No. 671,137. Patented Apr. 2, 1901.

# J. G. JOHNSTON.

## MOLDING PLANT.

(Application filed July 9, 1900.)

(No Model.)

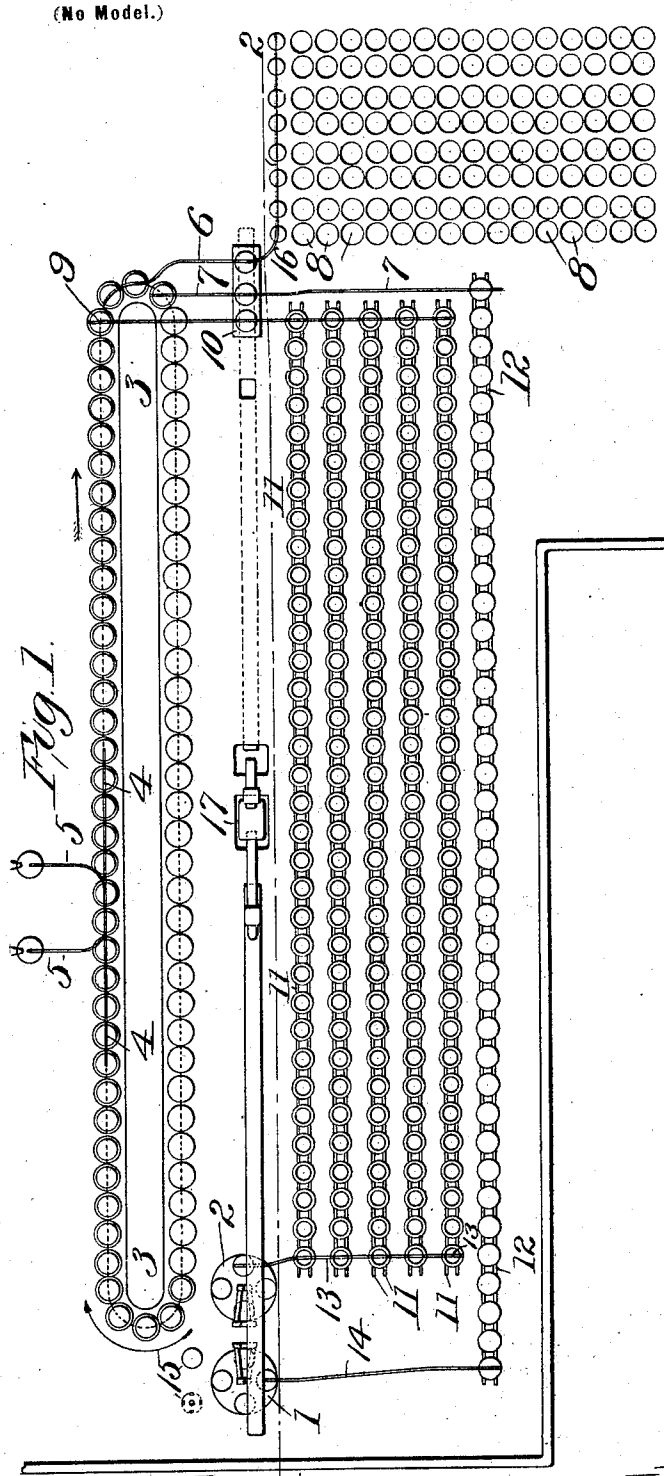


Fig. 1.

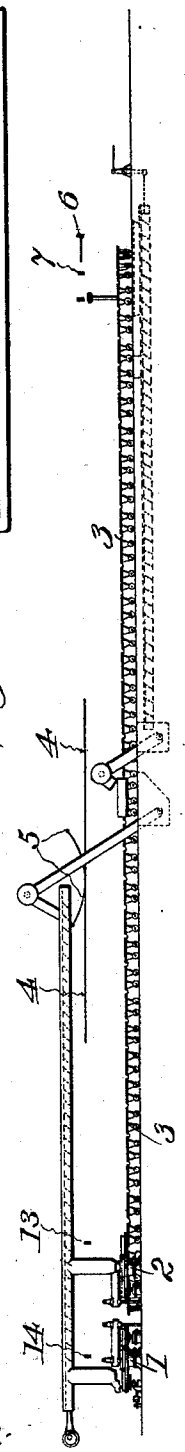


Fig. 2.

Witnesses:
Ralph Ralick

Inventor:
Joseph G. Johnston
by Bakewell & Cornwall
Attys.

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# UNITED STATES PATENT OFFICE.

JOSEPH G. JOHNSTON, OF DETROIT, MICHIGAN, ASSIGNOR TO THE AMERICAN CAR & FOUNDRY COMPANY, OF ST. LOUIS, MISSOURI.

## MOLDING PLANT.

SPECIFICATION forming part of Letters Patent No. 671,137, dated April 2, 1901.

Application filed July 9, 1900. Serial No. 22,988. (No model.)

*To all whom it may concern:*

Be it known that I, JOSEPH G. JOHNSTON, a citizen of the United States, residing at the city of Detroit, county of Wayne, State of Michigan, have invented a certain new and useful Improvement in Molding Plants, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a plan view of my improved casting plant. Fig. 2 is a sectional view thereof on line 2 2, Fig. 1.

This invention relates to a new and useful improvement in a casting plant, the object being to enable the manufacture of castings to be conducted expeditiously and at the same time considerably reduce the labor and expense of manufacturing castings as compared with the system ordinarily practiced.

My invention consists in the construction, arrangement, and combination of the several parts, all as will hereinafter be described and afterward pointed out in the claims.

It is well known that in ordinary foundry practice where various kinds of car-wheels are made the molds are usually formed under cranes, the floor-space occupied by each crane being commonly known as a "molding-floor." These molding-floors cover the floor-space of the foundry. When ready for pouring, the molten metal is conveyed from the cupola to the various floors and the molds filled with the metal. After sufficient time has elapsed for cooling the casting is taken from the mold to a common point, where it is placed in pits and permitted to cool slowly. The sand is shaken from the flasks and tempered, so as to be again used the following day. It is obvious that these operations involve considerable time and skilled labor; further, that a large area of floor-space is necessary, particularly when the system is conducted on a large scale.

In the accompanying drawings I have shown an improved system for handling flasks, pouring the molten metal into the cavities thereof, and manipulating the finished castings, whereby space is economized and the work is carried on expeditiously and with a minimum amount of manual labor.

In the drawings, 1 and 2 indicate molding-machines, of which there may be any desired number, two being shown in the drawings, said molding-machines being preferably located at one end of a suitable building and adjacent to a series of conveyers or tracks, which by a step-by-step movement return the drags, copes, and chills, said machines being also adjacent to an endless train of carriers or tables 3. The construction and operation of the molding-machines I prefer to use are illustrated in an application entitled "Wheel-molding machine," filed by me July 9, 1900, and serially numbered 22,987. To expedite the output from these machines, I prefer that the machine marked 1 handle the drag side of the flask, while the machine marked 2 handles the cope and chill side. These machines are arranged in juxtaposition to one end of the endless train of carriers 3, and when the drag side of the flask is finished the same is placed on an empty carrier 3 and the cope and chill side after the cores are arranged in position in the drag, if cores are employed, is placed thereover and clamped to the drag. The carriers move in the direction indicated by the arrow, and suitable driving mechanism (not shown) is employed in connection with these carriers to move them step by step along the track provided therefor.

4 indicates an overhead track arranged above and including within its scope a number of the carriers 3 and their carried flasks, said track receiving ladles of molten metal from cupolas (not shown) through the medium of the branch tracks 5. A ladle of molten metal on track 4 can thus be moved from one flask to the other and the pouring continued until the molten metal is exhausted from the ladle. After the molten metal is poured into the molds the carriers are moved step by step, sufficient time being given for the metal to solidify in the molds, and by the time the opposite end of the continuous train of carriers is reached the molds, with their solidified metal, are ready for the operation of removing the casting, shaking the sand therefrom, and placing the parts of the flasks

on conveyers to be returned to the molding-machine. To accomplish this, I arrange three overhead tracks 6, 7, and 9, traversing the sand-pit 10 and having one of their ends terminating over the carrier 3. The cope and chill removed from the casting by carrier on track 9 are arrested over the sand-pit 10 and the sand shaken therefrom after said cope and chill are deposited on one of a series of conveyers 11, which conveyers are driven by a similar mechanism in such manner that they may be operated independently and have a step-by-step movement, the number of these tracks and their combined capacity to be such that the chill-ring will have sufficient time for cooling.

The casting is taken from the flask by a carrier on track 6, is arrested over sand-pit 10, and is then deposited on one of the series of suitable rests 16 at the ends of the parallel rows of cooling-pits 8. From these rests the castings are conveyed by overhead cranes (not shown) to the various pits and deposited therein in the usual manner. The drag is removed from carrier 3 by a carrier on track 7, is arrested over sand-pit 10, where the sand is removed from the flask, and is then deposited on conveyer 12, similar to conveyers 11, having a step-by-step movement, the length of time required for the drag to traverse said conveyer being such that when it reaches the molding-machine it will be cool enough to be used again.

The large number of cooling-conveyers for the chill-ring and cope in excess of those for the drag is due to the chill-ring coming in contact with the molten metal, and being a comparatively large casting requires a considerable length of time to become cool enough for use a second time.

The sand removed from the casting and flasks and deposited in sand-pit 10 is conveyed by suitable machinery to a sand-screen 17 and after being screened and tempered is elevated to a conveyer, which delivers the sand to the molding-machines 1 and 2.

13 indicates a track which is arranged over the ends of the traveling tracks which carry the copes and chills, said track being provided with a suitable carrier, whereby the cooled copes and chills may be lifted from the traveling tracks 11 and deposited on the molding-machine 2.

14 indicates a track upon which is arranged a carrier for conveying the drags from the conveyer 12 to the molding-machine 1.

15 indicates one or more supports or rests upon which the patterns and their flasks are placed when it is desired to draw the patterns from the flasks, the patterns being returned to their respective molding-machines, while the flasks of both the cope and drag are assembled and placed on the carrier 3, ready to receive its charge of molten metal.

From the above it will be seen that the heavy flasks and castings are manipulated wholly by machinery and that the manual labor required is very little. A crane or suitable transferring device may be employed for handling the product of the molding-machines and depositing the same on the carriers 3.

I will state that the plan illustrated in the accompanying drawings is especially designed for turning out car-wheels, and the building as designed in actual practice is about two hundred and twenty feet total length, while the greatest width is one hundred and forty-eight feet.

I am aware that minor changes in the arrangement, construction, and combination of the several parts of my device can be made and substituted for those herein shown and described without in the least departing from the nature and principle of my invention.

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

1. In a plant for the manufacture of castings, the combination with an endless carrier upon which the flasks are placed, of a track extending over a portion of one side of said carrier, said track providing a way for the pouring-ladle, a series of conveyers for returning the empty flasks back to the front end of the carrier, and tracks over the rear ends of the carrier and conveyers, upon which tracks the flasks and castings are handled.

2. In a plant for the manufacture of castings, the combination with a molding-machine, of an endless carrier upon which the flasks are placed, a track extending over a portion of one side of said carrier, said track providing a way for the pouring-ladle, a series of conveyers for returning the empty flasks back to the molding-machine, a track over the rear end of the carrier and conveyers, a track over the rear end of the carrier and upon which the castings are handled, and a device interposed between the carrier and conveyers for returning the sand to the molding-machine, substantially as described.

In testimony whereof I hereunto affix my signature, in the presence of two witnesses, this 29th day of June, 1900.

JOSEPH G. JOHNSTON.

Witnesses:
A. F. ANNESLEY,
R. N. BAKER.