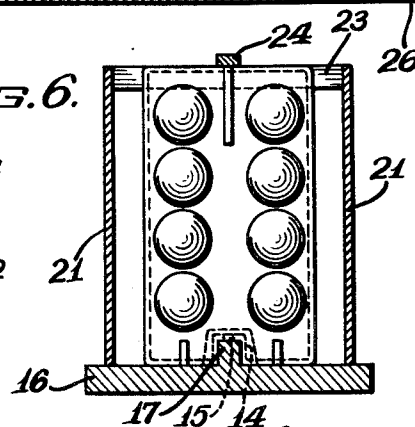
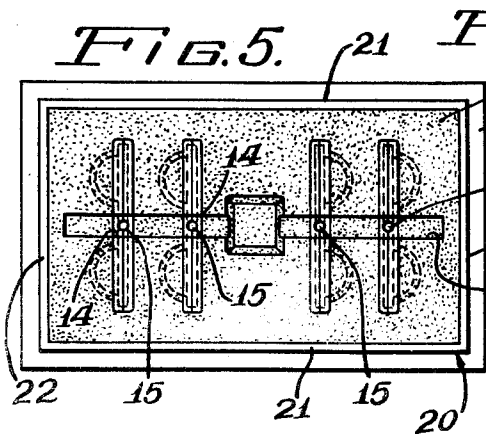
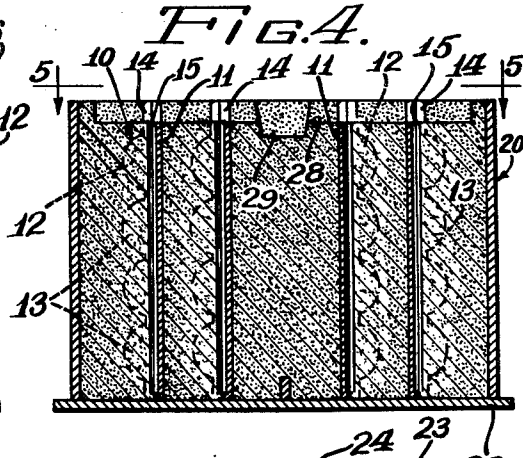
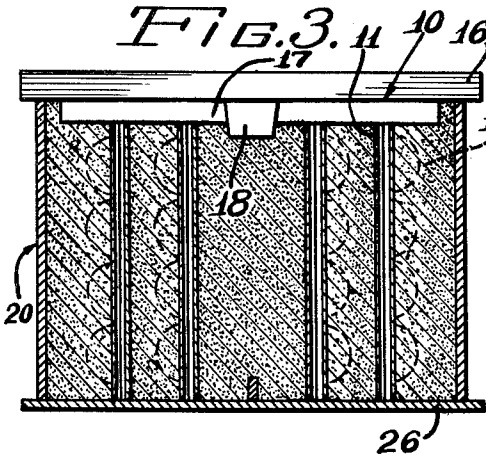
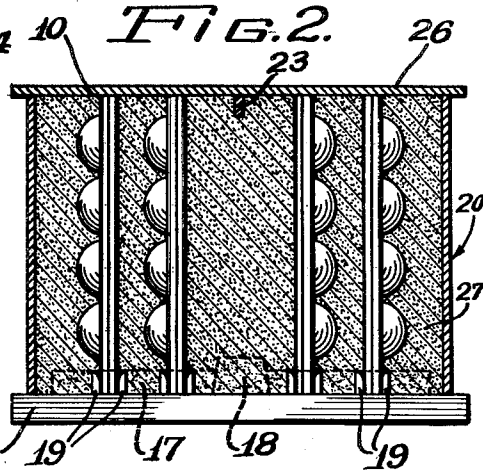
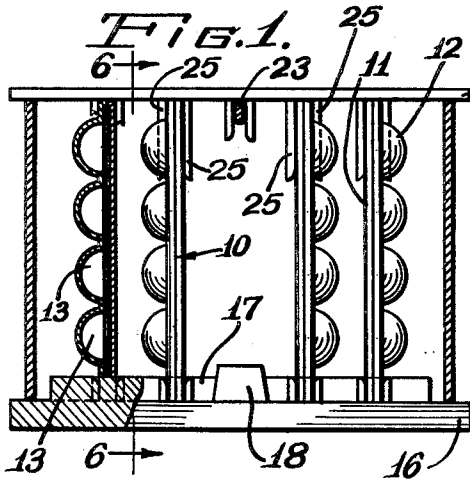


July 30, 1957

E. P. COOKE
METHOD AND APPARATUS FOR SUPPORTING SHELL TYPE
MOLDS FOR METAL POURING
Filed July 9, 1954

2,800,692



Inventor:
Edward P. Cooke
Paul O. Pippel Atty.

1

2,800,692

METHOD AND APPARATUS FOR SUPPORTING SHELL TYPE MOLDS FOR METAL POURING

Edward P. Cooke, Indianapolis, Ind., assignor to International Harvester Company, a corporation of New Jersey

Application July 9, 1954, Serial No. 442,248

10 Claims. (Cl. 22—90)

This invention relates to an improved method and apparatus for supporting shell-type molds in position for receiving molten metal. More particularly the invention relates to an improvement for forming a common runner in a backing material for delivering molten metal to the mold cavities of shell molds.

In the process of shell mold casting the shell molds generally consist of a pair of frangible shell portions which are suitably held together in assembly by means of an adhesive material. The shell molds are generally made of a frangible material consisting of a suitable binder and sand mixture. During the casting operation the shell molds must be properly supported so that the walls of the mold will remain in position while the metal is introduced into the cavity of the mold. Various means and ways have been devised for supporting the shell mold walls but perhaps the most effective is to support the same with a suitable dense sand mixture which is poured into a flask in which the molds are positioned in an upright position. The sand is suitably packed around the shell molds and effectively supports the walls during the casting operation. In any production shell mold casting operation it is desired to pour a large quantity of metal simultaneously into a plurality of shell molds. This can be accomplished by designing various independent runners leading to each of the cavities of the molds. However, this is a costly procedure and it is a prime object of this invention to provide an improved method and apparatus designed to permit the simultaneous casting of a number of shell molds in an inexpensive and effective manner.

It is another object of this invention to provide an improved method for forming a common runner or pouring passage in material normally disposed to support a plurality of shell molds in position for casting.

A still further object is to provide an improved runner passage in communication with a plurality of shell molds, the runner passage being formed in the material normally designed to support the walls of the shell molds.

A still further object is to provide apparatus for supporting shell molds, the apparatus including an enclosure or flask adapted to receive finely divided material for supporting a plurality of shell molds in an upright position, the container or flask also including a pattern member adapted to form a common runner in the backing material, the runner being in communication with a plurality of the shell type molds whereby cast material may be directed to the runner for simultaneously pouring a plurality of shell molds.

These and further objects will become more readily apparent from a reading of the specification when examined in connection with the accompanying sheet of drawing.

Figure 1 is a cross-sectional view through an apparatus for supporting shell molds in an inverted upright position;

Figure 2 is a view similar to Figure 1 showing the apparatus or container filled with a backing mixture adapted to support the molds in the position indicated;

Figure 3 is a view similar to Figure 2 showing the mold-

2

supporting container placed in an inverted position where the shell molds contained therein are placed in an upright pouring position;

Figure 4 is a view similar to Figure 3 showing the apparatus and shell molds in position for pouring with a bottom having a platten thereon removed from the apparatus;

Figure 5 is a plan view of a mold-supporting apparatus, the view being taken substantially along the line 5—5 of Figure 4;

Figure 6 is a cross-sectional view taken substantially along the line 6—6 of Figure 1.

The frangible shell-type molds with which the present invention is concerned are generally designated by the reference character 10. The shell-type molds 10 comprise relatively thin frangible half portions 11 and 12 suitably fastened together to form a cast metal receiving cavity 13. Each shell-type mold is provided with a recessed neck portion 14 having, as best shown in Figure 6, a pouring opening 15.

The shell molds 10 are supported in an upright position on a bottom member 16. In this position the molds 10 are inverted with the neck portion 14 disposed adjacent the bottom 16. The bottom 16 includes an elongated projecting pattern 17 provided with a centrally located enlargement 18, the said pattern 17 and enlargement 18 projecting inwardly between the shell molds 10. The bottom 16 also includes a plurality of upright laterally spaced supporting fingers 19 adapted to engage portions of the molds 10 so as to straddle the same and maintain them in laterally spaced relation with respect to the bottom 16.

A box-like enclosure or container 20 is placed on top of the bottom 16. The container or enclosure 20 comprises side walls 21 suitably connected to end walls 22 in rectangular or box-like configuration. A brace 23 connects the side walls 21. An upper support 24 is placed on the enclosure 20. The support 24 comprises a plurality of vertically extending fingers or supporting elements 25 the same being suitably spaced laterally for vertical alignment with the supporting fingers 19.

As best shown in Figure 2 a top closure member or cover 26 is placed on the enclosure 20 upon the removal of the upper support 24. This closing of the enclosure 20 may be accomplished after a sand mixture 27 has been suitably packed in and about the shell molds 10.

As best shown in Figures 4 and 5 the pattern 17 is effective to form a recessed passage or common runner 28 which is in communication with the pouring openings 15 of the shell molds 10. The common runner 28 also includes a recessed central well 29 which is suitably formed by means of the central enlargement 18 on the pattern 17.

In the process of forming a common runner and in positioning the shell molds for a casting operation, the shell molds are first placed upon the bottom 16 in an inverted upright position. The fingers 19 are effective to suitably space the shell molds 10. The recessed neck portions 14 of the shell molds serve to straddle the elongated projecting pattern 17 and the pouring openings 15 are immediately above and in contiguous relation with respect to the said pattern 17. The enclosure 20 is then placed on the bottom 16 and the support 24 is placed in position shown in Figure 1 whereupon the fingers 25 suitably serve to keep the shell molds in the upright position. A finely divided sand mixture 27 is then packed or blown into the container 20. This mixture 27 may be suitably packed by means of the conventional type of sand blowing machine or other foundry apparatus. The sand mixture may include a suitable binder such as oil which is conventional in the art so that it packs well and does not lose its shape after packing. The sand mixture 27 is suitably packed in between the shell molds 10 and also about the pattern 17.

3

After such packing the support 24 is removed from the enclosure 20 and the cover 26 is placed in position. The unit or apparatus is then turned a full 180 degrees until, as shown in Figure 3, the unit is positioned on the cover member 26. The bottom 16 containing the pattern 17 is now removed and as indicated in Figure 4 a runner or recessed passage 28 is formed in the sand mixture 27. The runner or passage also is in communication with a central well 29. As best shown in Figure 5 the runner 28 is now in direct communication with each of the pouring openings 15 of the shell molds 10. Casting material can now be delivered to the central well 29 and cast material simultaneously flows through the runner passage 28 to each of the cavities 13 of the shell molds 10.

It can thus be seen that an improved method and apparatus has been provided for supporting the shell molds during a pouring operation. Furthermore, the common runner or passage necessary to effect mass pouring of the material has been directly formed in the backing or packing material which is provided to suitably support the molds. Thus a very efficient and inexpensive common runner is provided without the necessity of using extraneous materials or troughs to effectuate this desirable simultaneous mass pouring operation.

Thus it can be seen that the objects of the invention have been fully achieved and it must be understood that changes and modifications may be made which do not depart from the spirit of the invention as disclosed or the scope thereof as defined in the appended claims.

What is claimed is:

1. A method of forming a common runner passage in backing material used for supporting frangible shell-type molds, each mold having complementary side walls disposed to form a receiving cavity and a pouring neck including a cavity opening in communication with said cavity comprising; placing said molds in an inverted upright position on a base having a longitudinal extending projection with the pouring opening disposed over and in laterally aligned relation with respect to said projection, positioning an enclosure around said molds and supporting the same on said base, packing material within the enclosure for backing up and supporting said molds, covering said enclosure with a closure member, turning said assembly to support the molds and enclosure in an upright position on said closure member, and removing said base to expose said backing material whereby an elongated runner passage is formed in the material, the runner being in communication with the pouring openings.

2. A method of forming a common runner passage in backing material and to support shell-type molds, each mold having complementary half portions positioned to form a receiving cavity and a pouring neck having a pouring opening in communication with said cavity comprising; positioning said molds in an inverted vertical position in a box-like structure having a removable top and a removable bottom, the bottom having an elongated projecting member connected thereto, supporting the molds with the pouring openings above and immediately adjacent the projecting member, packing a finely divided material in the box-like structure around said molds, inverting said box-like structure to support the same on the removable top whereby the molds are in an upright pouring position, and removing said bottom from the structure whereby said projecting member leaves a common runner passage in said backing material in communication with the pouring openings of the molds.

3. A method of forming a common runner passage in backing material and to support shell-type molds, each mold having complementary half portions positioned to form a receiving cavity and a pouring neck having a pouring opening in communication with said cavity comprising; positioning said molds in an inverted vertical position in a box-like structure with a removable top and a removable bottom, the bottom having an elongated pattern member connected thereto, supporting the molds with the pouring

4

openings adjacent the pattern member, packing a finely divided material in the box-like structure around said molds, inverting said box-like structure to support the same on the removable top whereby the molds are in an upright pouring position, and removing said bottom from the structure whereby said pattern member leaves a common runner passage in said backing material in communication with the pouring openings of the molds.

4. A method of forming a common runner passage in backing material and to support shell-type molds, each mold having complementary half portions positioned to form a receiving cavity and a pouring neck having a pouring opening in communication with said cavity comprising; positioning said molds in an inverted vertical position in a box-like structure having a removable bottom, the bottom having an elongated projecting member connected thereto, supporting the molds with the pouring openings adjacent the projecting member, packing a finely divided material in the box-like structure around said molds, covering said structure with a top closure member, inverting said box-like structure to support the same on the closure member whereby the molds are in an upright pouring position, and removing said bottom from the structure whereby said projecting member leaves a common runner passage in said backing material in communication with the pouring openings of the molds.

5. A method of forming a common runner passage in backing material used for supporting shell-type molds, each mold having complementary side walls disposed to form a receiving cavity and having a pouring opening in communication with said cavity comprising; positioning said molds in an inverted position in a box-like structure having a removable bottom wall, the bottom wall having an elongated projecting pattern extending upwardly into the structure and a plurality of inwardly extending supports engaging upper portion of the molds to maintain the same in relative lateral spacing, supporting lower portions of the molds with a removable support positioned on the structure to maintain the molds in laterally spaced vertical positions with the pouring opening disposed adjacent the pattern, packing a sand-like material in the structure around said molds, removing said removable support, enclosing said structure with a top closure member, inverting said structure to support the same on said top closure member, and removing said bottom and pattern to provide an elongated runner passage in communication with said pouring openings.

6. A method of forming a common runner passage in backing material used for supporting shell-type molds, each mold having complementary side walls disposed to form a receiving cavity and having a pouring opening in communication with said cavity comprising; positioning said molds in an inverted position in a box-like structure having a removable bottom wall, the bottom wall having an elongated projecting pattern extending upwardly into the structure and a plurality of inwardly extending supports engaging portions of the molds to maintain the same in relative lateral spacing, supporting lower portions of the molds to maintain the molds in laterally spaced vertical positions with the pouring opening disposed adjacent the pattern, packing a backing material in the structure around said molds, enclosing said structure with a closure member, inverting said structure to support the same on said closure member, and removing said bottom and pattern to provide an elongated runner passage in communication with said pouring openings.

7. A method of forming a common runner passage in backing material used for supporting shell-type molds, each mold having complementary side walls disposed to form a receiving cavity and having a pouring opening in communication with said cavity comprising; positioning said molds in an inverted position in a box-like structure having a removable bottom wall, the bottom wall having an elongated projecting pattern extending inwardly into the structure, supporting lower portions of the molds to

5

maintain the molds in laterally spaced vertical positions with the pouring opening disposed adjacent the pattern, packing a material in the structure around said molds, enclosing said structure with a closure member, inverting said structure to support the same on said closure member, and removing said bottom and pattern to provide an elongated runner passage in communication with said pouring openings.

8. A device for supporting frangible shell-type molds for a metal pouring operation comprising; a box-like container having upper and lower oppositely disposed openings, a removable bottom disposed over the lower opening, said bottom having an elongated projecting pattern portion extending into said container, a plurality of first supporting elements connected to said bottom and extending upwardly into said container, a removable supporting member having second supporting elements, said supporting member being adapted to be disposed adjacent the upper opening and having second supporting elements projecting downwardly into the container in vertically aligned relation with respect to said first supporting elements, said supporting elements being adapted to support a plurality of shell molds in an upright inverted position with the pouring openings of the molds disposed adjacent the pattern, said container being adapted to receive a quantity of backing material which is packed between the shell molds for supporting the same, said supporting member being removable after said backing material has been packed within the container, and a removable cover being adapted to be disposed over said upper opening, said box-like container being adapted to be inverted to support the same on the cover whereby said bottom and pattern may be removed to provide a recessed runway in said backing material in communication with the pouring openings of the shell molds.

9. A device for supporting frangible shell type molds for a metal pouring operation comprising; a box-like container having upper and lower oppositely disposed openings, a removable bottom disposed over the lower open-

6

ing, said bottom having an elongated projecting pattern portion extending into said container, a plurality of first supporting elements connected to said bottom and extending upwardly into said container, said supporting elements being adapted to support a plurality of shell molds in an upright inverted position with the pouring openings of the molds disposed adjacent the pattern, said container being adapted to receive a quantity of backing material which is packed between the shell molds for supporting the same, a cover removably disposed over said upper opening, said box-like container being adapted to be inverted to support the same on the cover whereby said bottom and pattern may be removed to provide a recessed runway in said backing material in communication with the pouring openings of the shell molds.

10. A device for supporting frangible shell-type molds for a metal pouring operation comprising; a box-like container having upper and lower oppositely disposed openings, a removable bottom disposed over the lower opening, said bottom having an elongated projecting pattern portion extending into said container, means adapted to support a plurality of shell molds in an upright inverted position with the pouring openings of the molds disposed adjacent the pattern, said container being adapted to receive a quantity of backing material which is packed between the shell molds for supporting the same, a cover removably disposed over said upper opening, said box-like container being adapted to be inverted to support the same on the cover whereby said bottom and pattern may be removed to provide a recessed runway in said backing material in communication with the pouring openings of the shell molds.

References Cited in the file of this patent

UNITED STATES PATENTS

521,450	Adams	June 19, 1894
2,155,800	Perazo	Apr. 25, 1939
2,651,822	Davis	Sept. 15, 1953