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J. RODGERS

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BLOW PLATE SEAL FOR CORE BLOWING MACHINES

Filed July 30, 1949

2 Sheets-Sheet 1

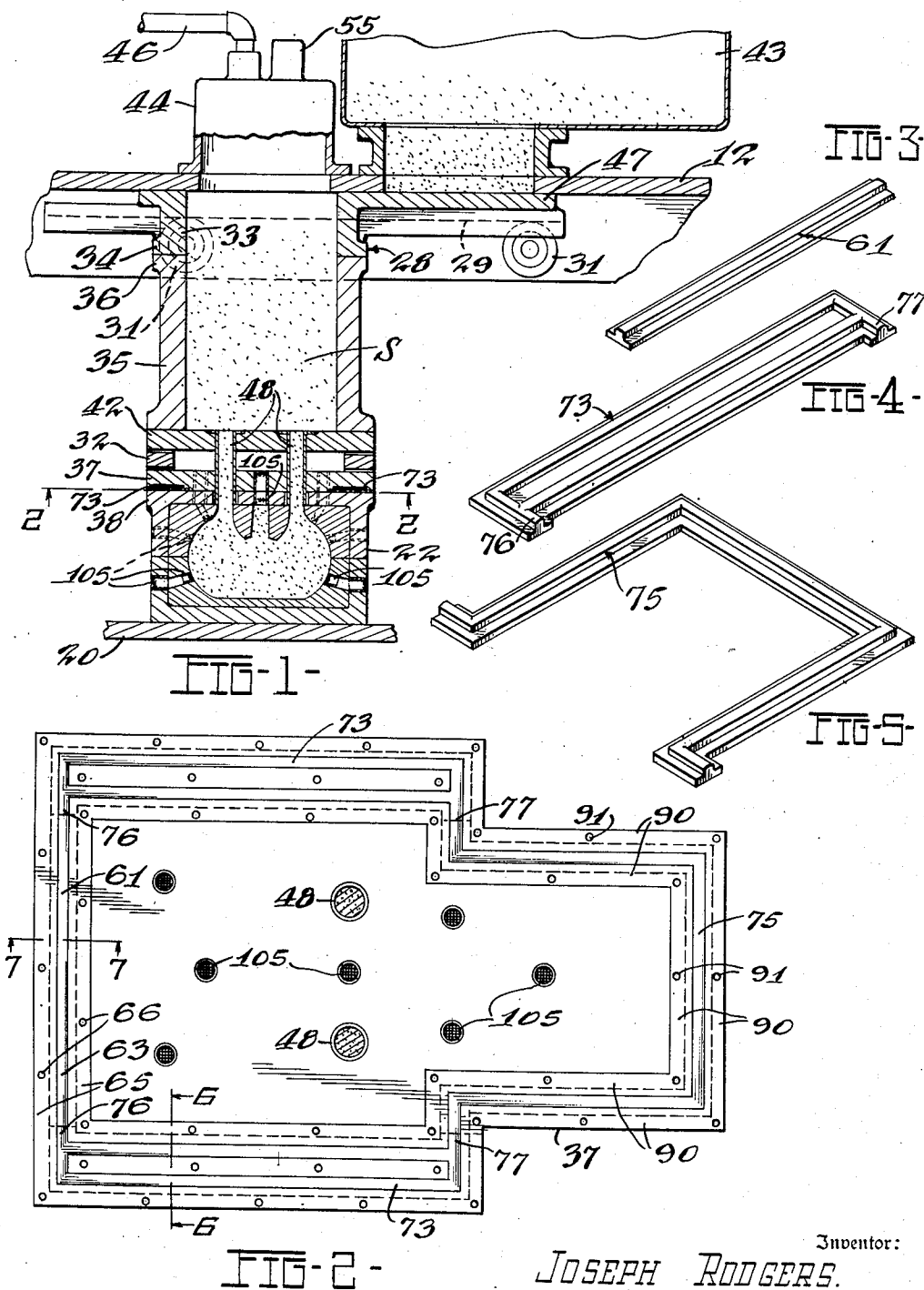


FIG-3

FIG-4-

FIG-5.

II-2-

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2 Sheets-Sheet 2

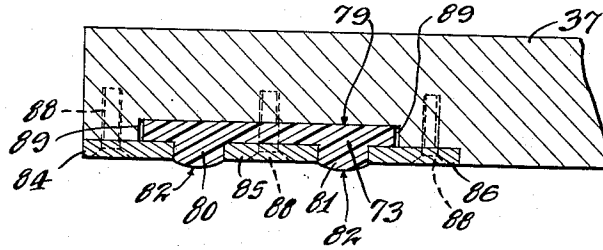


FIG-6-

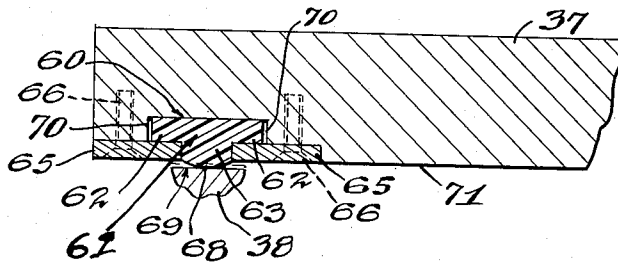


FIG-7-

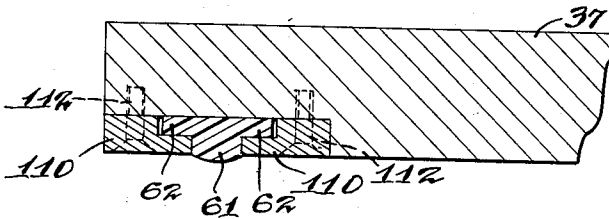


FIG-8-

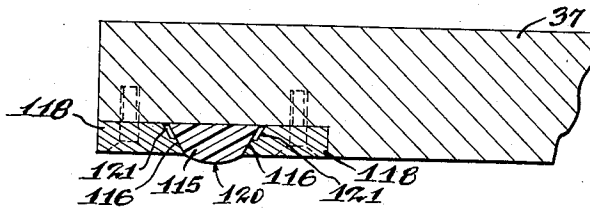


FIG-9-

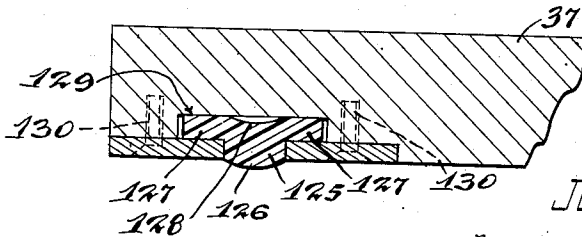


FIG-10-

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BLOW PLATE SEAL FOR CORE BLOWING
MACHINES

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assignments, to Willys Motors, Inc., Toledo,
Ohio, a corporation of Pennsylvania

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2 Claims. (Cl. 22-10)

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This invention relates to core blowing or forming machines and more especially to a sealing means for a blow plate of a machine of this character.

It has been conventional commercial practice for several years to inject sand into a core mold or core box by pneumatic means but difficulties have been encountered in efforts to establish an effective and efficient sealing means between the core box or flask and the sand feeding means. One of the major disadvantages is that moving sand particles have abrasive characteristics and tend to wear or score metal parts with which they are brought in contact. In carrying out the process of forming sand cores in this manner, the rim or flange of a core box is brought into surface engagement with a blow plate forming a part of the sand reservoir and pressure then impressed upon the sand in the reservoir whereby the sand is driven or carried into the core box. Efforts to establish an effective and efficient seal between the core box and the blow plate have been heretofore quite unsuccessful and rapid wear of the engaging surfaces of the blow plate and core box ensues. A defect in the seal between these elements permits the passage of sand at high velocity entrained in the air stream and the moving sand particles rapidly wears away the surrounding metal parts or elements and in a comparatively short time replacement of the worn elements becomes necessary.

The present invention embraces the provision of an effective and efficient sealing means disposed between elements which are subjected to moving particles of comminuted materials.

An object of the invention is the provision of a flexible sealing means for disposition between a blow plate of a core blowing or molding machine and the core box or flask for effectively preventing escape of sand between these elements.

Another object of the invention resides in the provision of a sealing means for a blow plate of a core blowing machine which is formed of a flexible or yieldable material of a nonporous character and which is arranged to be flexed or distorted in a position of use in order to establish an effective seal.

A further object of the invention resides in the provision of an effective sealing means for disposition between a blow plate of a core molding machine and a core box which is formed of a suitable resinous or plastic material which is not affected by oils, binders or other constituents admixed with the molding sand for obtaining the proper constituency of the sand for successful molding purposes.

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Still a further object of the invention resides in the provision of a sealing means of flexible material for disposition between a blow plate of a core molding machine and a core box, the sealing means being retained to the blow plate in a manner to facilitate assembly and removal of the sealing means, the sealing means retaining construction being of a character which facilitates effective sealing action of the sealing means.

Another object of the invention resides in the use of a flexible nonporous resinous sealing means for the blow plate of a core blowing machine, the resin being of a character which does not readily hold or retain particles of molding sand which may contact the sealing means during core blowing operations.

Further objects and advantages are within the scope of this invention such as relate to the arrangement, operation and function of the related elements of the structure, to various details of construction and to combinations of parts, elements per se, and to economies of manufacture and numerous other features as will be apparent from a consideration of the specification and drawing of a form of the invention, which may be preferred, in which:

Figure 1 is a vertical sectional view through a portion of a core blowing machine illustrating the application of the sealing means of my invention;

Figure 2 is a bottom plan view of the blow plate the view being taken substantially on the line 2-2 of Figure 1;

Figure 3 is a view showing one of the molded strips of sealing material for assembly in the blow plate construction illustrated in Figure 2;

Figure 4 is an isometric view illustrating another section of molded material of the sealing means;

Figure 5 is an isometric view illustrating a third section of molded material forming a part of the sealing assembly for the blow plate shown in Figure 2;

Figure 6 is a sectional view through a portion of the blow plate showing the sealing means and method of securing the sealing means to the blow plate, the view being taken substantially on the line 6-6 of Figure 2;

Figure 7 is a sectional view through the sealing means and blow plate assembly the view being taken substantially on the line 7-7 of Figure 2;

Figure 8 is a view showing a modified form of arrangement for securely retaining the sealing means to the blow plate;

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Figure 9 is a view illustrating another configuration of sealing strip of my invention; and

Figure 10 is a view illustrating another form of sealing strip.

While I have illustrated the invention as embodied in a blow plate construction for core blowing machines, it is to be understood that I contemplate the utilization of my invention with any apparatus wherein the same may be found to have utility.

Referring to the drawings in detail and first with reference to Figure 1, there is illustrated a portion of a core blowing machine and a blow plate construction embodying a sealing means of the present invention. The core blowing machine is provided with a core box or flask supporting table (not shown) which is vertically adjustable for the purpose of moving the core box or flask into cooperative relation with the blow plate. Mounted upon the table of the machine is a plate or pedestal 20 adapted to directly contact and support the core molding or core forming flask 22. A core box clamping means (not shown) is provided for maintaining the sections of the core box in proper aligned relation.

The frame member 12 of the core blowing machine supports a movable carriage 28 having a track 29 carried upon suitable rollers 31 whereby the carriage 28 may be moved along the frame member 12. The carriage is actuated by pneumatic means acting through an actuator (not shown) connected to a suitable source (not shown) of air under pressure. The carriage 28 has a depending portion 33 formed with a flange 34 to which is secured a sand reservoir 35 formed at its upper portion with a flange 36 bolted or otherwise secured to flange 34. The reservoir 35 is generally of frusto-pyramidal shape to which is secured a blow plate 37, which is usually of rectangular configuration. The blow plate 37 is of a size to mate with or match the upper flange 38 of the flask or core box 22. A spacing member 32 and a sand retaining plate 42 are disposed between the reservoir 35 and the blow plate 37 for a purpose hereinafter explained. The carriage 28 and reservoir 35 are movable to a position beneath the hopper when it is desired to fill the reservoir 35 with sand from a hopper 43.

Mounted upon the frame member 12 of the machine is a chamber 44 provided with a fitting 45 connected by means of suitable piping 46 with a source (not shown) of compressed air or other suitable pressure fluid. The pneumatic actuator for moving the carriage 28 and the valve mechanism for admitting compressed air into the chamber 44 and thence to the reservoir 35 are controlled by air pressure conveyed to these instrumentalities by means of suitable tubes (not shown).

In the operation of the machine the pneumatic control is manipulated so that the reservoir 35 and carriage 28 are moved to the position beneath the hopper at which position sand contained in the hopper 43 flows by gravity into the reservoir 35. The control is then manipulated to cause the pneumatic carriage actuating means to move the carriage 28 and the hopper 35 in a left hand direction to move the reservoir 35 beneath the air chamber 44. A gate 47 shown in Figure 1 prevents loss of sand from the hopper 43 when the carriage is beneath the air chamber. The core box or flask 22 is then moved into position beneath the reservoir 35 and an air actuator (not shown) energized to move the plate 20 and core box 22 upwardly into engagement with the

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blow plate 37 of the reservoir 35 after which compressed air is admitted by suitable valve mechanism to the reservoir 35 driving the sand in the reservoir downwardly through suitable tubes or channels 48 in the blow plate 37 so as to fill the space in the core box to form a core of the interior configuration of the box. The air pressure being in the nature of ninety pounds or more per square inch forcibly drives the sand into the core box so as to form a sand core.

After the core box has been filled with sand, the air pressure is removed from the reservoir 35 so that the reservoir may thereafter be moved to a position beneath the hopper 43 for the admission of a further charge of sand from the hopper 43, and the core box 22 taken from the machine table and the core removed therefrom. The box is repositioned so as to receive a subsequent charge of sand from the reservoir to form a core.

One of the principal difficulties in the operation of machines of this character is the inadequacy of a sand sealing means between the engaging surfaces of the core box and blow plate. Due to the fact that the sand is driven into the core box under high pressure and hence at a comparatively high velocity, any slight aperture or improper fit between the core box and blow plate permits the escape of sand, and in a short time, due to the abrasive characteristics of the moving sand, the core box or the blow plate or both become worn and cannot be used until repairs are effected. The present invention overcomes these difficulties through the provision of a seal which is effective throughout its entire area of contact with the core box so that no leakage of sand occurs at the sealing juncture and hence the life of the blow plate and core box is greatly prolonged. In Figure 2 there is illustrated a bottom plan view of the blow plate 37 which is of an exterior configuration to mate or match the flange 38 of the core box 22. In the embodiment illustrated, the sealing means comprises several molded strips of flexible material, but it is to be understood that the sealing means may be molded or formed as a single element if desired. As particularly shown in Figure 7 the blow plate 37 is formed adjacent an end with a recess 60 of substantially rectangular cross-section adapted to receive a section or strip of sealing material 61 illustrated per se in Figure 3. The sealing strip 61 is of T-shaped cross-section having lateral projections 62 and a central projecting portion 63. A pair of plates 65 disposed at each side of the strip 61 are fitted into a suitable shallow recess formed in the blow plate and are secured thereto by means of screws 66. The plates 65 bear against the projections 62 so as to retain the sealing strip in the recess 60.

As particularly illustrated in Figure 7 the exterior surface of the projection 63 is arcuately shaped or crowned as at 68, the arcuate surface being arranged to engage the upper surface 69 of the core box flange 38. The peak of the crown portion 63 is formed to normally extend outwardly from the surface of the blow plate a distance sufficient to establish an effective seal when flexed or distorted by engagement with the surface of the core box. I have found that the projection of the crown a distance of thirty to sixty-five thousandths of an inch has given very satisfactory results.

The sealing strips may be fabricated of any suitable flexible or yieldable material which will

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not deteriorate in contact with oil, moisture or other fluids embodied in the molding sand utilized to obtain the proper consistency of the molding sand. I have found that a flexible non-porous plastic material functions very satisfactorily and more specifically I have found that a highly halogenated vinyl resin molded to the desired shape is very satisfactory as a sealing means. As shown in Figure 7, the side walls of the recess 60 are spaced from the ends of the projections 62 of the sealing strip providing clearance spaces 70. This is highly desirable as the plastic sealing strip is easily distorted but is substantially incompressible as it is nonporous. Thus when pressure is placed against the crown surface 63 of projection 63 the plastic material is flexed and distorted, the material of the sealing strip moving into the spaces 70. This action takes place whenever the core box 22 is moved into sealing engagement with projections 63 causing the projecting portion thereof to be flattened into the plane of the lower surface 71 of the blow plate 37. Another feature is that the clearance spaces 70 are positioned so that they are not exposed to the molding sand and hence are not filled up with the sand during the core blowing operations.

The side portions of the blow plate at its widest dimension is provided with molded sealing strips of the character illustrated at 73 in Figures 2, 3 and 6 formed of the same material as strip 61. The narrower extension of the blow plate construction is provided with a seal in the form of a molded strip 75 of linear U-shaped configuration shown in Figure 5. In the assembly of the sealing strips illustrated in Figure 2, the ends of the strip 61 abut the extensions 76 of the strips 73 while the ends of the strip 75 abut the portion 77 of the strip 73 so as to prevent the escape of sand at these joints.

As shown in Figure 6 the strip 73 is disposed in a recess 79 formed in the plate 77. The strip 73 is provided with two parallel spaced raised portions 80 and 81 having crowned or arcuately shaped sealing surfaces 82. The strips 73 are securely locked in place by means of metal plates 84, 85 and 86 suitably secured to the blow plate 37 by means of screws 88. The recess 79 is wider than the strip 73 to provide clearance spaces 89 to accommodate distortion of the strip 73 when the projections 80 and 81 are depressed by engagement with the core box flange 38. The U-shaped strip 75 is held in place on the blow plate by means of metal strips 90 which are secured to the blow plate by means of screws 91. The strips 61, 73 and 75 when assembled on the blow plate as shown in Figure 2 provide a continuous sealing ridge or bead surrounding the central area of the blow plate and prevents the escape of sand. In Figure 1, the core box 22 is illustrated in engagement with the blow plate 37 in a position to receive a charge of sand "S" from the reservoir 35. The sealing means 73 is illustrated in this figure.

The blow plate 37 is spaced from a plate 42 associated with the lower end of the reservoir 35 by means of a spacing means 32 so as to permit the venting and escape of air from the core box when the sand is driven into the core configuration. The sand is driven into the core box chamber through tubes or channels 48 under air pressure from the chamber 44. The walls of the core box are formed with a plurality of openings in which are disposed vent screens 105. The vent screens are preferably in the form of circu-

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lar cup like members having a plurality of parallel spaced slots which are sufficiently narrow to prevent passage of the molding sand but which permit the venting of air therethrough. Through the use of the screened openings, pocketing of the air in the box is eliminated as the air in the box is completely replaced by the incoming sand. The vented air escaping upwardly through the upper vents 105 in the blow plate may pass outwardly to the atmosphere through suitable passages formed in the spacing means 32.

Figure 8 illustrates a modified form of means for retaining a sealing strip to the blow plate. In this form a notch is provided in the face of the blow plate and the sealing strip 61 held in position by means of securing plates 110 which are notched longitudinally to accommodate the laterally projecting portions 62 of the sealing strip 61. The retaining plates 110 are secured to the blow plate by means of screws 112.

Figure 9 illustrates a further form of sealing strip and means of retaining same to the blow plate 37. In this form of the invention the sealing strip 115 is formed with tapered walls 116 the strip being held in place by means of metal plates 118. The surfaces of the plates 118 engaging the walls 116 of the sealing strip are respectively parallel thereto so as to prevent an ingress of sand between the sealing strip and the retaining plates. In this form of the invention, as in the previously described forms the portion of the strip that normally projects above the surface of the blow plate and is of arcuate or crowned configuration as indicated at 120. Clearance spaces are provided as at 121 in the retaining plates 118 so as to accommodate the distorted or displaced portions of the sealing strip when pressure is placed upon the arcuate projecting portion 120.

Figure 10 illustrates a further form of sealing means 125 which has a projecting portion 126, laterally extending portions 127 and an arcuate recess 128 in the base of the strip. A recess 129 of substantially rectangular cross-section is formed in the blow plate 37 to accommodate the portions 127 of the sealing strip, the latter being held in place by means of securing screws 130. In this form of the invention, the arcuate recess 128 molded or formed in the resin sealing strips provides a clearance space to accommodate the material of the sealing strip 125 which is displaced by pressure upon the projection 126 during core forming or blowing operations.

From the foregoing description of the several forms of the present invention it is to be noted that I have provided a simple yet effective means for maintaining a seal between a blow plate of a core blowing machine and the core box or flask which will be effective over long periods of time in preventing the escape of sand during core forming operations. I have found that through the use of my invention, the sealing means practically eliminates wear of the engaging surfaces of the blow plate and core box. The utilization of the present invention has thus greatly reduced the cost of core blowing operations as expensive repairs to the blow plate and core box are substantially eliminated. The plastic sealing means effectively seals the engagement of the blow plate with the core box against the escape of sand, and hence there is little or no wear of these elements.

It is apparent that, within the scope of the invention, modifications and different arrangements may be made other than is herein disclosed,

and the present disclosure is illustrative merely, the invention comprehending all variations thereof.

What I claim is:

1. In combination, a blow plate adapted for cooperation with a core box for molding cores having a recess formed therein, a sealing means disposed in said recess, said sealing means being of a T-shaped cross section, means engageable with the arms of the T-shaped sealing means for retaining same in the recess, said means defining a T-shaped recess, the body portion of the T-shaped sealing means projecting beyond the surface of the blow plate, said arms of said T-shaped sealing means being in width less than the width of said recess to provide clearance when the body portion is distorted upon engagement with the core box.

2. In combination, a blow plate adapted for cooperation with a core box for molding cores having a recess formed therein, a sealing means disposed in said recess, said sealing means being of a T-shaped cross section, means engageable with the arms of the T-shaped sealing means for retaining same in the recess, said means defining a T-shaped recess, the body portion of the T-shaped sealing means projecting

beyond the surface of the blow plate, the exposed surface of the projecting portion being of curved contour, said arms of said T-shaped sealing means being in width less than the width of said recess to provide clearance when the body portion is distorted upon engagement with the core box.

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