G. S. MONSON.

CENTRIFUGAL CASTING MACHINE.

APPLICATION FILED MAR. 29, 1909.

1,009,167. **Patented Nov. 21, 1911.**

2 SHEETS—SHEET 1.

Fig. 1

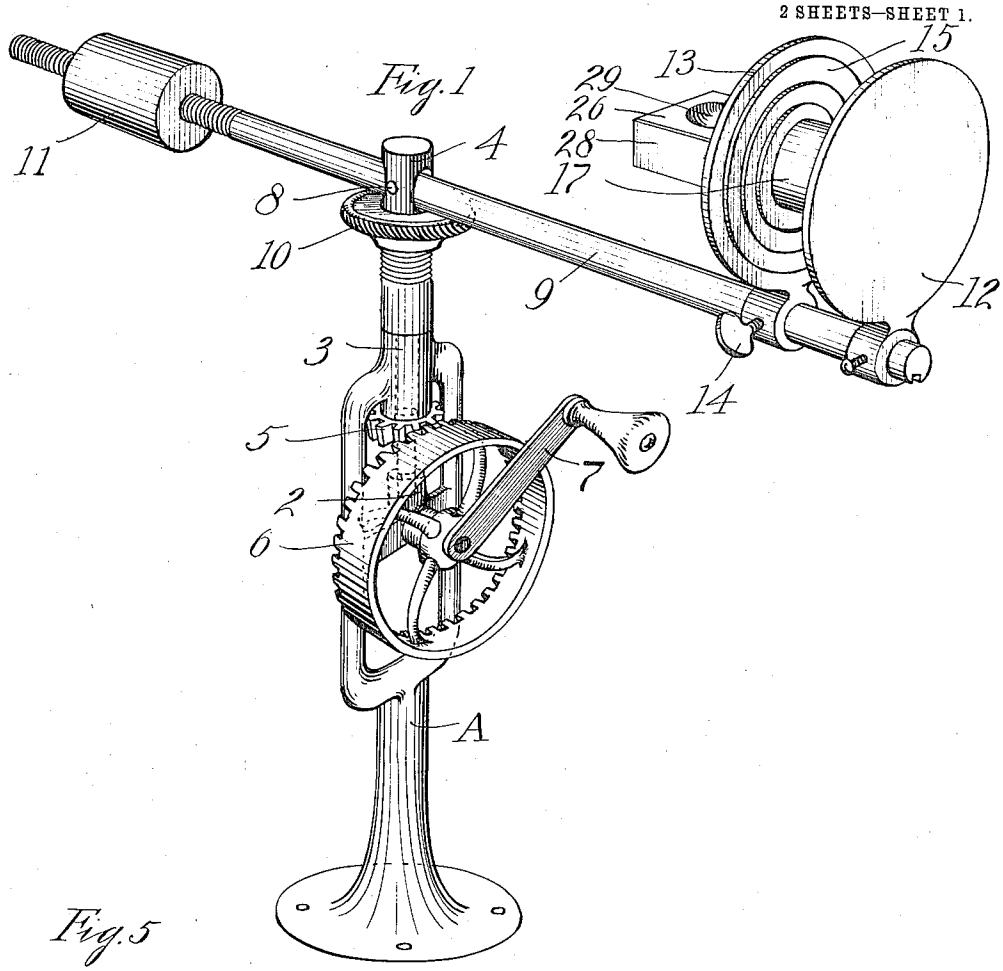
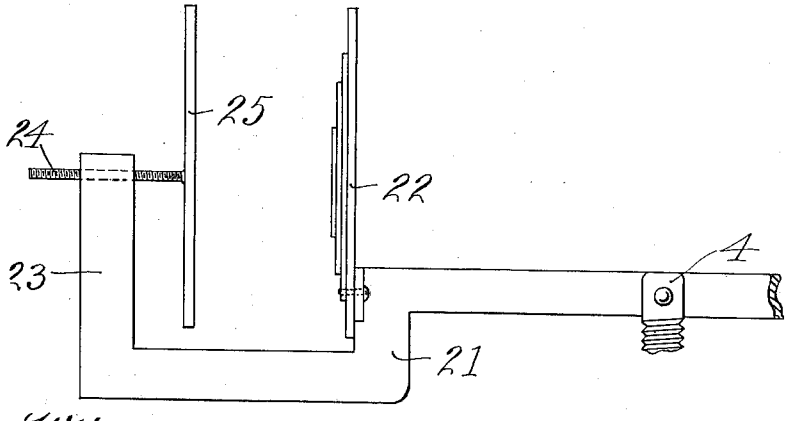


Fig. 5



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2 SHEETS—SHEET 2.

Fig. 2

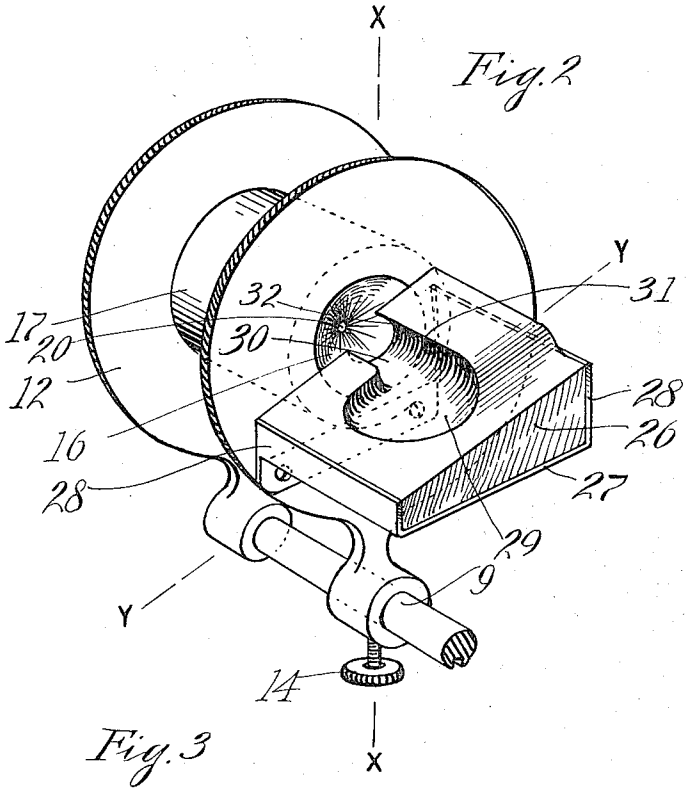


Fig. 3

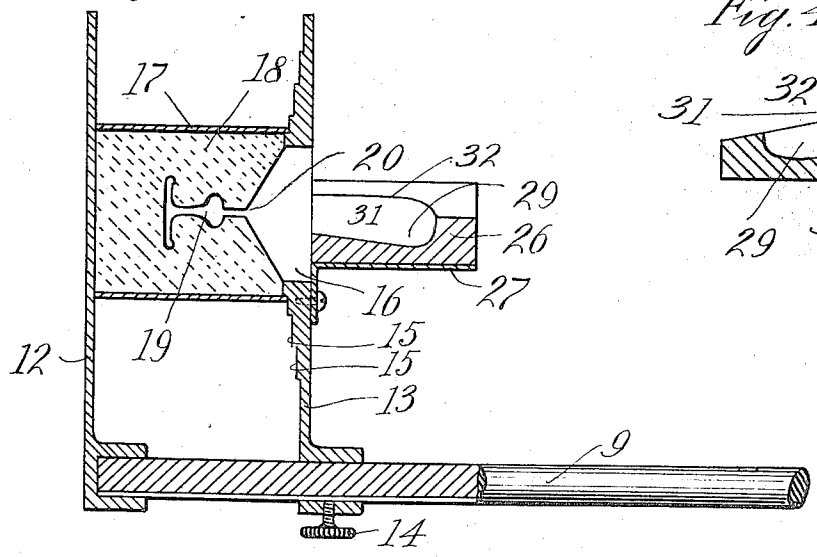
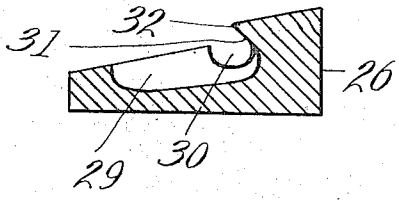


Fig. 4



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UNITED STATES PATENT OFFICE.

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CENTRIFUGAL CASTING-MACHINE.

1,009,167. Specification of Letters Patent. Patented Nov. 21, 1911.

Application filed March 29, 1909. Serial No. 486,399.

To all whom it may concern:

Be it known that I, GEORGE S. MONSON, a citizen of the United States, residing at St. Paul, in the county of Ramsey and State of Minnesota, have invented certain new and useful Improvements in Centrifugal Casting-Machines, of which the following is a specification.

My invention relates to improvements in centrifugal machines for casting metals, its object being to provide improved apparatus wherein the flask holder is adjustable to flasks of different sizes, wherein the rotating parts are kept in balance, and wherein the metal is guided and driven into the flask the most direct and efficient way.

With these and other objects in view the invention consists in the construction, combination and arrangement of parts hereinafter described and claimed.

In the accompanying drawings forming part of this specification, Figure 1 is a perspective view of an embodiment of my improved apparatus; Fig. 2 is a perspective view on an enlarged scale of the flask and crucible with the supporting bar partly broken away; Fig. 3 is a vertical longitudinal section through the flask and crucible on line *x*—*x* of Fig. 2; Fig. 4 is a cross section through the crucible on line *y*—*y* of Fig. 2, and Fig. 5 is a side view of a modified form of adjustable flask holder, with the supporting bar partly broken away.

Referring to the drawings, A represents the frame of the machine, which is adapted to be secured upon a table or other support. Upon the frame is a pivot bearing 2 and a vertical sleeve or bearing 3 in which is journaled the rotating head 4. Upon the head is a horizontal gear 5 which meshes with a toothed wheel 6 journaled in the frame and having an operating handle 7 whereby the head may be rotated.

Pivotally supported upon a horizontal pivot 8 at the upper end of the head, and preferably working within an opening therein, is a flask supporting bar 9. Upon the upper end of the head just below the bar is threaded an annular supporting nut 10 which, when screwed up againt the under side of the bar, will adjust and hold the same in horizontal position perpendicular to the head.

Supported upon the bar on one side of its pivotal support is a flask holder, and on the other side a longitudinally movable counterweight 11 to balance weight of the flask holder and flask. To secure a nice adjustment the counterweight has, preferably, screw threaded engagement with the bar.

The flask holder consists of two upright abutment plates, either one of which may be adjusted toward or away from the other. In the preferred embodiment of the invention shown in Figs. 1 and 3, the holder consists of an outer plate 12 fixedly secured to the bar 9, and an inner plate 13 sleeved thereon so as to be movable toward and away from the plate 12. It is held in adjusted positions by means of a set screw 14. The outer plate 12 is flat on its inner face, while the plate 13 is formed with a plurality of annular steps or shoulders 15 arranged at progressively increasing distances from the central opening 16 through which the metal is cast into the flask.

The flask consists, preferably, of an open ended cylindrical shell 17 adapted to be held endwise between the two plates with its inner end fitting over one or other of the shoulders or steps 15, according to the diameter of the flask. Within the flask is a plaster mold 18, having a matrix 19 and a central inlet opening 20. The matrix is made by any usual method, such as casting the plaster around a form of wax, and then heating the mold so as to burn out the wax, thus leaving a matrix of the desired shape. To facilitate the entrance of the metal, the mold is flared outwardly about the mouth of the inlet 20.

In Fig. 5 is shown a modified form of flask holder wherein the inner plate is fixed to the bar and the outer plate is movable toward and away from the inner plate. As here shown the bar is formed with an elbow 21 to which the stepped inner plate 22 is bolted, and an upwardly extending arm 23 in which is screw-threaded the spindle 24 of the outer plate 25.

The crucible 26 is supported in a bracket 27 having retaining flanges 28. It is formed with a dished bowl 29 having on the follower side a lateral outlet channel 30 through which the metal is thrown out into the flask. To retain the metal and guide it out through the channel when it comes under the influence of centrifugal force, the side wall 31 of the bowl on the follower side is made comparatively high, and is grooved or cut under so as to have an overhanging retaining edge 32. The wall portion 31 is also

carried straight out to the mouth of the outlet channel, of which it forms the upper side wall, so that the metal in the bowl will be projected directly into the mouth of the mold. To prevent the metal from dribbling out prematurely in a thin or interrupted stream, the bottoms of the bowl and channel are made to rise slightly toward the outlet end of the channel.

By having the plates of the flask holder movable toward and away from each other, flasks of different length may be used, and by making one of the plates with steps or shoulders arranged at progressively increasing distances from the central opening 16, flasks of different diameters may be used.

In use a flask of the desired length and diameter is inserted between the end plates of the flask holder with the projecting end of its end wall fitting over the corresponding step or shoulder of the stepped plate. The movable plate is then made fast against the end of the flask. The counterweight is then moved along the bar until it approximately balances the flask and flask holder. The adjusting or supporting nut 10 is then screwed up on the head 4 against the under side of the rod on both sides of the pivotal support thereof, thereby forcing it into exact horizontal position and locking it in such position.

After the metal in the crucible is melted by means of a blow pipe, the rod is revolved by means of the handle 7 being turned from left to right and the gears actuated thereby. At the beginning of the rotation the inertia of the metal will cause it to work across the bowl toward the undercut follower wall 31. As the rod is further revolved the metal will be thrown by centrifugal force against this wall and out of the channel into the flask, the metal being projected into the mold with great force while the lighter impurities and the contained air will work inwardly toward the center of rotation. By making the crucible of the shape shown in the drawings, the metal will be permitted to travel, and will be guided in line with the resultant direction of force or motion.

By using a pivoted bar and counterbalancing the flasks, as described, the lateral strain or side draft upon the head and bearings is avoided, and the rod will turn freely and evenly.

I claim as my invention:

1. A centrifugal casting machine comprising a head rotatable upon a vertical axis, a bar pivotally supported upon the head at a point between its ends so as to swing upon a horizontal axis, an adjustable flask holder secured to the bar on one side of its pivotal support and a counterweight movable upon the bar on the other side of its pivotal support.

2. A centrifugal casting machine comprising a head rotatable upon a vertical axis, a bar pivotally supported upon the head at a point between its ends so as to swing upon a horizontal axis, an adjustable flask holder mounted upon the bar on one side of its pivotal support and a movable counterweight upon the other side and means for holding the bar in horizontal position.

3. A centrifugal casting machine comprising a head rotatable upon a vertical axis, a bar pivotally supported upon the head at a point between its ends so as to swing upon a horizontal axis, an adjustable flask holder mounted upon the bar on one side of its pivotal support and a movable counterweight on the other side, and an adjusting nut threaded upon the head beneath the bar.

4. In a centrifugal machine, the combination, with a rotating head, of an adjustable flask holder carried thereby, said flask holder comprising a pair of plates adapted to fit against the ends of a flask, one of said plates being adjustable toward and away from the other.

5. In a centrifugal casting machine, the combination, with a rotating head, of an adjustable flask holder carried thereby, said flask holder comprising a pair of plates adapted to fit against the ends of a flask, one of said plates being formed on its inner face with a plurality of shoulders arranged at different distances from the center.

6. A centrifugal casting machine comprising an inflexible rotatable bar, a mold rigidly supported on said bar at a distance from the axis of rotation thereof, and a crucible rigidly supported upon the bar at the mouth of the mold between the mold and the axis of rotation of the bar, said crucible being formed with a bowl and a lateral outlet channel leading therefrom, the wall of the bowl and channel on the follower side being undercut and extending in approximately a straight line to the outlet end of the channel.

7. In a centrifugal casting machine, the combination, with an inflexible rotating bar and a mold rigidly mounted thereon, of a crucible rigidly supported upon the bar between the mold and the axis of rotation of the bar, said crucible being formed with a bowl and with an outlet channel leading laterally from the bowl toward the mouth of the mold, the wall of the bowl and channel on the follower side extending in approximately a straight line to the mouth of the channel, and the bottom of the bowl and channel rising toward the mouth of the channel.

8. A centrifugal machine for the slinging of the molten metal into hollow casting molds. characterized by a pair of arms, one of which carries a device for holding a casting mold and the other an adjustable counterweight for the purpose of accurately bal-

ancing the weight of the mold, while the arms are hung upon an axle, which by a convenient transmission of force can be set in swift rotation, all with the object of pressing, by means of centrifugal force, molten metal into the casting mold, thereby insuring a firm casting.

9. A centrifugal casting machine comprising a rotatable bar, an adjustable flask holder supported on said bar on one side of its axis of rotation and an adjustable counterweight supported on said bar on the opposite side of its axis of rotation.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE S. MONSON.

Witnesses:
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H. SMITH.