Feb. 14, 1928. 1,658,836

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MOLDING APPARATUS

Original Filed April 26. 1924

Fig. 1.

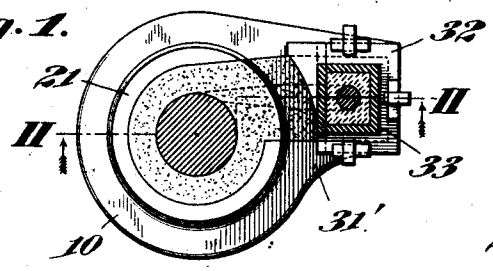


Fig. 5.



Fig. 2.

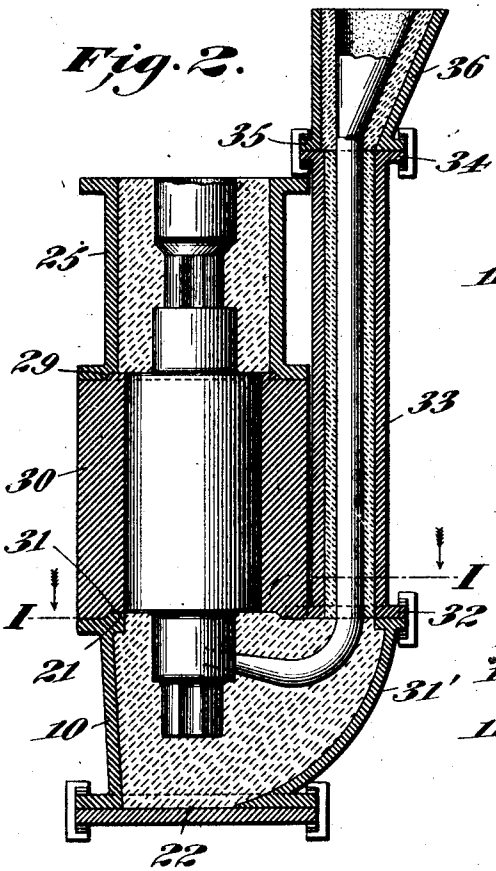


Fig. 4.

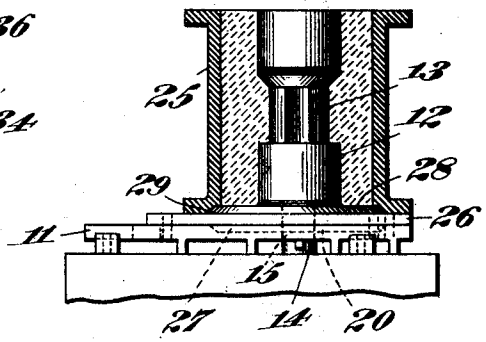
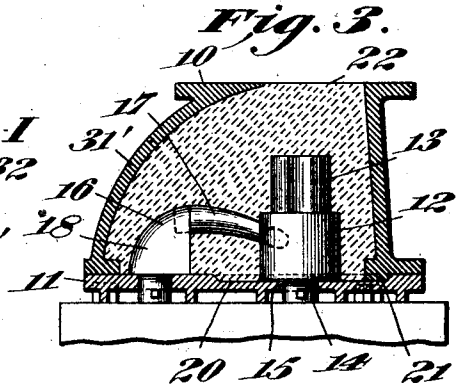


Fig. 3.



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UNITED STATES PATENT OFFICE.

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MOLDING APPARATUS.

Original application filed April 26, 1924, Serial No. 709,125. Divided and this application filed May 18, 1926. Serial No. 109,847.

The application is a division of application Serial No. 709,125, filed April 26, 1924.

Our invention relates to molding apparatus and it has for an object to provide a flask construction having gate and mold portions open to the top of the flask and not separated from each other by any partition so that a molded article may be readily removed from the mold.

A further object of our invention is to provide a bottom flask having gate and mold portions open to the top of the flask and not separated from each other by any partition together with a drag flask and a runner box for covering the chambers, whereby the sand defining the gate opening between the channel of the runner box and the mold chamber is effectively reinforced to prevent out-breaking of metal through the sand.

A further object of our invention is to provide an arrangement of drag plates having interfitting joints whereby the bottom flask molds and the coping flask molds may be coaxially formed.

A further object of our invention is to provide a mold construction made up of a bottom flask, an intermediate flask, and a coping flask together with interfitting joints between the flasks, whereby the flasks may be readily fitted into accurately assembled relation.

Heretofore the drag necks and wabblers of chilled cast iron rolls have been molded in an iron or steel flask so constructed that they are molded in one flask while the gate is molded in a separate flask, called the "elbow flask" and bolted to the drag flask. Sometimes this elbow flask has been cast in one piece with the drag flask, such as in our invention, but a dividing partition between the two has always been retained. Then when the rolls are cast and ready to be removed from the sand, the gate must be first broken or cut off, thus causing much labor, loss of time and possible damage to the casting itself or to the flask. In our invention this partition is omitted. Molding is very much facilitated, and the castings may be readily, easily and cheaply removed from the flask and sand without damage to the casting or flask. Our invention is adaptable to either hand molding or machine molding.

Apparatus made in accordance with our invention is illustrated in the accompanying drawings, forming a part of this application, in which:

Fig. 1 is a plan view of the flask and showing a section of the runner box;

Fig. 2 is a vertical sectional view of the molding apparatus;

Fig. 3 is a vertical sectional view showing the flask inverted and placed on a drag plate;

Fig. 4 is a vertical sectional view of the coping; and,

Fig. 5 is a detail view of a gate pattern.

Referring now to the drawings and particularly to Fig. 3, the flask 10 is inverted and placed on a drag plate 11. The pattern 12 for the drag neck and the pattern 13 for the wabbler neck are firmly fastened to the drag plate 11, the pin 14 of the pattern 12 fitting the central opening 15 in the drag plate.

The elbow pattern 16 is fastened to the drag plate 11 with the small end arranged tangent to the pattern 12 so that the gate shall assume the proper tangential relation to the neck. The elbow pattern 16 is made in two parts, 17 and 18, to permit of ready removal as hereinafter pointed out.

The flask 10 is next inverted and placed in position as shown in Fig. 3, and it is bolted or fastened down to the drag plate 11 in any suitable manner. The drag plate is provided with a female portion 20 to receive a male portion 21 on the flask. Sand is inserted through the opening 22 and the mold is prepared in the usual way. In case a molding machine is used, the drag plate 11 is first securely fastened in position on the plate of the machine.

When the mold is completed, the flask 10 is turned over and the patterns are withdrawn. After the patterns 12 and 13 and the part 18 of the elbow pattern are removed, the part 17 of the elbow pattern may be pushed back into the space formerly occupied by the part 18 and readily removed. The elbow covering core is now placed in position and the mold is ready to be blackened and dried. In connection with the final elbow core, this may take the form of a horn-like pattern 23 shown in Fig. 5, which is inserted in the space occupied by the two-part elbow pattern 16 and then sand is packed therearound to provide a smooth curved gate passage.

In molding the cope, as may be seen from Fig. 4, a cope molding plate 26 is placed directly on the drag plate 11, the plate 26, having a lower projection 27 to fit the recess 20 in the drag plate 11 and an upper projection 28 to fit a recess 29 in the cope flask 25. Drag neck and wabbler patterns 12 and 13 are fastened to the plates 11 and 26 before the flask 25 is placed in position. The cope mold is now prepared in the same manner as the bottom flask mold, already referred to.

Upon reference to Fig. 2, it will be seen that the drag flask 30 is placed on top of the bottom flask 10, the lower end of the drag flask having a recess 31 to receive the projection 21 at the top of the bottom flask. Likewise, the upper end of the drag flask is provided with a projection to fit the recess 29 in the cope mold.

Referring more particularly to Figs. 1, 2 and 3, it will be seen that the bottom flask 10 is provided with a lateral spout portion 31′ which is open to the top of the flask so that the gate is not covered by a portion of the bottom flask. To prevent metal from breaking through sand at the top of the spout, it will be seen that the top of the spout is covered by the drag mold and also by the bottom flange 32 of the runner box 33.

The runner box is provided with an upper flange 34 to which is fastened the lower flange 35 of the funnel member 36. The flanges 32 and 34 are preferably of different sizes so that each runner box may be caused to fit drag molds of different sizes.

While I show a drag flask 30 of the chill mold type, it will be apparent that a flask of the sand mold type might be used. Also, if articles, such as rolls, are to be cast, circumferential rings may be provided; and such articles may be cast and chilled or cast merely in sand. In other words, in so far as our invention is concerned the mode of casting is immaterial, our invention relating to an improved mold construction consisting of accurately fitting parts and means whereby the bottom flask and top flask molds may be quickly and economically prepared either by hand or by machine, the bottom flask having mold and gate portions each communicating with the other throughout its height so as to avoid any bridging piece or partition.

After an article is molded, the cope and drag molds and the runner box are removed, whereupon the molded article, such as a roll, may be readily removed with the gate portion attached, the gate portion passing upwardly of the spout and breaking the sand above it. In this way, the removal of runner box elbows and breaking off of gate portions incident to removal of molded articles, involving labor and frequent breakage of the bottom mold are avoided. After the article is removed, the gate portion may be broken or cut off without much likelihood of damaging the article as is the case where the gate portion is broken off incident to removing the article from the bottom mold. As the spout portion is entirely covered by the drag mold and the flange of the runner box, the sand of the mold is effectively reinforced, thereby preventing any breaking through the sand of metal from the gate.

Having thus described the invention what we claim as new and desire to secure by Letters Patent is:

1. In molding apparatus, the combination of a bottom flask having a mold portion and a gate portion each open to the top of the flask and not separated from each other by any partition, a drag plate, a pattern connected to the drag plate and extending into the mold portion of the flask, and a two-part elbow pattern having one part connected to the drag plate and having its other part contacting with the first part and contacting with the first pattern, said two-part pattern having the drag-plate connected part arranged within the gate portion of the flask and having its other part arranged partly in the gate portion of the flask and partly in the mold portion thereof.

2. In molding apparatus, the combination of a bottom flask having a mold portion and a gate portion each open to the top of the flask and not separated from each other by any partition, a drag plate, said flask having an annular projection adapted to fit an annular recess in the drag plate, a pattern connected to the drag plate and extending into the mold portion of the flask, and a two-part elbow pattern having one part connected to the drag plate and having its other part contacting with the first part and contacting with the first pattern, said two-part pattern having the drag-plate connected part arranged within the gate portion of the flask and having its other part arranged partly in the gate portion of the flask and partly in the mold portion thereof.

In testimony whereof I hereunto affix my signature this 8th day of May 1926.

FRED C. T. DANIELS.

In testimony whereof I hereunto affix my signature this 8 day of May 1926.

WILLIAM H. McCAUSLAND.