J. W. BROWN, JR.

CASTING APPARATUS.

APPLICATION FILED MAY 4, 1910.

1,119,680.

Patented Dec. 1, 1914.

5 SHEETS-SHEET 1.

Fig. 1.

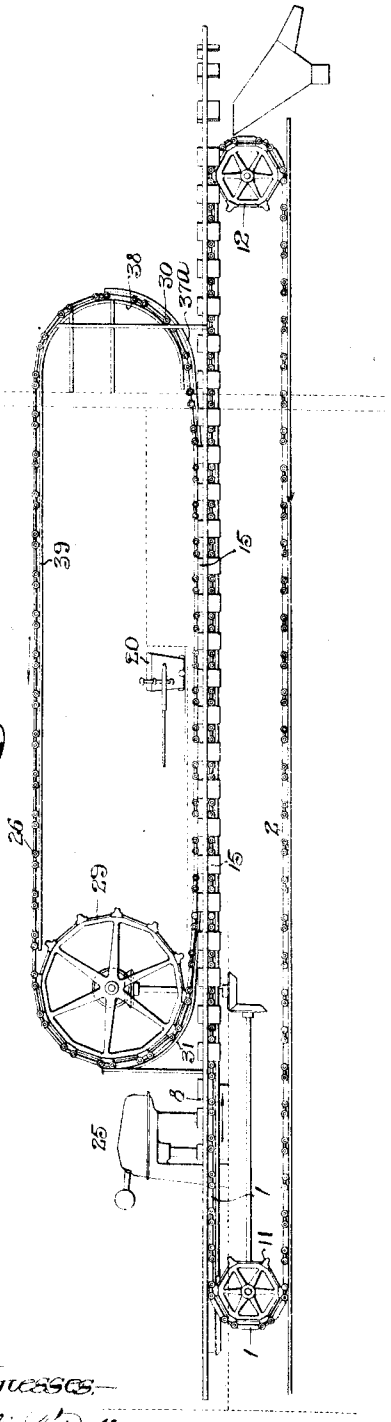
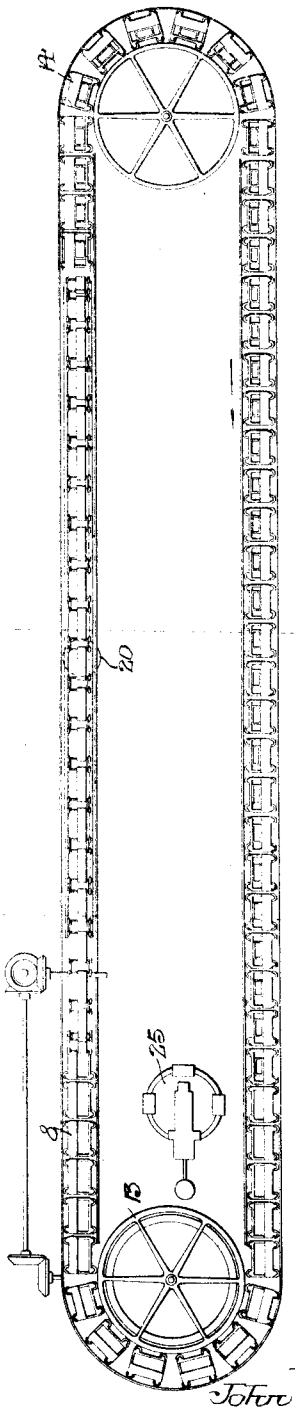


Fig. 2.



Witnesses.—
Walter A. Tubinger
Wills A. Burrowes

Inventor—
John W. Brown Jr.
by his Attorneys:
Howson & Sinnar

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5 SHEETS-SHEET 2

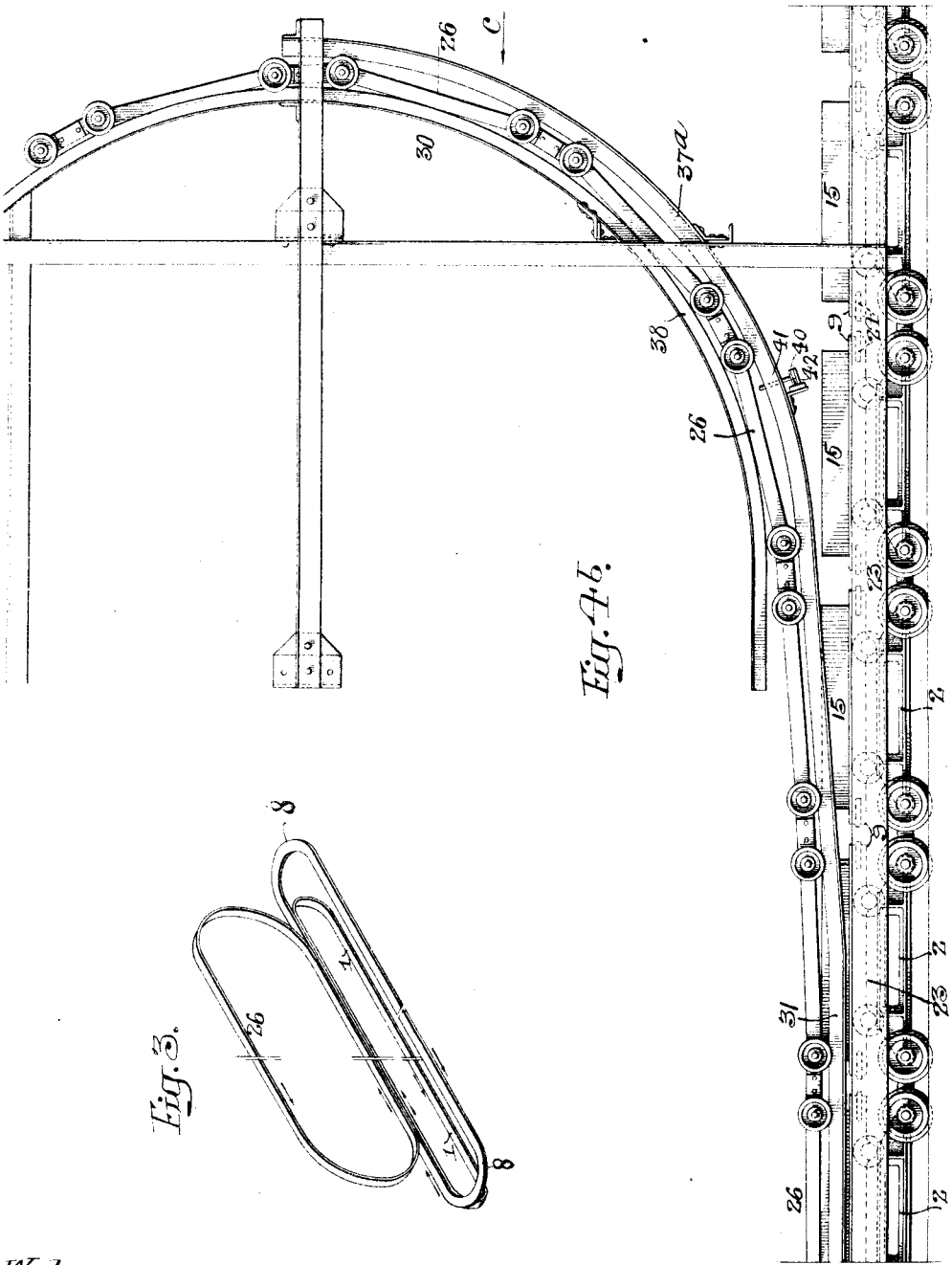


Fig. 4.

Fig. 5.

Witnesses.

Walter W. Pellinger

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5 SHEETS—SHEET 3.

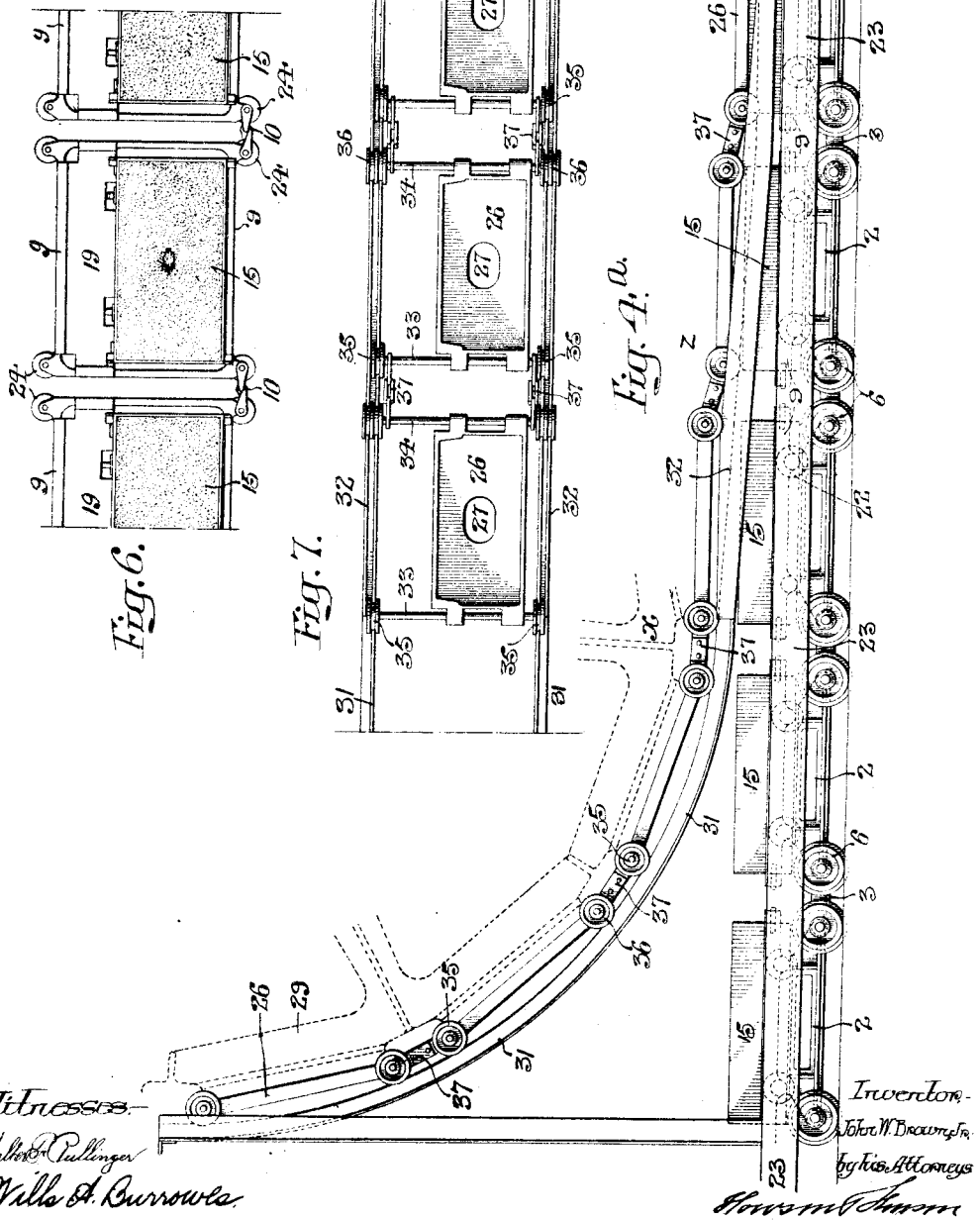


Fig. 6.

Fig. 7.

Fig. 4.

Witnesses.

Walter S. Pullinger

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5 SHEETS-SHEET 4.

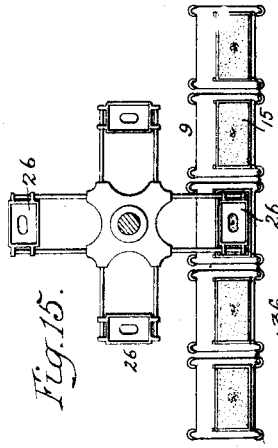


Fig. 15.

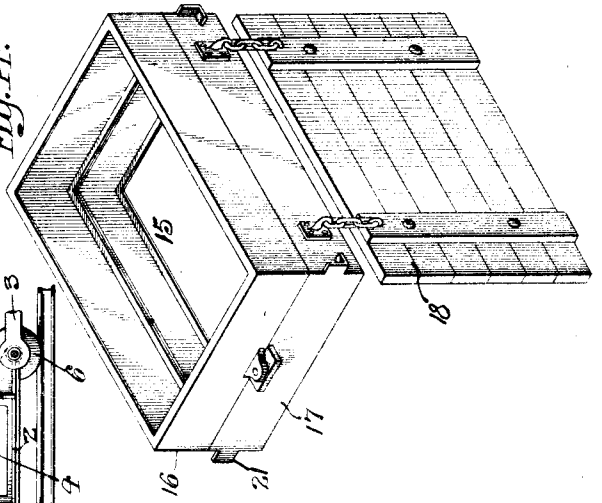


Fig. 14.

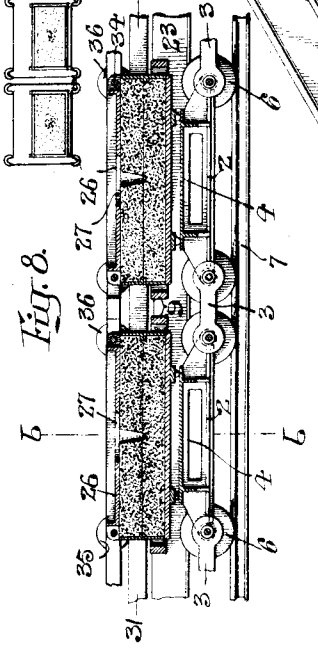


Fig. 8.

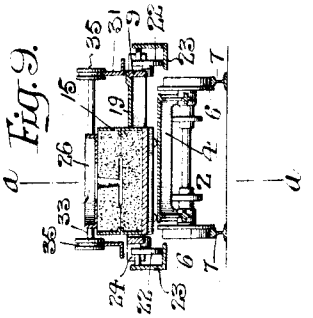


Fig. 9.

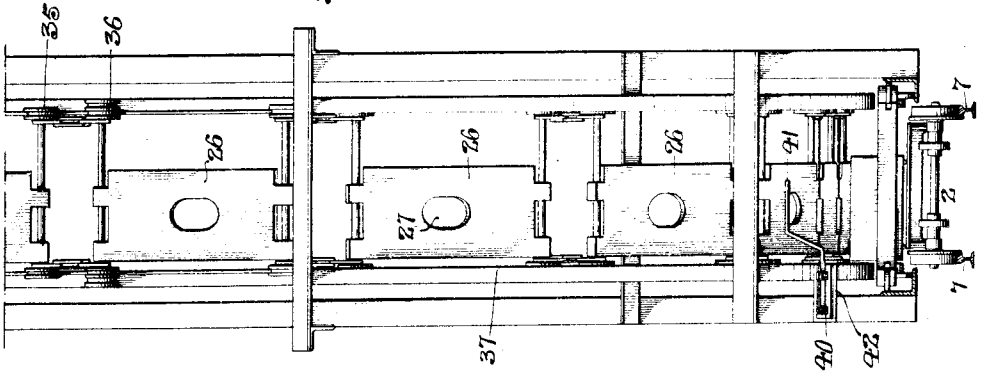


Fig. 5.

Witnesses.—
Walter A. Pullinger
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J. W. BROWN, JR.

CASTING APPARATUS.

APPLICATION FILED MAY 4, 1910.

1,119,680.

Patented Dec. 1, 1914.

5 SHEETS—SHEET 5

Fig. 10.

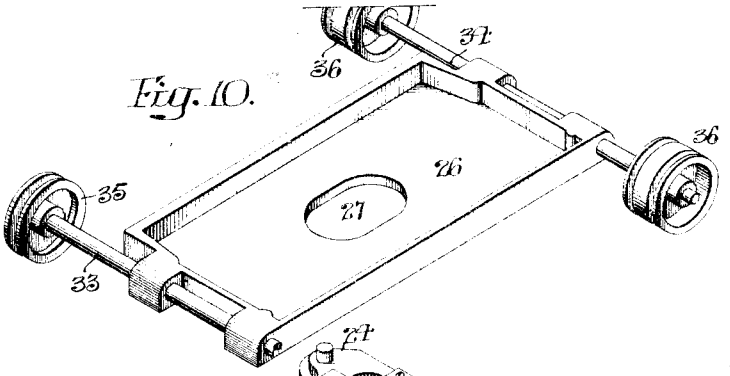


Fig. 11.

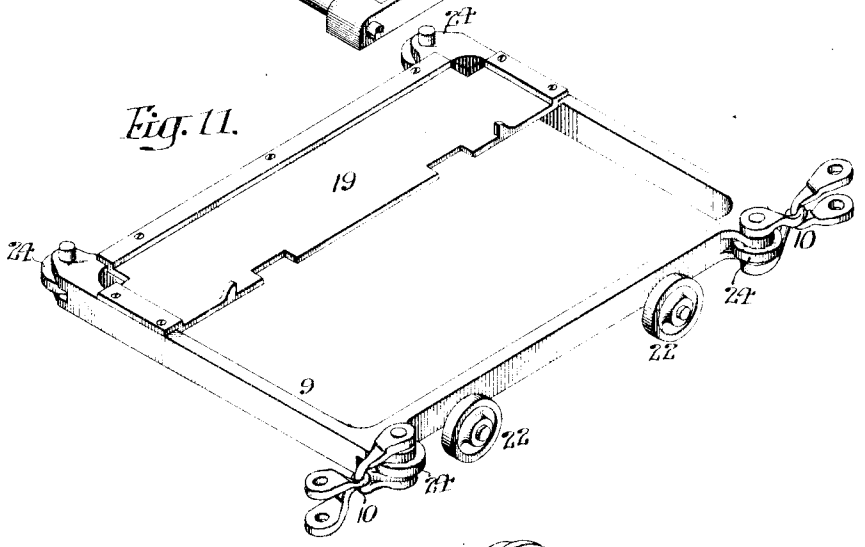


Fig. 12.

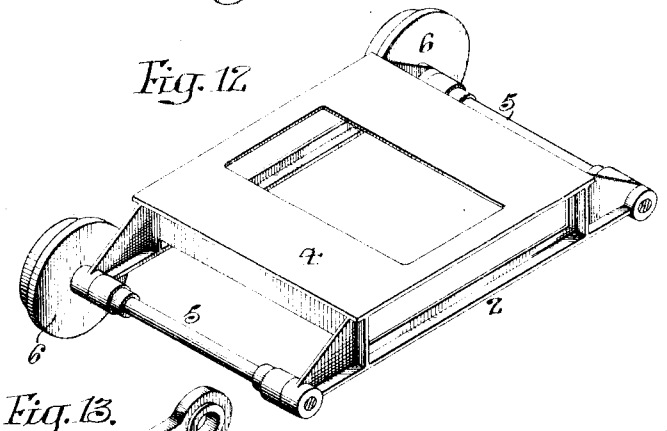
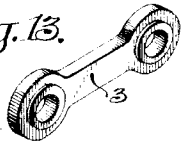


Fig. 13.



Witnesses.

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Howson & Howson

UNITED STATES PATENT OFFICE.

JOHN WILSON BROWN, JR., OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO THE ENTERPRISE MANUFACTURING COMPANY OF PENNSYLVANIA, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

CASTING APPARATUS.

1,119,680. Specification of Letters Patent. Patented Dec. 1, 1914.

Application filed May 4, 1910. Serial No. 559,290.

To all whom it may concern:

Be it known that I, JOHN WILSON BROWN, Jr., a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain Improvements in Casting Apparatus, of which the following is a specification.

My invention relates to certain details of construction not claimed in a companion and copending application filed January 8, 1910, Serial No. 537,076, (patented May 21, 1912, No. 1,027,316).

The main object of the present invention is to provide means for applying weights to the molds of a casting machine.

A further object of the invention is to so construct the mechanism that the weights will be removed from the molds prior to the discharge of the sand and castings from the flasks.

The invention relates further to details of construction of the mechanism, as will be fully described hereafter, reference being had to the accompanying drawings, in which:—

Figure 1, is a diagrammatic sectional view of a continuous casting apparatus, such as illustrated in the above mentioned patent, showing my improvements; Fig. 2, is a diagrammatic plan view; Fig. 3, is a diagrammatic perspective view illustrating the location of the endless chain of flask rings with the supporting conveyer and an endless chain of flask weights; Fig. 4ª, is a view in elevation of one end of the casting apparatus, showing the means for applying the weights to the flasks; Fig. 4ᵇ, is a similar view of the opposite end of the apparatus, showing the means of removing the weights from the flasks; Fig. 5, is an end view looking in the direction of the arrow C, Fig. 4ᵇ; Fig. 6, is a plan view of the flask carrying rings; Fig. 7, is a plan view of a portion of the weight conveyer; Fig. 8, is a sectional view through the three conveyers showing the flasks in position and the weights resting thereon; the view being a section on the line *a*—*a*, Fig. 9; Fig. 9, is a transverse sectional view on the line *b*—*b*, Fig. 8; Fig. 10, is a perspective view of one of the weights; Fig. 11, is a perspective view of one of the flask rings; Fig. 12, is a perspective view of one of the conveyer trucks; Fig. 13, is a view of one of the links connecting the trucks; Fig. 14, is a perspective view of the flask, and Fig. 15, is a view of a modification.

1 is a vertically arranged endless conveyer made of a series of trucks 2, Fig. 12, connected by links 3, Fig. 13. Each truck has a platform 4 which supports the bottom board of the flask.

5, 5 are the axles mounted in suitable bearings at each end of the truck and provided with wheels 6 which travel on rails 7, shown clearly in Figs. 8 and 9. These trucks travel only in a vertical plane and in the direction indicated by the arrow, Fig. 1, and the sole object of this conveyer is to support the flasks when filled with sand and during the process of casting.

8 is a horizontal conveyer, one run of which travels over the vertically arranged conveyer 1. These two conveyers are driven at the same speed and travel in unison. The horizontal conveyer 8 is made up of a series of flask carrying rings 9, Fig. 11, connected together at one edge by links 10; the links being free to swivel, as clearly indicated in said Fig. 11, so that they will readily pass around the curves at each end and will accommodate themselves to any unevenness in the supporting tracks. The flask carrying rings do not act until after the mold is poured and the bottom board is dropped prior to the discharge of the sand and castings, then the flask drops onto the carrying ring and is supported by said ring until its return to the molding machine.

The conveyer 1 passes around sprocket wheels 11 and 12; 11 in the present instance being the driving wheel; and the conveyer 8 passes around sprocket wheels 13 and 14, and 13 in this instance is the driving wheel. The two driving wheels may be connected together in any suitable manner so that the two conveyers will travel together in unison.

The flask 15, illustrated in Fig. 14, is made with the cope 16 and drag 17, and loosely hinged to the drag is the bottom board 18, Fig. 14. On the ring 9 is a filling plate 19. This filling plate can be of any size to suit the flask and is for the purpose of so locating the flask that the pouring hole will come directly under the mouth of the ladle 20. On the flasks are lugs 21 which

rest directly above the rings but clear of the rings when the flasks are carried by the trucks 2, but as soon as the truck is moved away then the flasks drop and the lugs 21 rest directly upon the rings 9.

The rings 9 of the horizontal conveyer have wheels 22 which travel on rails 23, as shown in Figs. 8 and 9. These rails are in the form of angles and the upright portions of the angle rails act as guides to hold the rings laterally in position and on each end of each ring, as illustrated in Fig. 11, are wheels 24, which rest against the rails 23.

25 is the molding machine which, in the present instance, is within the loop of the conveyer 8 and located at one end of the apparatus. This molding machine may be of any construction desired. The flasks are filled by the use of this molding machine and placed in the rings to be carried to the pouring point. In fact, in some instances, the molds may be made by hand, if desired, without departing from the essential features of the invention.

In order to properly hold the sand within the mold during the pouring operation, I provide weights 26 which rest directly upon the sand of the mold, and in each weight is an opening 27 directly in line with the pouring opening of the mold, so that when the conveyer reaches the ladle 20 and is stopped, the opening in the weight and the pouring opening will aline with the mouth of the ladle, so that the metal can be properly poured into the mold. The weight prevents the upward displacement of the sand during the pouring operation, insuring accuracy in the castings.

In order to properly place the weights on the mold, I connect them together, forming an endless chain of weights 26, which pass around a driven sprocket wheel 29. At the opposite end is a guide 30 around which the enchained weights pass.

31, 31 are guide rails for supporting the weights after they pass over the center of the sprocket wheel 29 and on the outside of each of these rails and running parallel with them for a certain distance are rails 32, and it will be noticed, in referring to Figs. 7 and 10, that each weight is carried by axles 33 and 34, and on the rear axle 33 are single grooved wheels 35 which travel only on the rails 31, whereas on the forward axles 34 are double grooved wheels 36 which travel on both rails 31 and 32. The axles are connected together by loose links 37. The links in the present instance are arranged in sets of three, so that the weights will independently accommodate themselves to the rails and to the flasks and, when the weights rest upon the sand within the flasks, there is no tendency of the weights to move, as any movement of the weights would be liable to destroy the molds.

It will be noticed that the rails 31 and 32 are so arranged that when the point x, Fig. 4^a is reached the weights begin to travel in a line parallel with the flask, the rail 32 lifting the forward end of the weight owing to the fact that the wheels 36 travel on the rails 32 and are free of the rails 31. From the point x to the point y the weights gradually settle upon the sand and when the weights contact with the sand, as at y, they are carried by the sand and not by the wheels, so that there is no disturbing of the sand of the mold as the weights are applied to the sand. This is essential, as it will be understood that the elements of the apparatus are moving intermittently in unison and any disturbing of the sand will be liable to ruin the mold.

It will be noticed that, when the weights are on the sand of the flasks, the weights are loosely connected one with the other and the links drop a trifle out of line, as illustrated at z, Fig. 4^a. This slack is taken up again as soon as the weight leaves the flask on the return run, due to the fact that the pitch of the sprocket wheel 29 is greater than the pitch of either of the sprocket wheels 11 or 13.

The rails 31 connect with the rails 37^a of the guide 30, as illustrated in Fig. 4^b, and running parallel with this rail for a certain distance is a rail 38 which connects with a supporting rail 39 for supporting the return run of the weights, Fig. 1.

In order to prevent accidents due to the overpouring of the metal in the mold when the weight is parted from the flask, I provide an electric knife switch 40 having an arm 41, which is located directly under the traveling weights, so that any projection hanging from the weights would strike the switch and throw it out of the contacts 42, and, as this switch is connected electrically with the power mechanism of the entire apparatus, it would immediately cut off the power and stop the entire mechanism, as in some instances the metal may overflow to such an extent as to connect the sprue with the weight, and, consequently, when the weight is lifted off the mold, it would simply pull the casting out of the sand but this casting would strike the arm 41, above described, and would immediately stop the machine before any damage was incurred. As soon as the casting would be removed from the weight the machine could be immediately set in operation.

By the above construction it will be seen that I am enabled to place weights upon the sand in the flasks without any liability of disturbing the sand and destroying the mold and that the weights remain on the sand during the pouring operation and during the time the metal is setting. After the metal has set the weights are automatically removed,

after which the trucks of the conveyer 1 are moved from under the rings and the flasks settle onto the rings 9 simultaneously with the dropping of the bottom board.

While I have illustrated my invention applied to a continuous casting machine and have shown enchained weights, I wish to claim broadly mechanism for applying a weight to the sand or other material in the flask before pouring and also mechanism for removing the weight from the flask.

In Fig. 15, I have illustrated a modification in which the weights are carried by an intermittently revolving head located in front of the pouring point so that the weight is applied immediately before the pouring takes place and is removed after the pouring. This modification will form the subject of a separate application for patent.

I claim:

1. The combination in a casting apparatus, of a series of flasks, means for pouring, a series of weights, mechanism for placing the weights on the material in the flasks before pouring, and means for removing the weights from the flasks after pouring.

2. The combination of a series of flasks, means for pouring, means for traversing said flasks, weights for the flasks, and means for applying said weights to the sand in the flasks before pouring.

3. The combination in a casting apparatus, of means for carrying a series of flasks, a series of weights, means for placing a weight on each flask, means for removing said weight, and means for restoring the weight to its original position.

4. The combination in a casting apparatus, of a moving flask, a weight and means for applying said weight to said flask in such manner that the bottom of the weight will be substantially parallel with the surface of the sand in the flask at the moment of contact.

5. The combination of a conveyer, a series of flasks mounted on said conveyer, means for pouring, a series of weights arranged to travel at the same speed as the flasks, means for applying the said weights to the material within the flasks, and means for removing the weights after pouring.

6. The combination in a casting apparatus, of means for carrying a series of flasks, a series of enchained weights adapted to be mounted on the material within the flasks, and rails for guiding the enchained weights onto the flasks.

7. The combination in a casting apparatus, of means for carrying a series of flasks, and a series of enchained weights adapted to be mounted on the material within the flasks.

8. The combination in a casting apparatus, of a series of flasks, means for traversing the flasks, a series of enchained weights, means for guiding the weights so as to direct them onto the flasks, the weights being loosely connected so that when resting upon the flasks one weight will be carried by its flask independently of all others.

9. The combination in a casting apparatus, of a series of flasks, means for traversing the flasks, a series of weights, sets of three links connecting the weights, means for traversing the weights, and guides for directing the weights onto the flasks, the links being so arranged that each weight will be carried independently by its flask.

10. The combination in a casting apparatus, of a series of flasks, means for traversing the flasks, a series of enchained weights, rails for guiding the said weights, said rails being so arranged that the weights will travel with their under faces parallel with the upper face of the sand in the flask and will gradually settle onto the sand as they move forward.

11. The combination in a casting apparatus, of a horizontal conveyer, rings carried thereby, a vertical conveyer traveling under one run of the horizontal conveyer and having a series of trucks, flasks mounted within the rings of the horizontal conveyer and supported by the trucks while filled with sand, with a series of enchained weights arranged to rest upon the sand in the flasks, the parts traveling in unison so that the metal can be poured into the mold while the flasks are supported on the trucks and while the weights are upon the sand and when the weights are removed and the trucks withdrawn the flask will be supported entirely by the rings allowing the bottom board to drop and the sand and casting to be discharged from the flask.

12. The combination in a casting apparatus, of a series of flasks, means for carrying said flasks, a series of enchained weights adapted to rest upon the sand in the flasks, means for traversing the weights, a guide for gradually removing the weights from the flasks after the metal has been poured into the mold, means for driving the apparatus, and an electric switch controlling said driving means having an arm located in close proximity to the path of the enchained weights so that in the event of a casting adhering to the weights it will contact with the arm and throw the switch, stopping the mechanism.

13. The combination in a casting apparatus, of a conveyer, flasks carried thereby, a series of enchained weights adapted to rest upon the sand within the flasks, each flask having double wheels at the forward end and single wheels at the rear end, with one set of rails adapted to the wheels at both ends of the weight and another set of rails adapted to the wheels at the forward end only of the weight, said rails being so

arranged that the weights will settle upon the flasks without disturbing the sand.

14. The combination of a flask, means for pouring, a traveling weight, and mechanical means for applying said weight to the sand in the flask and removing the weight from the flask after pouring.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

JOHN WILSON BROWN, JR.

Witnesses:

WM. E. SHUPE,

WM. A. BARR.