A. SCRIVENOR.

SAND RETAINING DEVICE FOR FOUNDRY FLASKS.

APPLICATION FILED MAY 15, 1909.

947,261. Patented Jan. 25, 1910.

Fig. 1

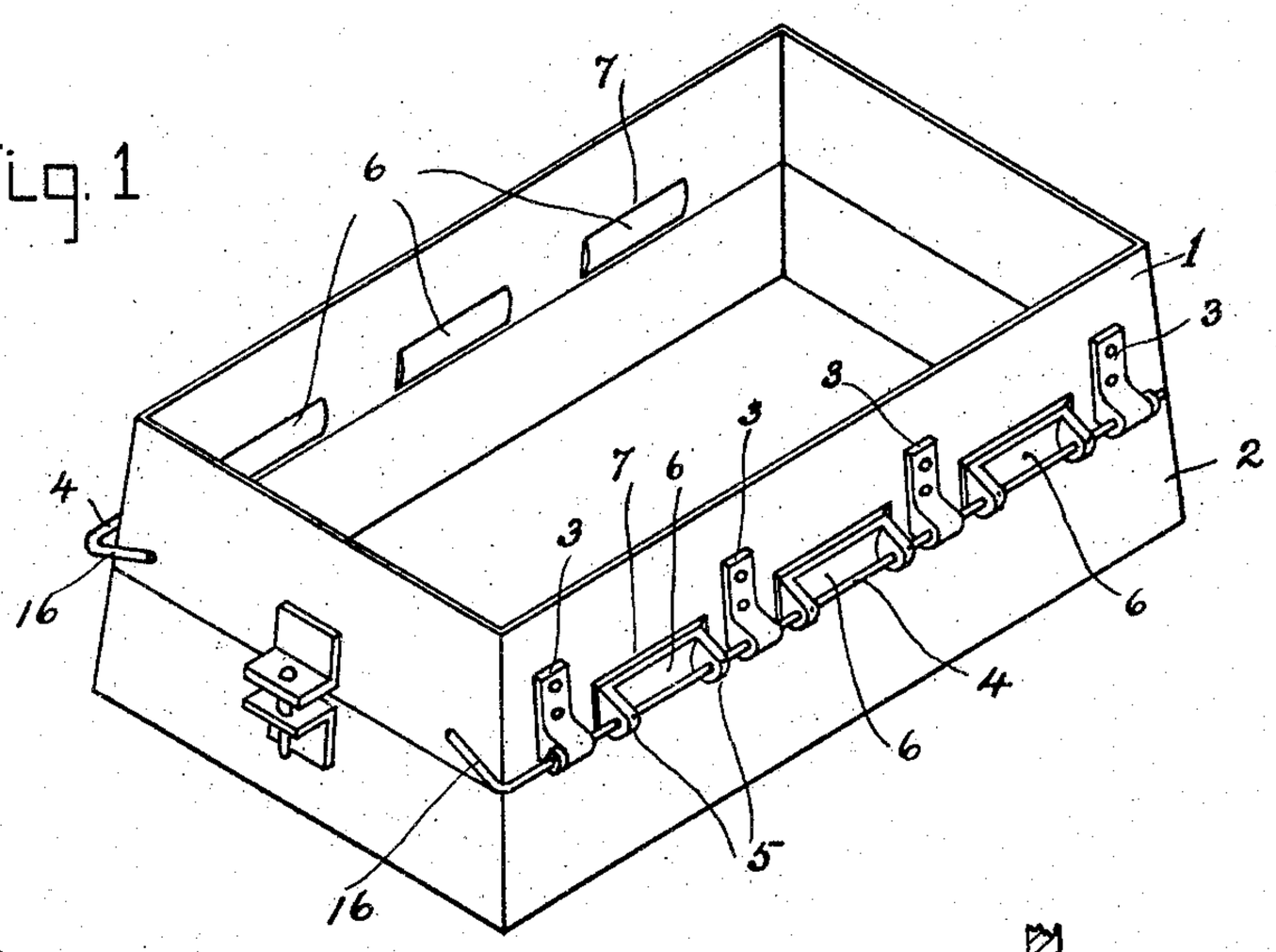


Fig. 2

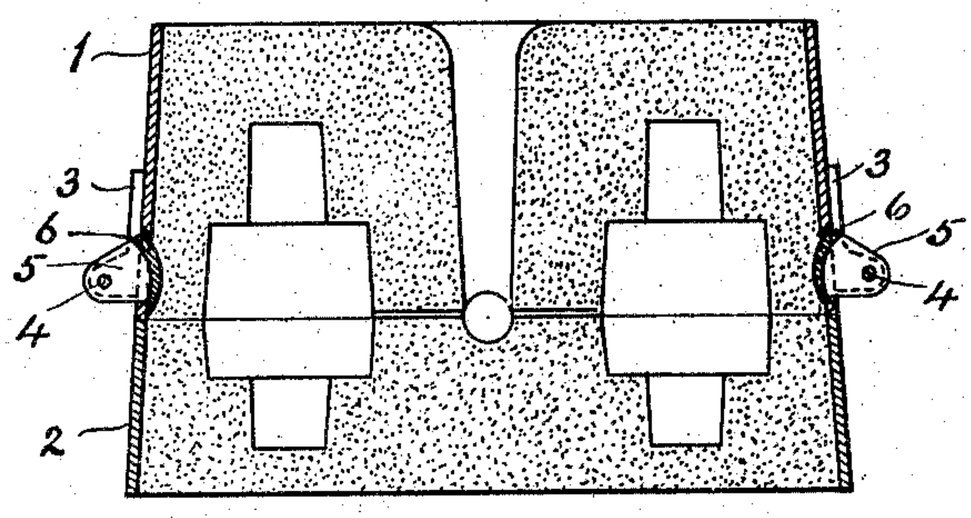


Fig. 3

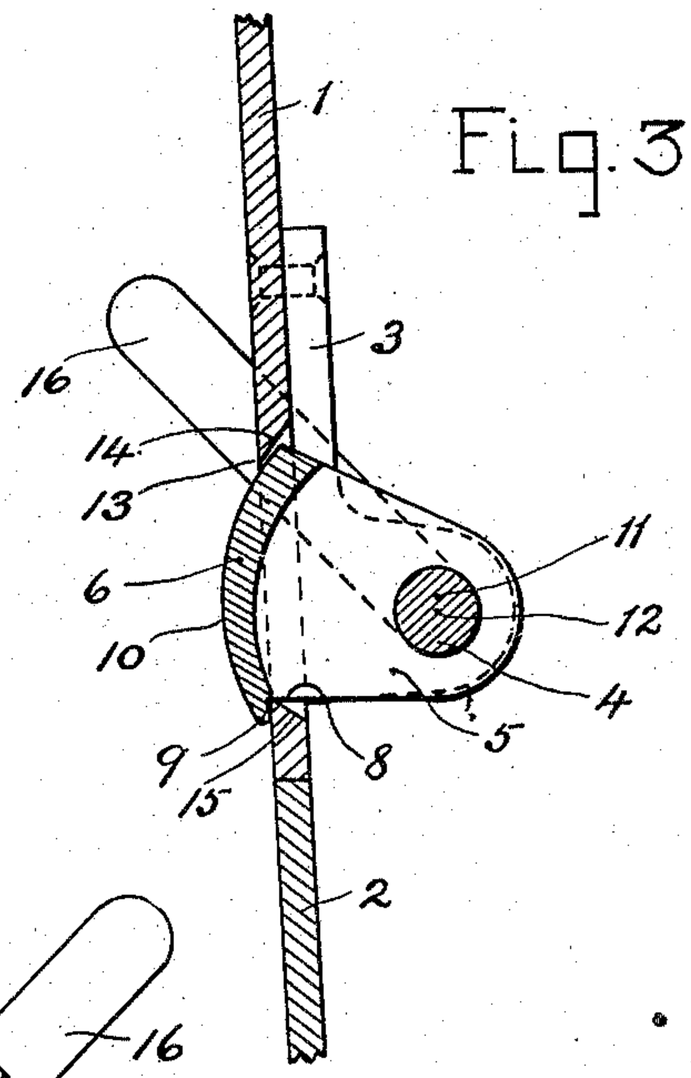
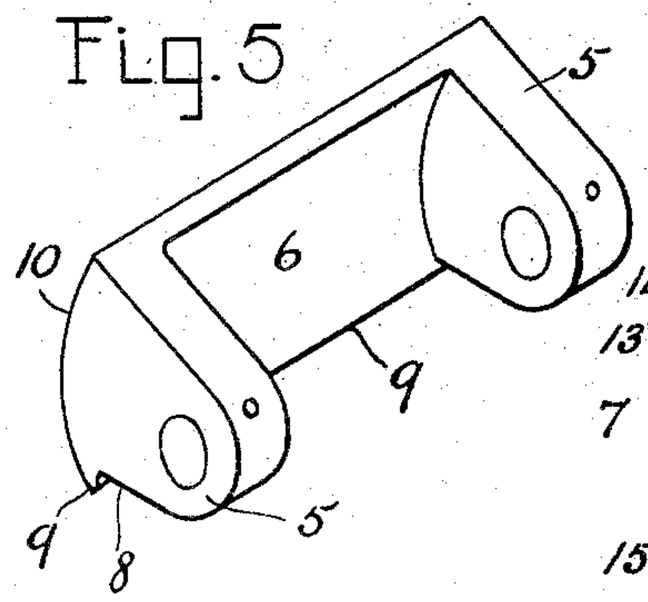


Fig. 5



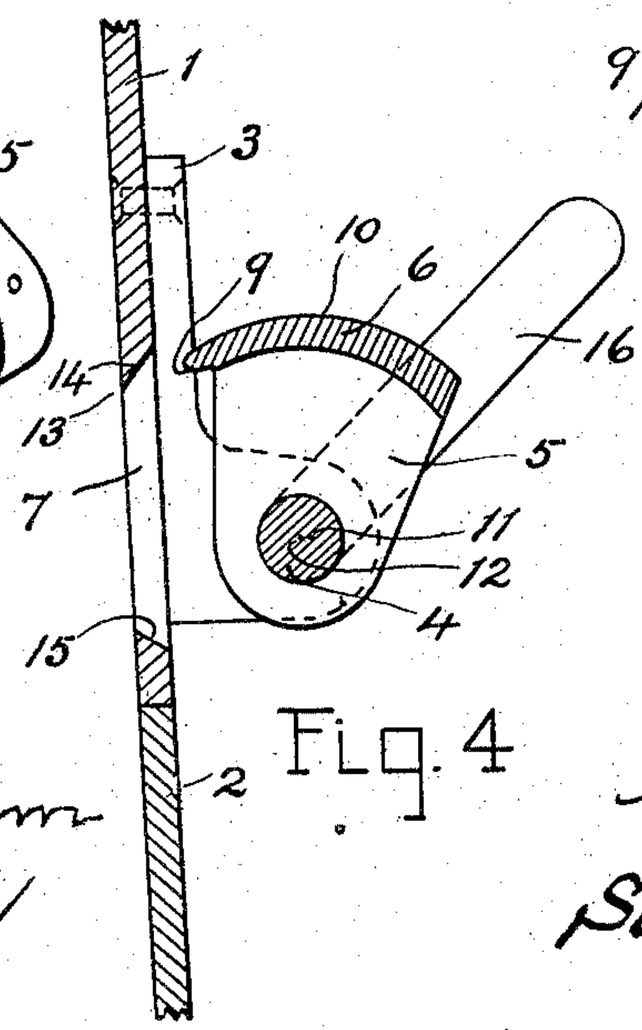


Fig. 4

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SAND-RETAINING DEVICE FOR FOUNDRY-FLASKS.

947,261. Specification of Letters Patent. Patented Jan. 25, 1910.

Application filed May 15, 1909. Serial No. 496,212.

To all whom it may concern:

Be it known that I, ARTHUR SCRIVENOR, a citizen of the United States of America, residing at the city of Richmond, in the county of Henrico and State of Virginia, have invented certain new and useful Improvements in Sand-Retaining Devices for Foundry-Flasks, of which the following is a specification.

The present invention relates to making molds in connection with the production of metallic castings.

To practice increased economy in the number of flasks employed it is customary in many foundries to use what are known as snap flasks. As is well known, these flasks are provided with hinges and with clamps or latches so that they may be easily removed from the completed molds. Consequently, one and the same flask may be used in the production of any number of molds. But such flasks are open to the serious objection that the repeated opening and closing soon wear the hinges and other joints to such an extent that perfect molds cannot be made. The lugs and pins which are attached to the cope and drag work loose after a time, as the usual snap flask is constructed of wood and the said fittings are screwed thereto; and a very slight movement of either lug or pin will cause "shift" in a casting. To overcome these objections and to provide a more rigid and serviceable snap flask, other materials, such as sheet steel, cast iron, etc. have been used; but owing to their weight these materials can only be economically used on the smallest sizes of flasks; and these, again, are open to several of the objections attached to snap flasks of wood. Again, when using a snap flask, a considerable quantity of sand must be left all around the pattern; and this must be sufficient to prevent destruction of the mold or leakage of the iron from the mold—known as a "run-out"—during pouring. But it is very desirable to reduce the amount of sand used in the production of any casting to as small a quantity as may be practicable. This may be done, and destruction of the mold and run-outs prevented by either ramming up wrought iron bands in the mold, or by slipping a jacket or slip-box over the mold before pouring. The bands are effective, but soon have to be replaced by new ones. Jackets are better, but it is evident that if they are a proper fit on the mold, great care has to be used in placing them over the mold so that the latter may not be injured.

All of the above mentioned objections to snap flasks of both wood and metal, and to bands and jackets, are serious enough in ordinary bench molding. They are, however, far more potent when considered in connection with machine molding, owing to the great cost of fitting up machines and to the greater number of molds that can be made by machine per day than can be made by hand. Now, all of the troubles attendant on the use of snap flasks and jackets of the common form can, in both bench and machine molding, be overcome by using tapered flasks and tapered jackets; the tapered flasks being made solid, instead of being made to open. They are removed from the molds by merely lifting them therefrom, the flasks being first slightly rapped, if found necessary, to loosen any sand which might otherwise adhere to the flask. These tapered flasks and jackets may be made of either wood or metal, but metal is probably the most satisfactory material. If the taper of the flask is sufficient to allow it to be easily lifted from the mold, it is manifest that some provision must be made to retain the sand within the flask during the process of molding; which retaining means must be removable before the flask is lifted from the mold. Where bottom-boards are used the drag will not require any retaining device, as the bottom-board itself will prevent the sand from falling from the drag. But special provision is necessary to retain the sand in the cope during the process of molding. The drag may also be provided with sand retaining means where bottom-boards are not used. Tapered flasks and jackets may also, within certain limits, be used on floor work.

Tapered flasks fitted with sand retaining devices have already been used in the art, but several of them have been open to objection. In some the retaining device is mounted in a groove on the inside of the flask. Sand will soon collect in the said groove, and prevent or impede the operation of the device. In others the retaining device is mounted on the outside of the flask, and is caused to project into the flask through a slot in the side thereof. The said slot may become clogged with sand, and so impede the withdrawal of the retaining device; or the inwardly projecting portion of the device may be caused to spring outward

or downward during the ramming of the sand in the flask, and so give trouble by either jamming in the slot, or by tearing the mold during removal.

The above objections are overcome by my invention, which provides a retainer which is disposed in an opening of such shape that sand is not easily introduced into it, and which is adapted to clear itself of sand.

My sand retainer also has the advantage of becoming disengaged from the sand during the initial portion of its withdrawal, so that it does not engage the mold in sliding contact, and thereby displace the sand.

My device has the further advantage of being so disposed that it may be of any desired extent and configuration to correspond to the outline of the casting. It is also so formed that during the ramming of the sand it remains in position without springing or displacement, and without risk of jamming in the opening in the side of the flask.

Referring to the accompanying drawings, in connection with which the same reference characters are used throughout to designate the same elements:—Figure 1. is a perspective view of a taper flask, showing the sand retainer in operative position, one or more retainers being placed on each of the two longer and opposite sides of the flask. Fig. 2. is a cross section of the same; a completed mold being shown within the flask. Fig. 3. is a detail view showing a part of the side of the flask, in section, with the sand retainer in position; and Fig. 4 is a similar detail view, but showing the sand retainer withdrawn from the inside of the flask. Fig. 5. is a detail, in perspective, of the sand retainer.

In the drawings only the flask has been illustrated, as every one skilled in the art of molding thoroughly understands the use of bottom-boards and jackets. The bottom-boards and jackets have therefore not been illustrated.

In Figs. 1 and 2, (1) is the body of the cope, tapered so as to give an increasing cross section from top to bottom. The drag (2) is of course similarly tapered, and its cross section is such that when the cope and drag are put together the taper is continuous from the top of the cope to the bottom of the drag. The brackets (3) are rigidly secured at suitable intervals to the external faces of the cope. These brackets are provided with shaft bearings. To the shafts (4) are rigidly attached the sand retaining members (6) by means of arms (5); and the said shafts are journaled in the bearings of the brackets (3). The arms (5) and the retaining member (6) are preferably made in one piece. They may be made of any thickness; but I prefer to make them as shown, with an open space between the arms and behind the retaining member, for the sake of reducing the weight. In their normal position the sand retaining members (6) extend through the openings (7) in the walls of the cope; the heels (9), see Figs. 3 and 4, of the retainers engage with the inner faces of the cope just below the openings (7); and the lower surfaces (8) of the arms may be allowed to rest upon the lower inside edges of the openings. Thus much of the pressure of the sand, due to ramming, on the retainers is taken up by the heels (9) of the sand retainers, and stress is removed from the shafts.

An important feature of this device is the configuration of the external surface (10) of the sand retainer. This surface is in the form of a circular arc, and is "relieved;" that is to say, it is struck from a center (11) which is slightly above the center (12) of the shaft (4), so that the initial portion of the movement of the retainer as it is rotated to withdraw it from the flask disengages it from the sand.

It will be noticed that the downwardly disposed edge (13) of the upper wall of the opening (7), through which the retainer projects into the flask, see Figs. 3 and 4, is sharp and forms a good scraping edge by means of which sand, should it adhere to the face of the retainer, may be removed as the latter is withdrawn. It is not necessary that the edge (13) should touch and actually scrape the face (10) of the retainer. It is sufficient that it should prevent the possible tendency of any sand to loosen from the mold and follow the rotating retainer (6) through the opening (7).

The upper wall (14) of the opening (7) is made inclined upwardly and outwardly; the lower wall (15) is inclined downwardly and outwardly; and the two end walls are also inclined, as clearly shown in Fig. 1. Thus I obtain an opening of increased cross section toward the outer surface of the flask, so that any sand which may in any way be introduced into the opening (7) tends to be ejected therefrom, and prevents the jamming and packing of the retainer by sand.

Any suitable type of crank or handle (16) may be provided for the purpose of rotating the shaft (4) and so actuating the sand retainers.

By mounting the sand retainers in journals placed externally of the flask it is made unnecessary to extend them the full length of the sides of the flask, as is the case where they are journaled internally of the flask, as is frequently done in present practice. The objection to those journaled internally is that they are always clogged with sand, which can only be removed with difficulty and great loss of time.

My retainers, as is apparent from the drawings, may be made in sections of any

desired length; and they may be mounted on any part of the surface of the flask where they are necessary or desirable. They may also be placed so as to conform to the outline of the casting which is to be made.

I have described my sand retainer in connection with a tapered flask. It may also be used on a straight flask when a retainer of some form is desirable on such a flask, as is sometimes the case.

Having now described my invention, what I claim and desire to secure by Letters Patent is:

1. In combination a flask having an opening in its walls, a pivoted sand retainer normally disposed with its sand engaging surface extending through the opening into the flask, a heel on the retainer engaging the wall of the flask adjacent the opening, and supporting the retainer from below so that it may be swung in the opening to remove it from the interior of the flask.

2. A flask, a sand retainer, having a sand engaging surface, and bearings about which the retainer may be rotated, the center of the bearings being eccentrically placed in relation to the surface.

3. A flask, a sand retainer, a curved sand-engaging surface on the retainer, and bearings about which the retainer may be rotated, the center of the bearings being eccentrically placed in relation to the curve of the retainer.

4. A flask having an opening in one of its walls, a sand retainer having a sand retaining surface, the retainer being normally placed with its sand-engaging surface extending through the opening into the interior of the flask, and bearings for the retainer about which it may be rotated placed externally of the flask and eccentrically in relation to its sand-engaging surface.

5. A flask having an opening in one of its walls, the cross section of which increases outwardly, and a sand retainer mounted with its sand-engaging surface normally extending through said opening into the interior of the flask, and means for withdrawing the sand retainer.

6. A flask having an opening in one of its lateral faces, the upper wall of said opening being inclined upwardly and outwardly, and a sand retainer mounted to extend through said opening into the interior of the flask.

7. A flask, having an opening in one of its lateral faces, the upper wall of said opening being inclined upwardly and outwardly, the lower wall of the opening being inclined downwardly and outwardly, and a sand retainer mounted to extend through said opening into the interior of the flask.

8. A flask, having an opening in one of its walls, a cross section of which increases outwardly, a sand retainer normally placed with a sand-engaging surface extending through said opening into the interior of the flask, and bearings for the said retainer placed externally of the flask, about which it may be rotated to withdraw it from its normal position.

9. Means for molding, comprising a flask having openings in one or more of its faces, sand retainers movably mounted on the flask and arranged to project through the openings and beyond the inner surface of the flask and having sand engaging faces so disposed in relation to the mounting as to be released from contact with the sand of the mold at the initial portion of the movement to withdraw the said retainers from the interior of the flask, and means for operating the sand retainers.

10. Means for producing molds, comprising a flask provided with openings in its wall, a sand retaining device so disposed in relation to the openings that it may be caused to project beyond the inner surface of the wall of the flask, and means for withdrawing the sand retaining device from engagement with the sand of the mold, the said means being so arranged that the sand-engaging surfaces of the sand retaining device may be released from contact with the sand of the mold at the initial portion of the withdrawal of the retainer.

11. Means for producing molds, comprising a flask provided with openings in its wall, a sand retaining device rotatably mounted on the flask and so disposed in relation to the said openings that it may be rotated so as to cause its sand-engaging surface to project beyond the inner surface of the wall of the flask, and means for rotating the sand retaining device so as to withdraw its sand-engaging surface from contact with the sand of the mold at the initial portion of its rotation.

12. Means for producing molds, comprising a flask, a sand retaining device rotatably mounted on the flask and so disposed that it may be operated to project within and to be withdrawn without the inner wall of the flask, the said sand retaining device having a curved sand-engaging surface so disposed with relation to the center of rotation that the said sand-engaging surface may be released from contact with the sand of the mold at the initial portion of the rotation of the said sand retaining device, and means for rotating the sand retaining device.

13. Means for producing tapered molds, comprising a tapered flask having openings in its wall, a sand retaining device rotatably mounted on the external wall of the flask and so arranged in relation to the openings that it may be rotated inwardly through the said openings to engage the sand and that it may be rotated outwardly to release it from engagement with the sand, the said

retaining device having curved surfaces arranged eccentrically with the center of rotation so that the said surfaces will be released from contact with the sand of the mold at the commencement of the outward rotation, and means for rotating the retaining device.

Signed by me at Richmond, Virginia, this 11th day of May 1909.

ARTHUR SCRIVENOR.

Witnesses:
J. JORDAN LEAKE,
HENRY SHERFER.