tip 38 will expand endwise as shown in Fig. 10 to open the rows of slits 40 to 43 inclusive to provide a multiplicity of radially disposed discharge openings for the multiple distribution of the sand into a plurality of streams leading radially outwardly from the rubber end of the tube disposed within the core box cavity.

Since the tubes of the present construction are disposed slightly inwardly of the core box cavity as demonstrated in Fig. 1 a portion of the formed core shown at 44 in Fig. 12 will obviously include a small indenture or recess which is indicated by the rectangular area 45 that may be easily patched with a core sand fill such as illustrated at 46. It is also possible to plan the location of the core blowing tubes so as to be within a dotted line area such as shown at 47 in Fig. 12 that may be provided as a core print zone or core part. This will hereinafter be more fully described.

Referring now to Figs. 13 to 15, an arrangement is here illustrated to form a sand core in a core box through the method of providing opposed sand streams within the core box cavity. In Fig. 13 the core box 48 consists of upper and lower sections 49 and 50, with section 49 suitably carried by the blow plate 51 of the blow head 52 and with section 50 clamped or otherwise secured to the table 53 of a core making machine. Complementary cavities 54 and 55 are provided in sections 49 and 50 with air vents 56 and 57 formed in section 49 as shown, with vent plugs 58 in vents 57.

Spaced blow tubes 59 and 60 are carried in aligned openings in the blow plate and core box as shown, each tube depending into the core box cavity to a given distance with their tip ends 61 and 62. Also, each tube, in this instance, is provided with one discharge opening such as 63 in tube 59 and 64 in tube 60. These openings are arranged to face each other and are generally in line to direct opposite streams of sand toward each other to meet at some given distance between the tubes and within the confines of the core box cavity.

Here the sand streams greatly act to neutralize the excessive abrasive sand action within the core box and also act to quickly fill up the box in opposite corners or recesses and also form a central zone therein forming a core such as 65 shown in Fig. 12 having the core print ends 66 and 67.

Core 65 lends its use to a flask 68 as shown in Fig. 14 providing a mold with a cope 69 and drag 70 together with a sprue cavity 71 and gate cavity 71a all coacting to receive molten metal that is formed or cast into a reel or spool unit 72.

By positioning tubes 59 and 60 in spaced locations entering the core print forming cavities in the core box 48, cavities 73 and 74 result which are well absorbed or concealed within the core print receiving cavities 75 and 76 found between the cope and drag mold

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sections of the flask 68. In this instance, recesses 73 and 74 need no patching and merely comprise a part of the core as developed in the core making machine.

The foregoing description has been directed to several embodiments of the present invention and it is obvious that certain changes may be made in the individual elements of such constructions or in the combination of such elements as described without departing from the fundamental concept of the invention. Such modifications shall, however, be governed by the breadth and scope of the appended claimed subject matter directed to the present invention.

What I claim is:

1. In combination with a core box defining a cavity and having an upper wall containing an access aperture extending therethrough into an intermediate portion of said cavity, a sand conducting tube having a rubber tip extending through said aperture and depending freely in said cavity, said tip having a portion lying within said aperture, a closed end lying within said cavity, and a portion lying within said cavity containing a radially disposed discharge opening spaced from said end and in communication with said cavity to direct sand radially outwardly from said discharge opening into said cavity, whereby the introduction of sand under pressure through

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said tube tends to produce a seal between said core box and tip.

2. The invention as set forth in claim 1 wherein said opening is expansible in response to pressure applied within said tube.

3. The invention as set forth in claim 1 wherein said opening is defined by at least one slit through said tip, adapted to distend in response to pressure applied within said tube.

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