(No Model.)

W. G. RICHARDS.

MOLD FOR MAKING FLANGED WHEEL CASTINGS.

No. 459,049. Patented Sept. 8, 1891.

Fig. 1

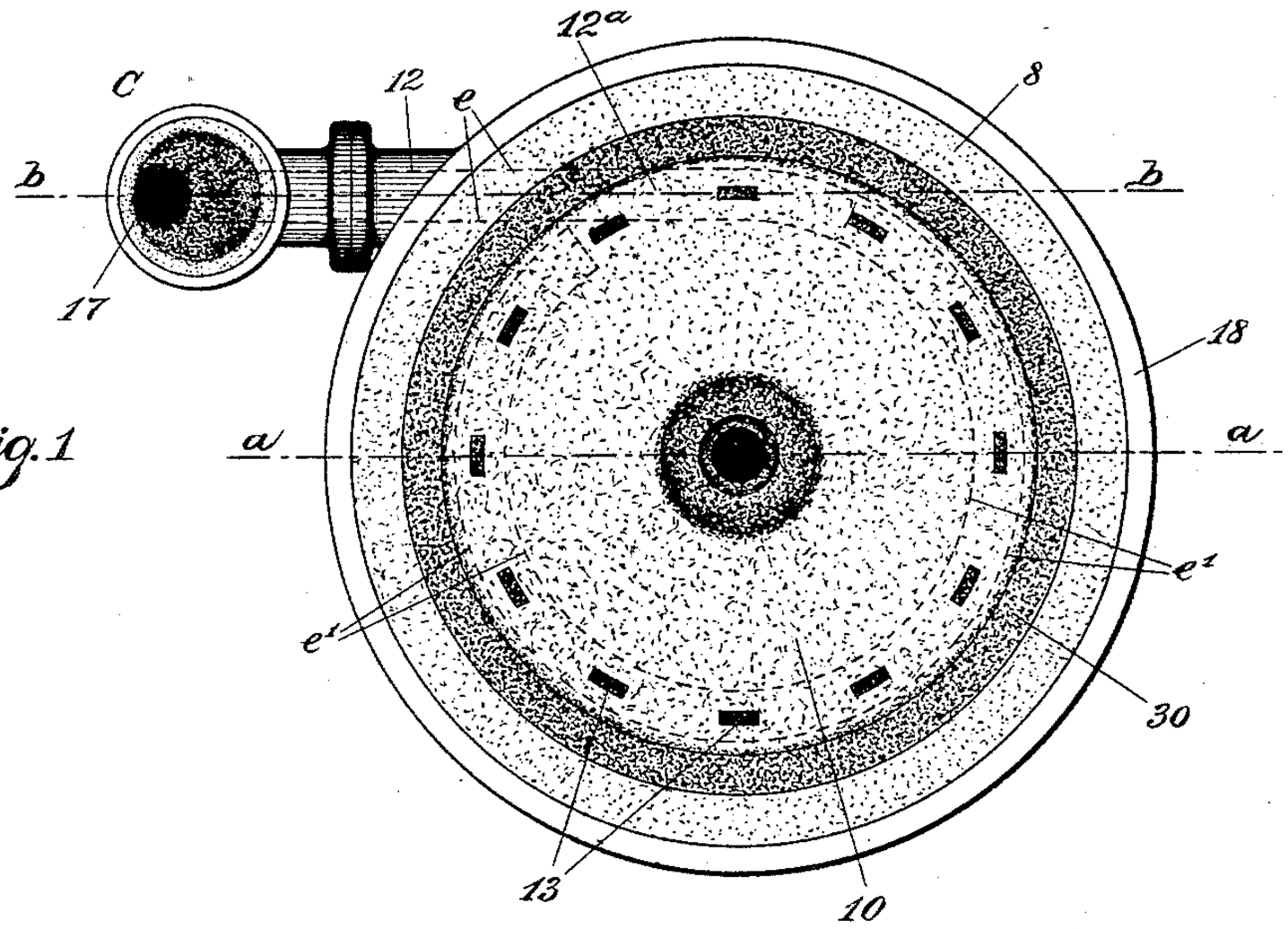


Fig. 2

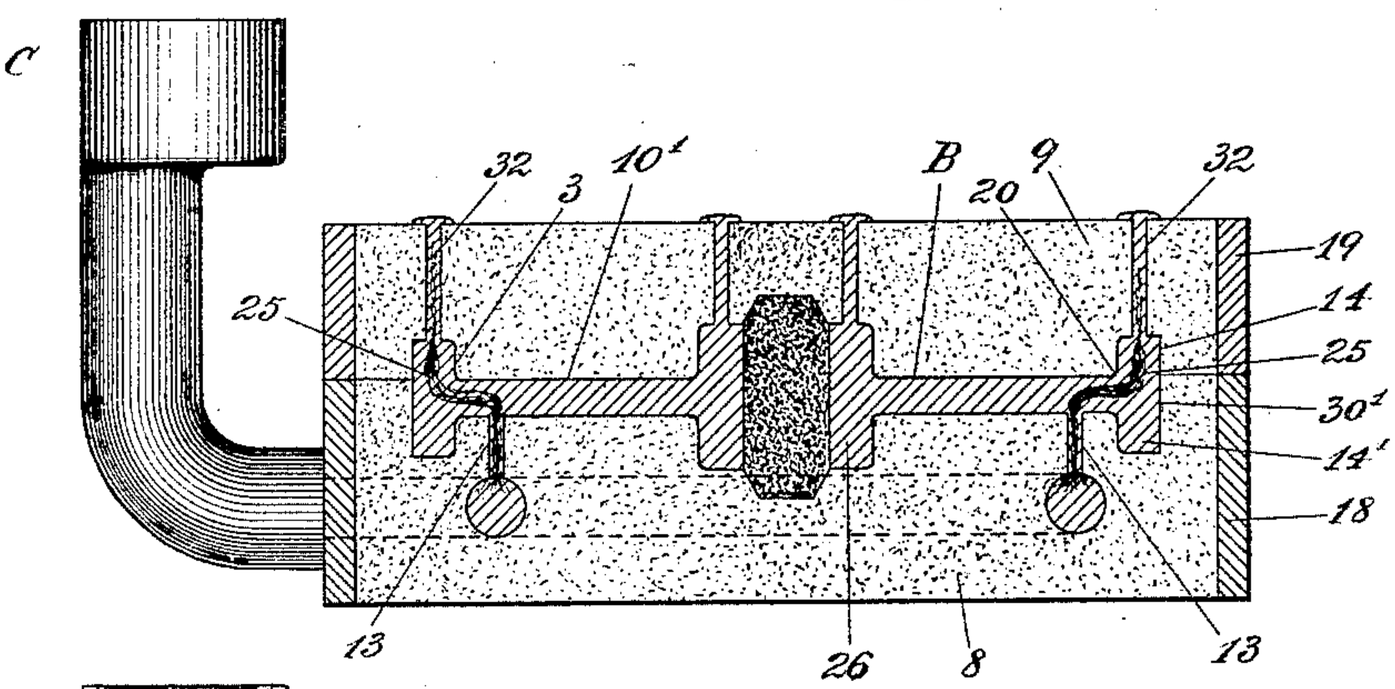
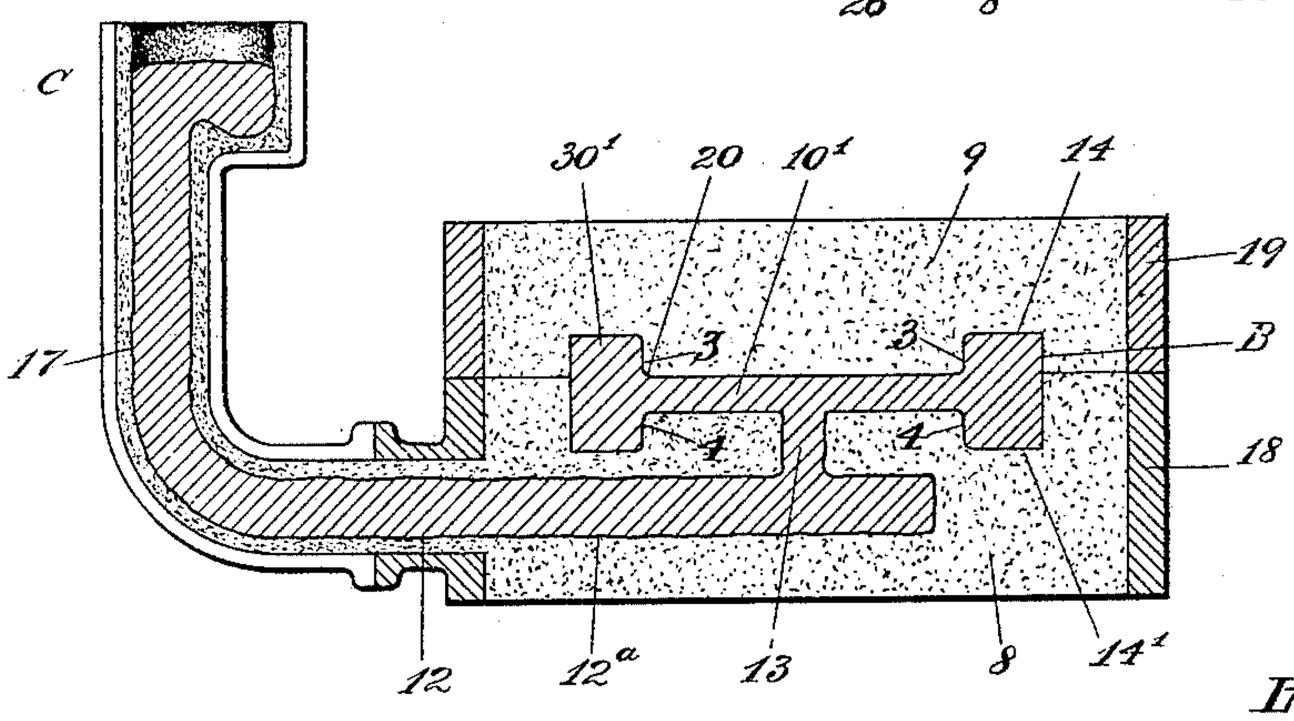


Fig. 3



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UNITED STATES PATENT OFFICE.

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MOLD FOR MAKING FLANGED WHEEL-CASTINGS.

SPECIFICATION forming part of Letters Patent No. 459,049, dated September 8, 1891.

Application filed April 11, 1891. Serial No. 388,441. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM G. RICHARDS, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Molds for Making Castings, of which the following is a specification.

This invention relates to molds for making flanged wheel-castings by the process described and claimed in my prior application, Serial No. 369,296, filed October 25, 1890. The mold herein described is more especially designed for the making of steel wheel-castings by said process.

In the drawings accompanying and forming a part of this specification, Figure 1 is a plan view of the lower part or nowel of the mold. Fig. 2 is a vertical section in line *a a*, Fig. 1, of the complete mold, showing the mold-space filled, and illustrating also the practicing of said process. Fig. 3 is a similar view in line *b b*, Fig. 1.

Similar characters designate like parts in all the figures.

The flask for containing the mold proper consists or may consist of the circular nowel-frame 18 and the cope-frame 19, constructed and combined substantially as in ordinary practice.

The mold proper consists of the nowel 8 and the cope set thereon, substantially as indicated in the drawings. A suitable pouring-head (designated in a general way by C) is attached to one side of the mold at or near the base thereof and extends to a point at some elevation above the top of the mold. The main runner 12, through which the metal is conducted to a line adjacent to the under side of the mold-space, is formed in the nowel immediately under the said space and is supplied from the channel 17 of the pouring-head, that extends downward and connects with said main runner, as indicated by dotted lines at *e* in Fig. 1. However, the particular mode and means for supplying the molten metal to the main runner is not essential to the principal features of my present invention.

The mold-space is formed, as usual, in or between the nowel and cope and consists of the plate-space 10, Fig. 1, (which space 10 is shown filled with the wheel plate or disk 10′ in Figs. 2 and 3,) and the flange-space or rim-space 30 for the flange or rim of the wheel-casting. In Fig. 2, the mold-space there being shown filled with metal, said spaces are designated by 10′ and 30′, respectively, which characters refer to the filled mold-spaces or alternatively to the castings or metal in said spaces, the whole casting being designated in a general way by B. The flange or wheel-rim 30′ is shown consisting of two parts, one extending below and the other above the plane of the wheel-disk 10′. These proportions, however, may be modified as circumstances require. The main runner extends from the pouring-head to a point at 12^a under the plate-space and then follows around inside of the flange-space throughout substantially the whole length thereof, as indicated by the dotted lines at *e′*, Fig. 1. The runner is connected at frequent intervals throughout its length with the plate-space through a series of mold-filling passages 13, which enter the plate-space adjacent or contiguous, substantially as shown, to the line of the plate-and-rim juncture 20. The runner 12 from the pouring-head to the main runner within the mold enters the mold-runner at 12^a tangentially to said mold-runner, thus following the course of the wheel-rim. The effect of this construction is to deliver the inflowing metal to the mold-space throughout the periphery thereof, after the well-known principle of centrifugal action.

The cope of the mold is or may be vented in the usual manner for the escape of gases, and has over the flange-space 30 a series of vents or overflow-passages, as 32 32, through which any surplus of metal may escape, and whereby after the mold has been filled a stream of metal 25 may be maintained for similarly continuing the "through-flowing" of the plate-and-flange juncture during the contraction of the plate portion 10′ of the casting.

The casting shown in the mold-space in Fig. 2 consists of the plate or disk 10′, having at its center the usual hub 26 and at its periphery the upper and lower flanges 14 14′; but one of said flanges may obviously be omitted without thereby affecting the essential features of my present invention. When the

mold, it being of the construction described, is filled with molten iron or steel, the said flanges are drawn by the shrinkage of the plate 10′ forcibly against the shoulders 3 and 4 of the mold, thereby causing a tension in the plate tending to rupture the same at the weakest point thereof, which point will naturally be the point where the plate retains its heat the longest.

In the making of steel wheel-castings the molds employed, in order to resist the intense cutting action of the white-hot metal, are necessarily formed of firm material, while, on the other hand, the steel, owing to its peculiar physical character, is without much strength at the moment of its greatest shrinkage, so that on the solidifying of the plate 10′ said plate is naturally ruptured at or near the line of the plate-and-flange juncture. To overcome this breakage I fill the mold and feed the casting by a method in which the plate-and-flange juncture is through-flowed throughout the periphery thereof during the contraction of the plate, whereby the said space or separation is refilled as fast as formed, thus in effect lengthening the plate to counteract the shrinkage thereof, as more fully set forth in my aforesaid application. This operation of flooding or through-flowing the plate-juncture and thereby overflowing the flange during the shrinkage of the plate is shown in Fig. 2 by the representation at 25 of a stream of metal, which passes from the main runner 12 through the mold-filling channels 13, traverses the plate-and-flange juncture at 20, passes through the interior of the flange, and when poured to excess escapes by an overflow through the cope-vent 32. In passing from the plate into the upper part of the flange said current 25 reaches to the pipe-forming region of the flange, and thus prevents piping in the flange.

Having thus described my invention, I claim—

1. In a mold, the combination, with the nowel having the main runner therein, of the vented cope, the nowel and cope having formed therein the wheel-mold space consisting of the plate-space and the peripheral flange-space, said main runner communicating with the plate-space at intervals throughout the circuit thereof at points adjacent to and within the plate-and-flange juncture, and the cope-vents communicating with the mold-space without said juncture, whereby said juncture may be outwardly through-flowed throughout the periphery of the plate during the contraction of the plate, substantially as described.

2. In a mold, the combination, with the nowel having the main runner, of the vented cope, the nowel and cope having formed therein the wheel-mold space consisting of the plate-space and the peripheral flange-space, said runner communicating with the plate-space at intervals throughout the periphery thereof at points adjacent to the plate-and-flange juncture, and the cope-vents communicating with the peripheral flange-space, said nowel having a pouring-head runner entering the circuit of the main runner tangentially thereto, substantially as described.

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