

F. L. RAINBOW.

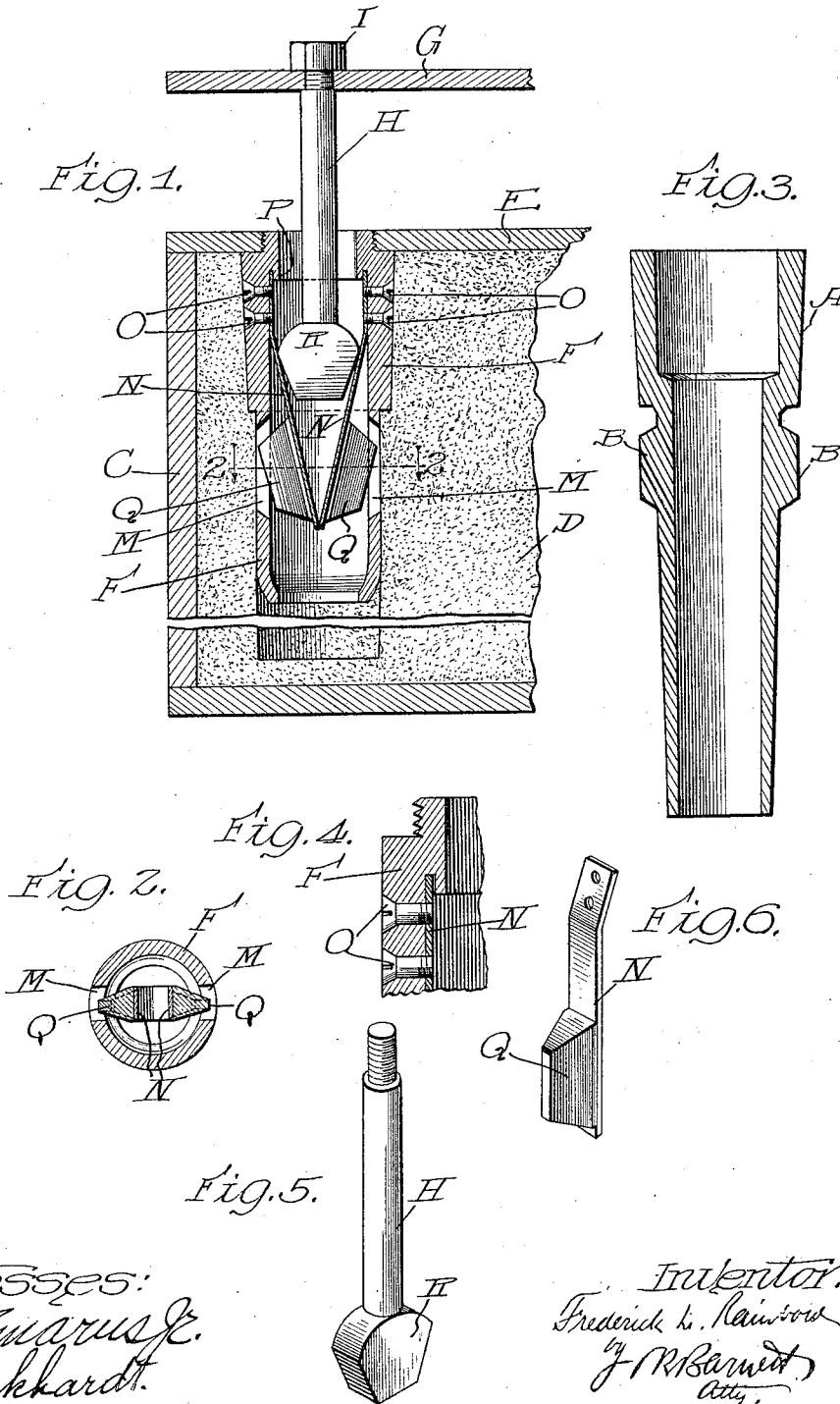
DEVICE FOR MAKING SAND MOLDS FOR AXLE BOXES AND THE LIKE.

APPLICATION FILED NOV. 10, 1911.

Patented Feb. 11, 1913.

2 SHEETS—SHEET 1.

1,052,751.



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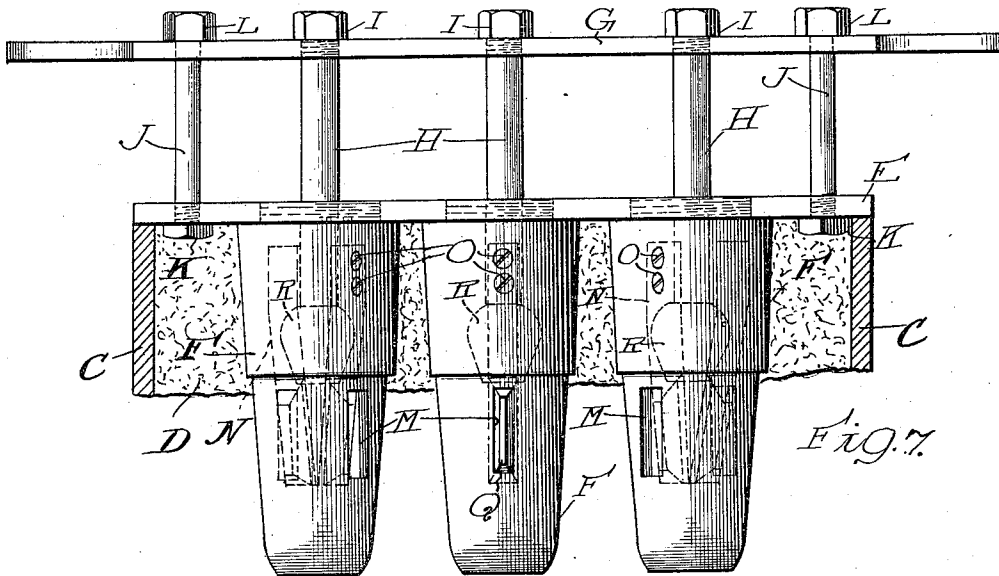


Fig. 7.

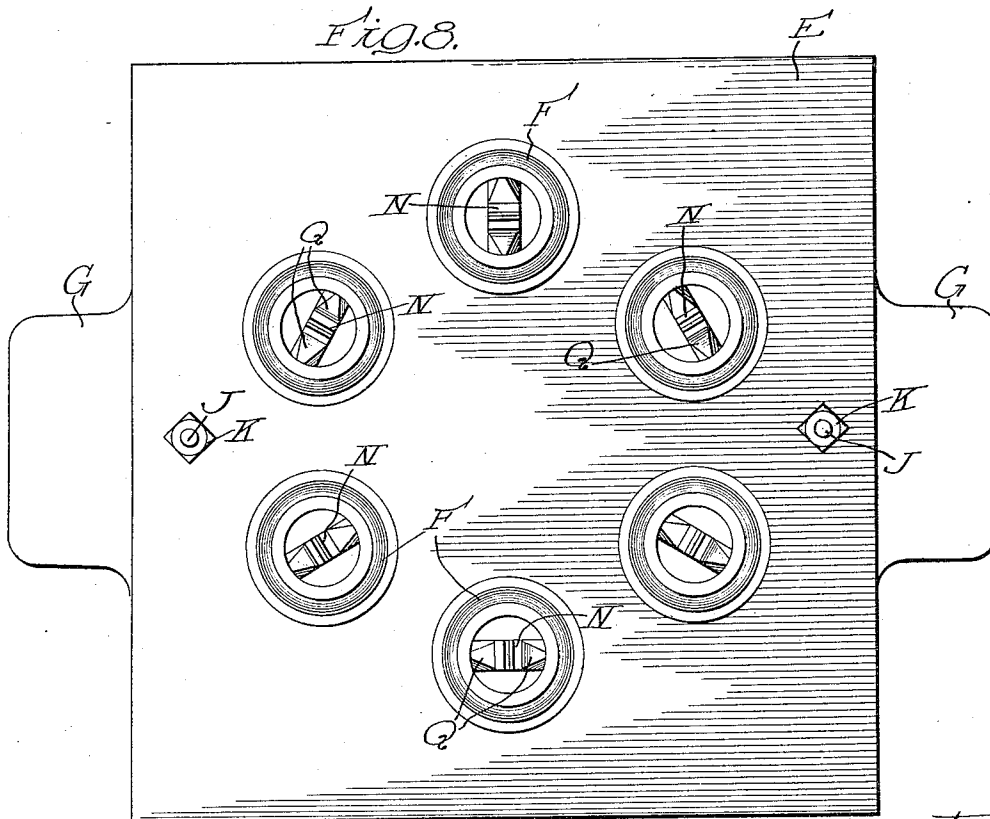


Fig. 8.

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UNITED STATES PATENT OFFICE.

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DEVICE FOR MAKING SAND MOLDS FOR AXLE-BOXES AND THE LIKE.

1,052,751.

Specification of Letters Patent.

Patented Feb. 11, 1913.

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To all whom it may concern:

Be it known that I, FREDERICK L. RAINBOW, a citizen of the United States, residing at Elgin, in the county of Kane and State of Illinois, have invented certain new and useful Improvements in Devices for Making Sand Molds for Axle-Boxes and the Like, of which the following is a specification.

My invention relates to improvements in mechanism for making sand molds for castings and articles such, for example, as axle boxes of the character hereinafter pointed out, which articles when finished are provided with projections such as fins, but are otherwise of such an external contour that the patterns therefor can be readily withdrawn from the sand.

The object of my invention is to provide a simple mechanism whereby recesses for such fins, lugs, or like projections can be readily, quickly and accurately formed in the sand of a casting mold and without any particular skill on the part of the operator. This and such other objects as will be hereinafter more particularly described and claimed are obtained by my invention, a suitable embodiment thereof being shown in the accompanying drawings in which—

Figure 1 is a vertical sectional view through a molding flask filled with sand and through one of my devices inserted therein; Fig. 2 is a cross sectional view through one of my devices on the line 2—2 of Fig. 1, looking in the direction indicated by the arrows; Fig. 3 shows an axle box cast in a mold formed in part by the device embodying my invention; Fig. 4 is an enlarged detail sectional view of an upper corner of my mold forming device; Fig. 5 is a perspective view of a plunger; Fig. 6 is a perspective view of a spring fitted with a mold-forming lug; Fig. 7 is an elevation of my device arranged in multiple form with the molding flask shown in section, and Fig. 8 is a bottom plan view of the structure shown in Fig. 7 with the molding flask removed.

Like letters of reference indicate like parts in the various figures of the drawings.

For convenient illustration and understanding of my invention I have, in Fig. 3, shown an axle box which is a typical example of the character of casting in the making of molds in which the problem arises

which my invention is designed to meet. Such axle boxes are driven into the tapered bore of the hub of a wagon wheel and are provided with fins which cut their way into the hub and thus nonrotatably secure the axle box in the wooden hub. Preferably the axle box is so tapered that the hub will fit snugly around the outer end of the axle box and if desired, either a shoulder formed on the outer end of the axle box or a shoulder provided on the axle, which is mounted therein, will close the joint between the axle box and the wooden hub, thus excluding moisture and protecting the wooden hub against deterioration by decay or otherwise. If, however, the hub engaging fins are mounted adjacent the outer end of the axle box they will cut into the hub and leave an unprotected groove which will admit moisture, tending to rot the hub, and will also have a tendency to start a split in the hub at this point. To avoid or minimize this difficulty many axle boxes are tapered and formed with the lugs projecting from a part of the box at which the diameter is less than the maximum diameter thereof; the transverse dimension through the lugs being preferably no greater than the maximum diameter of the box. With this arrangement the lugs cut into the hub only at a point remote from the outside opening in the hub. However, in preparing molds for axle boxes of this character if the pattern is made exactly in external contour the same as the axle box, it is obvious that the projecting lugs will prevent the withdrawal of the pattern from the sand. To avoid this it is necessary to make the pattern without these projecting lugs and then the mold maker inserts, in the opening left by the pattern, some suitable tool and according to his best judgment and skill forms in the walls of the recess or mold the necessary recesses to form the lugs on the axle box. Obviously this requires skill and good judgment on the part of the mold maker for there is danger of knocking down the walls of the mold and there is no certainty of having these recesses properly made or uniformly and properly placed, while the necessity for skill reduces the speed of operation. Another way of accomplishing this result is to mount lugs on the pattern so that they can be withdrawn through slots in the pattern

extending to and opening from the inner end of the pattern, the packed sand above the lugs resisting the withdrawal of the pattern lugs when the body of the pattern is withdrawn from the sand, but with a casting of the design shown in Fig. 3 this is impractical because there will be such a small body of sand to resist the withdrawal of the wooden lugs that this small body or shoulder of sand will be broken down when the pattern is withdrawn.

With my invention I provide a device which may be inserted in the sand after the pattern is withdrawn and will quickly, certainly and uniformly make in the sand the necessary recesses for casting the lugs or fins, at the same time supporting and protecting the walls of the mold, and thus insuring rapidity of operation without requiring skill, and absolute certainty and uniformity in the forming of these recesses, thereby providing molds which will insure uniform castings. If desired, however, the device itself if constructed can be also used as a pattern although I prefer inserting my device in the sand after the regular wood patterns have been used to form the main molding recess.

A is a tapered axle box provided with the lug engaging fins B.

C is a molding flask containing the sand D.

E is a plate into which is screwed, or otherwise mounted, the form F.

G is a plate to which is secured, or in which is otherwise suitably mounted, the stem of the plunger H.

The plates G and E form a feature of the preferred embodiment of my invention. In such preferred embodiment my devices are mounted in gangs as illustrated in Figs. 7 and 8, each plunger H being screwed into the plate G and locked thereto by nuts I screwed on the ends of the plungers, each form or shell F being screwed into the plate E, the plate E preferably having also screwed into it guide bolts J which are locked in position by nuts K screwed on the ends of said guide bolts, said guide bolts extending loosely through the plate G and being provided with heads L. As many of the guide bolts J will be used as may be found necessary or desirable. The forms or shells F preferably correspond in external contour to the external contour of the patterns, where separate patterns are used, or to the general external contour of the body of the casting to be made, where the forms F are themselves used as patterns, and are provided with openings M.

N are springs secured to the shells F as by screws O and preferably, as shown, having a flat portion which fits snugly against the inner face of the form F, and is anchored in a recess between the body of the

form F and a shoulder P. Secured to each spring N is a recess forming lug Q which may be secured in position by screws tapped through the spring N and into the lug Q. These lugs are formed wedge-shape as shown in the drawings. In normal position form F, springs N and lugs Q will occupy the relation to each other shown in Fig. 1.

The plunger H is provided with the plunger head R which may be of any suitable form, although I prefer to construct it as shown in Fig. 5 with tapering flat faces which lie parallel with the abutting faces of the springs N.

In the ordinary, and as I consider the preferred, use of my invention the body mold is formed in the sand by compacting the sand in the flask around the usual patterns for the body of the casting and preferably by mounting these patterns in gangs on some rigid mount whereby they are arranged in fixed relation to each other. Thereupon the pattern is withdrawn and the shell F inserted in its place. Preferably these shells are also mounted in gangs which are centered to correspond with the arrangement of the gang of patterns so that a gang of forms F, such as shown in Fig. 7, will be exactly centered in the mold form or impression left in the sand by the withdrawal of the patterns. Thereupon the plunger H is pushed downwardly, the plunger head R forcing the springs N outwardly, thereby forcing the lugs Q through the openings M into the sand, compressing the sand and forming the necessary recesses for the lugs which are to appear on the finished casting, the form F meanwhile supporting and protecting the walls of the mold impression. Upon withdrawing the plunger H the springs N react and the lugs Q are withdrawn into the form F and the form F is withdrawn from the mold.

When my device is mounted in a gang as shown in Fig. 7 the plate G is depressed, guided in such downward movement by the guide bolts J and simultaneously forces all of the plungers H downwardly, thereby simultaneously forming the desired recesses in all of the molds, whereupon the plate G is lifted, first withdrawing the plungers and allowing the lugs Q to be carried back into their respective forms F, and then lifting the entire device out of the mold.

Of course the springs N are not essential but form a convenient automatic means for withdrawing the lugs Q into the form F as well as a convenient means for forcing the lugs outwardly by the depression of the plunger head R.

While I have shown my invention in what I consider its preferred form, it should be understood that I do not limit myself to the embodiment herein shown, and that it is my purpose and intention to herein claim

and protect, both generically and specifically, all features of patentable novelty here disclosed.

I claim:

5 1. A device for forming lateral recesses in sand molds comprising a form provided with an internal shoulder and having openings with beveled edges in the side, a pair of flat springs mounted within said form and anchored at one end under the shoulder in a manner to prevent rotary movement thereof, beveled recess-forming members mounted on the free ends of the springs, and a longitudinally movable plunger adapted to engage the springs so as to force the recess-forming members outwardly into a wedging engagement with the beveled surfaces at the openings in the form.

20 2. A device for forming lateral recesses in sand molds comprising a form having openings in the side with beveled edges, a pair of flat springs mounted in said form and anchored at one end thereto, beveled recess-forming members mounted on the free ends of the springs, and a longitudinally movable plunger adapted to engage the springs so as to force the recess-forming members outwardly into a wedging engagement with the beveled surfaces at the openings in the form.

30 3. A device for forming lateral recesses in sand molds comprising a plate, a form mounted thereon, a second plate, recess forming devices mounted in said form and adapted to be forced outwardly into the sand surrounding said form to form lateral recesses therein, means for normally holding said devices within said form, a plunger arranged to force said devices outwardly from said form and into the surrounding sand, said plunger being operatively engaged by

said second plate, and means engaging both of said plates for guiding the vertical movement of said plunger.

4. A device for forming lateral recesses in sand molds comprising a plate, a plurality of forms operatively mounted thereon, each of said forms being provided with means adapted to be forced outwardly therefrom to form lateral recesses in a sand mold, a plunger for each of said forms, said plungers adapted when moved toward said forms to force said recess forming means outwardly, a second plate by which said plungers are operatively engaged, and guiding means engaging both of said plates for centering and guiding the longitudinal movement of said plungers.

5. A device for forming lateral recesses in sand molds comprising a plate having rigidly secured thereto a plurality of pattern shaped forms, a plurality of springs mounted in each of said forms, each spring being provided with a device adapted to be forced outwardly from the form in which it is mounted, said springs normally holding said devices within said forms, each form being provided with a plunger arranged, when moved longitudinally inward with relation to said forms, to engage said springs and move said recess-forming devices outwardly, a second plate to which said plungers are rigidly secured, and guiding means secured to one of said plates and loosely engaging the other of said plates whereby the longitudinal movement of said plungers is centered and guided.

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