June 6, 1950 W. E. REHKLAU 2,510,417

FOUNDRY MOLD PRACTICE

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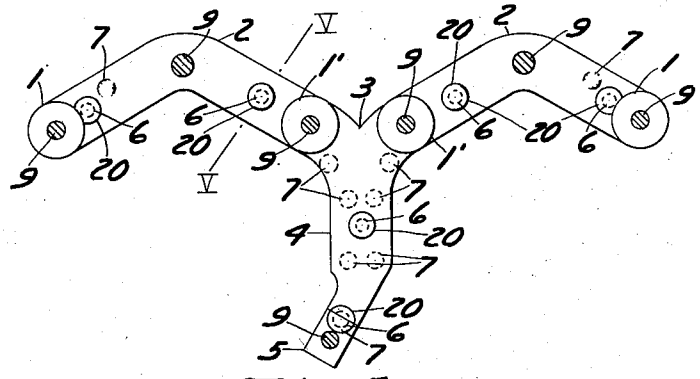


Fig. 1

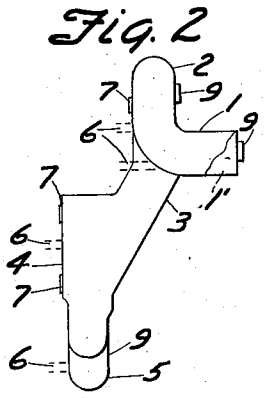


Fig. 2

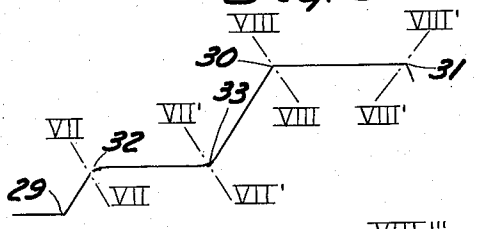


Fig. 3

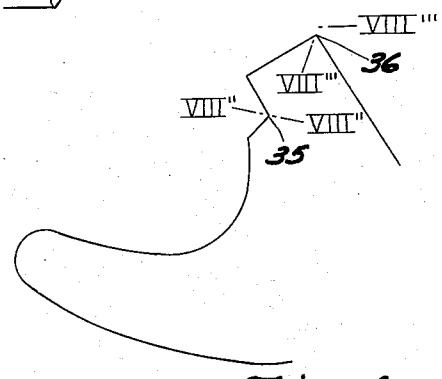


Fig. 4

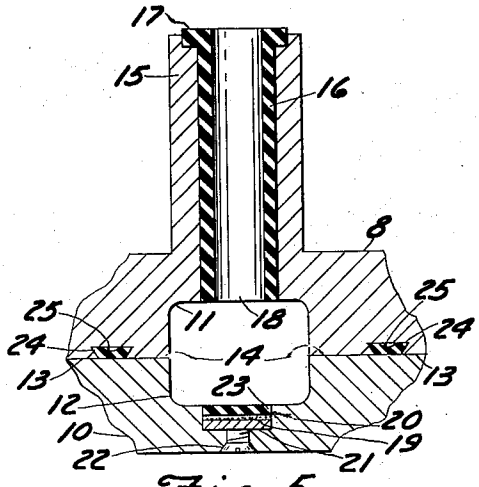


Fig. 5

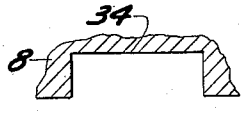


Fig. 7

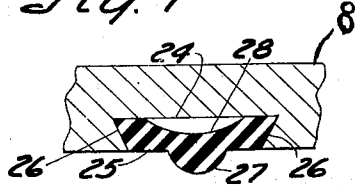


Fig. 6

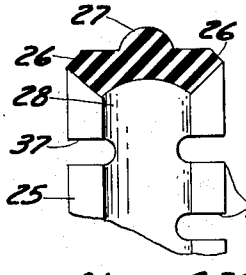


Fig. 8

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FOUNDRY MOLD PRACTICE

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1 Claim. (Cl. 22—13)

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This invention relates to the promotion of efficiency in molding practices.

This invention has utility in the molding of cores, and more particularly has to do with the handling of core boxes during the charging thereof by air blasts of the molding sand or granular material to be shaped into a form for a core object to be thereafter baked to impart sufficient rigidity thereto that it may be assembled as a core in a mold. The general character of the core box may be of aluminum casting, or of iron, wood, or other material. Frequently, even when generally of aluminum, there may be patches or special portions of other metal, as brass, iron or solder.

Considering the corebox of two major sections or parts, there is a lower section or half, and a complementary upper section or half. Upon assembly, the purpose is for fully enclosing a chamber for the core to be formed. Accordingly, the respective sections are partible along the chamber at smooth surfaces adapted to abut for snug registry. Depending upon whether the core chamber be flat or devious, the parting region may be a plane, or planes connected by more or less abrupt regions or arcs of concave or convex form. In the carrying out of the invention, bounds at the parting in one of the sections, as the upper section, may have a dovetail seat or channel to carry a compressible sealing element of continuity. Furthermore the blastway and direct impingement are lined or faced with rubber characteristic material not subject to disintegration.

Referring to the drawings:

Fig. 1 is an outline of a four-cylinder exhaust manifold core;

Fig. 2 is a side elevation of the manifold core of Fig. 1;

Fig. 3 is a graph of sealing element course portion in side elevation for the core of Fig. 1;

Fig. 4 is a graph of sealing element course portion in plan looking down on a turned over top section for the core of Fig. 1;

Fig. 5 is a section on the line V—V, Fig. 1, showing blast tube lining and facing with sealing features;

Fig. 6 is a larger scale showing of the sealing element in section.

Fig. 7 is a section thru the groove or holding channel, as in a convex region VII—VII, or a concave region VII'—VII' Fig. 3; and

Fig. 8 shows special adaptation of the elastic strip to avoid puckering at abrupt direction changes in the channel or way, as in a region VIII—VIII and a region VIII'—VIII' Fig. 3, as

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well as for regions VIII''—VIII'' and VIII'''—VIII''' Fig. 4.

Contour outline 1, 2, 3, 4, 5 (Fig. 1), for a four-cylinder internal combustion motor exhaust manifold core, is shown as for a pattern or mold having granular material or sand blast charging ports 6, and distributed air-escape or seepage screen or latticed ports 7 to retain the core material grains. The ports 7 are so located that the blown-in sand grains may be lodged uniformly thruout the core mold in completing its formation. The ports 7 for air escape are shown or indicated as from upper core mold section 8, with similar ports 9 in a complementary lower core mold section 10. The mold section 8 has therein a core mold channel 11 adapted to register with a complementary core mold channel 12 in the section 10. The section 8 has parting face smooth region 13 extending away from opposite sides of the channel 11. Adapted for tight-fitting register therewith, as abutting thereon, the section 10 has parting face 14. Outline portions 1' are for cylinders intermediate the portions 1.

Under the invention herein, blast ways or ducts 15 (Fig. 5) as seats have a lining 16 with an outer incompletely countersunk flange portion 17, adapted for sand blast nozzle non-leak insertion. The discharged granular material is impinged upon core mold wall opposite the entrance or delivery port 18 from the lining 16. Adhesive or cement 19 anchors a face disk 20 with a disk or plate 21, removably locked by a screw 22 in a seat 23 directly in front of the port 18.

In the face 13 of the section 8, spaced more or less uniformly away from the core mold channel 11, endless way or bounding groove 24, say of normal dovetail contour in cross-section, is provided. The groove 24 is an endless seat in which is located a yieldable elastic strip 25 having dove-tail undercut complementary seat portions 26. The face or exposed portion of the strip 25 has a convex bead or rib 27, back of which in the groove 24 the strip has a concave arc thinned portion 28. There is thereby promoted the give factor achieved for snugly forcing the rib 27 in uniformly effective contacting relation thruout with the face 14 of the abutting section 10 with the section 8 of the core mold or box.

Foundry practice in the handling of granular material or molding sand for core boxes, has special ingredients or substances, as resin or oil incorporated therewith, to coact as a bonding agent for holding the grains together for transfer to the heating or baking stage, as well as to retain sufficiently rigid form thereafter to respond to

holding up in a mold to be formed, as to which the section is the core portion. Furthermore in clearing a used box or mold for re-use, solvents or cleansing agents, such as kerosene and sal soda solutions, may be used. It is thus seen that the walls of the core box may to some extent have contamination thereon of attacking properties as to natural gutta percha or rubber. Applicant has found that certain synthetic plastics of rubber-like characteristics, to be readily yieldable, with a degree of elasticity may be used herein as a potent agent in contributing to core box upkeep in sealing against abrasion, as well as coact in speeding up foundry operations. Accordingly, the liner **16**, with its flange **17**, the disk **20** and the strip **25** are of a selected elastic yieldable plastic, usually a synthetic substance, such as neoprene.

Deviations from flat plane direction for the abutting faces **13**, **14**, are taken into account for the effective sand blast sealing between the core box sections. At more or less abrupt angles or corners **29**, **30**, **31** (Fig. 3), graph, the dovetail groove **24** may be fared out thereinto to avoid sharp cutting edges, whether acute, right angles, or obtuse, and of the degree therefor. However, for arcuate paths, whether convex region **32**, or concave region **33** (Fig. 3), the cutting tool for forming the groove **24** does not readily hold to the seat cross-section as such curved regions may be of radius say 1" or less, on the basis that the groove **24** may be in the range of $\frac{3}{8}$" wide at its root, and say $\frac{1}{8}$" to $\frac{3}{16}$" deep with the opening or throat say $\frac{3}{16}$" to $\frac{1}{4}$" wide. Accordingly to meet this special arc condition a groove portion **34** (Fig. 7) may be of a width slightly wider than the throat of the normal dovetail thereto, but not so wide as the root. However the rectangular cross-section groove **34** may be slightly deeper than the groove **24**. The stretch or elasticity of the strip **25** is such as readily to conform to the special directions, not only as up and down, but as sinuous or more or less tortuous in the plane laterally from the core channel **11**. Corners **35**, **36** (Fig. 4) graph, may not pucker or distort the strip seat portions **26**, for as there may be need therefor, notches **37** (Fig. 8) may extend to the give recess portion **28** from the strip under edge portions, to leave the bead or packing portion **27** continuous.

The preferred practice is to have the strip **25** endless. This may be by vulcanizing or cementing. Also, the normal overall length may be slightly less than that of the endless groove **24**, **34**. From this it follows that there is to some extent an availing of the elasticity for stretching the strip **25** into its bounding seat for the channel **11**. There is normally ample frictional holding so to retain the strip, but as occasion may arise, the strip **25** may be readily pulled free therefrom for later re-use or replacement.

What is claimed and it is desired to secure by Letters Patent is:

A mold box first section providing a channel way portion forming spacing means between coplanar faces extending away from the way portion, a complementary second section having a channel way portion adapted to register with the channel way portion of the first section to form a cross-section completed passage of lineal extent for a duct in the assembled mold box, the second section having faces abutting the coplanar faces of the first section in said assembly in providing a peripherally complete bounding wall for the passage at the cross-section, laterally spaced from each other by said passage there being a pair of dove-tail grooves in one of the sections, said grooves having in cross-section configuration a straight bottom between a pair of corners, and compressible filler strip means for the respective grooves, said strip means being configured in cross-section with diverging corner portions to register in the dove-tail groove corners with a concave face portion providing centrally along said groove bottom a clearance width way, said strip means having outwardly from the concave face portion a narrower convex rib portion of less width than the clearance width way of the opposite side of the strip means, said rib portion coacting upon the assembly of the first section with the second section to squeeze the rib portion toward the coplanar abutting faces into bridging relation and further distort the strip means in reducing the concave clearance of the strip means relatively to the dove-tail groove therefor.

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