No. 620,494. Patented Feb. 28, 1899.

E. RAMSAY.

CASTING MACHINE.

(Application filed June 25, 1898.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 1.

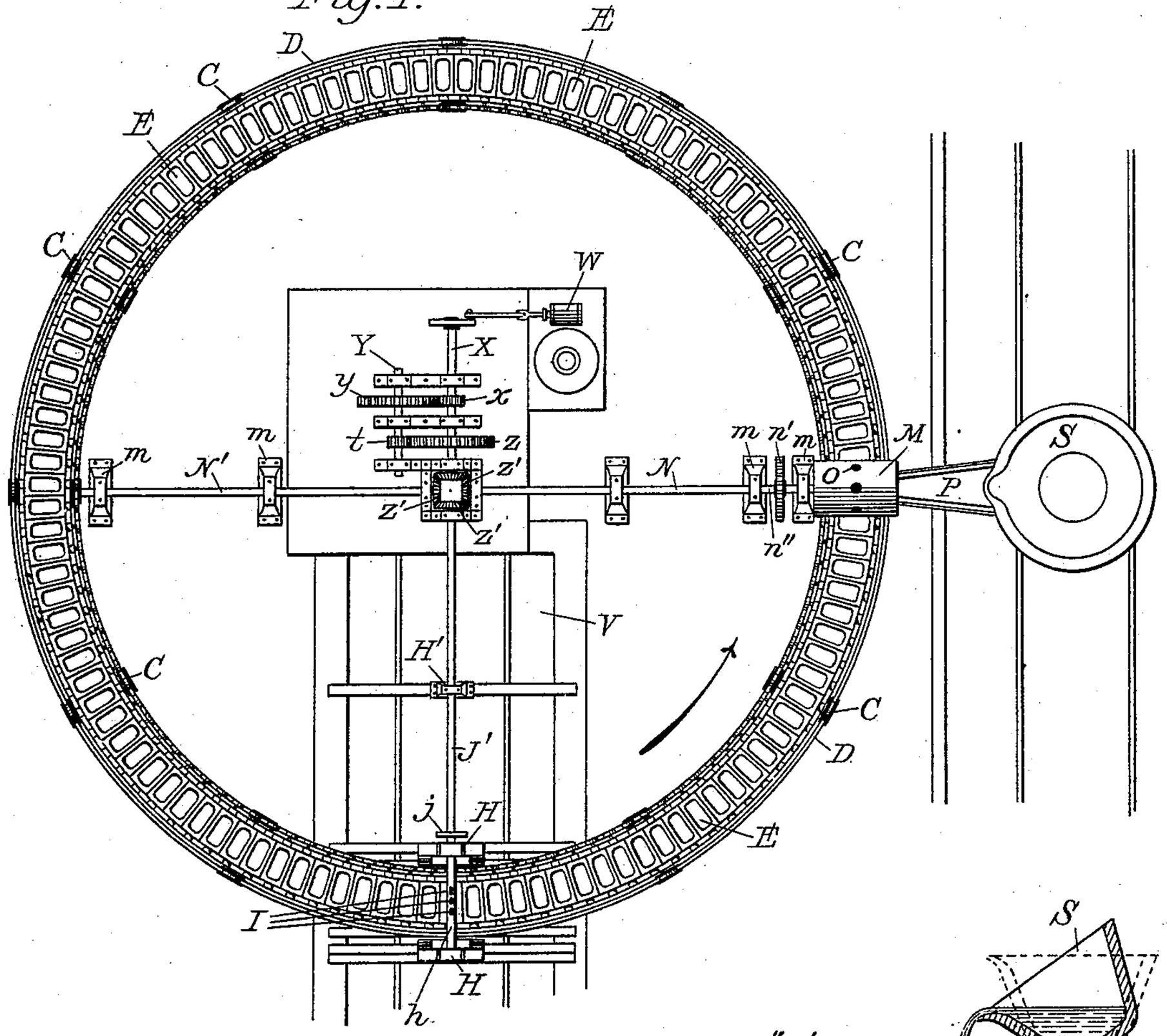
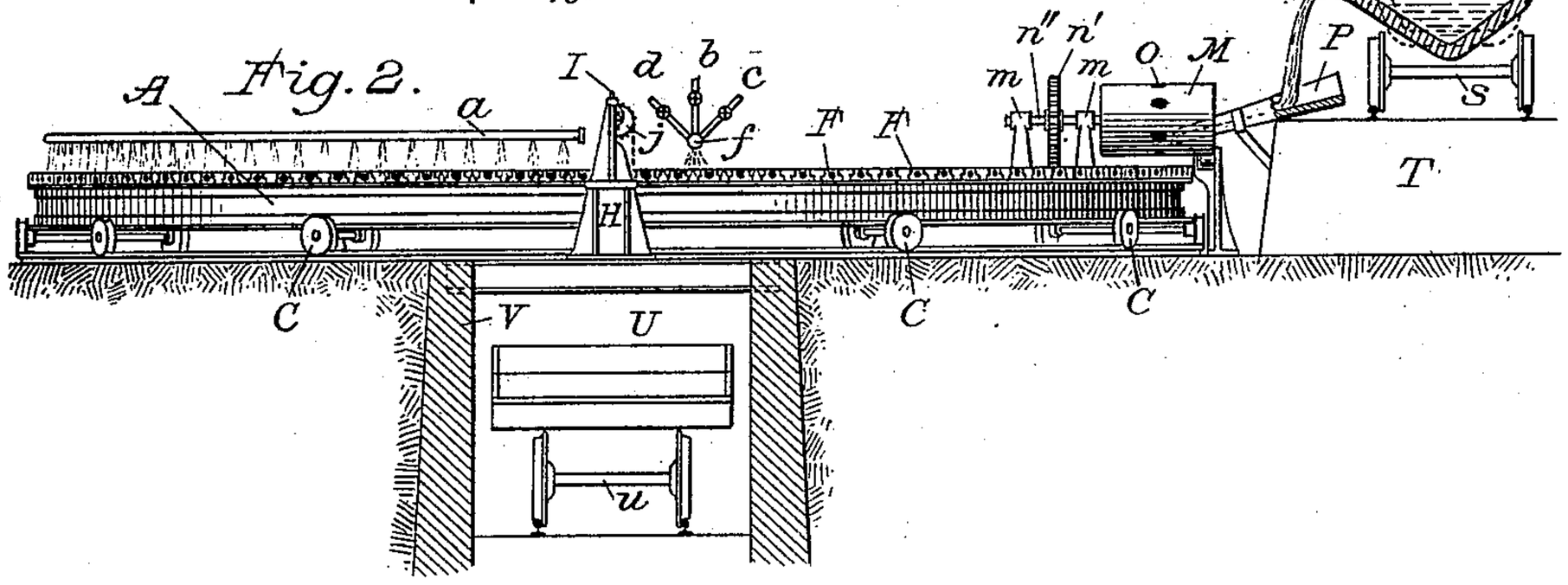


Fig. 2.



Attest:
M. A. Miller.
M. C. Durand.

Inventor:
Erskine Ramsay,
By Howson & Howson,
his Attys.

No. 620,494. Patented Feb. 28, 1899.

E. RAMSAY.

CASTING MACHINE.

(Application filed June 25, 1898.)

(No Model.) 3 Sheets—Sheet 2.

Fig. 4.

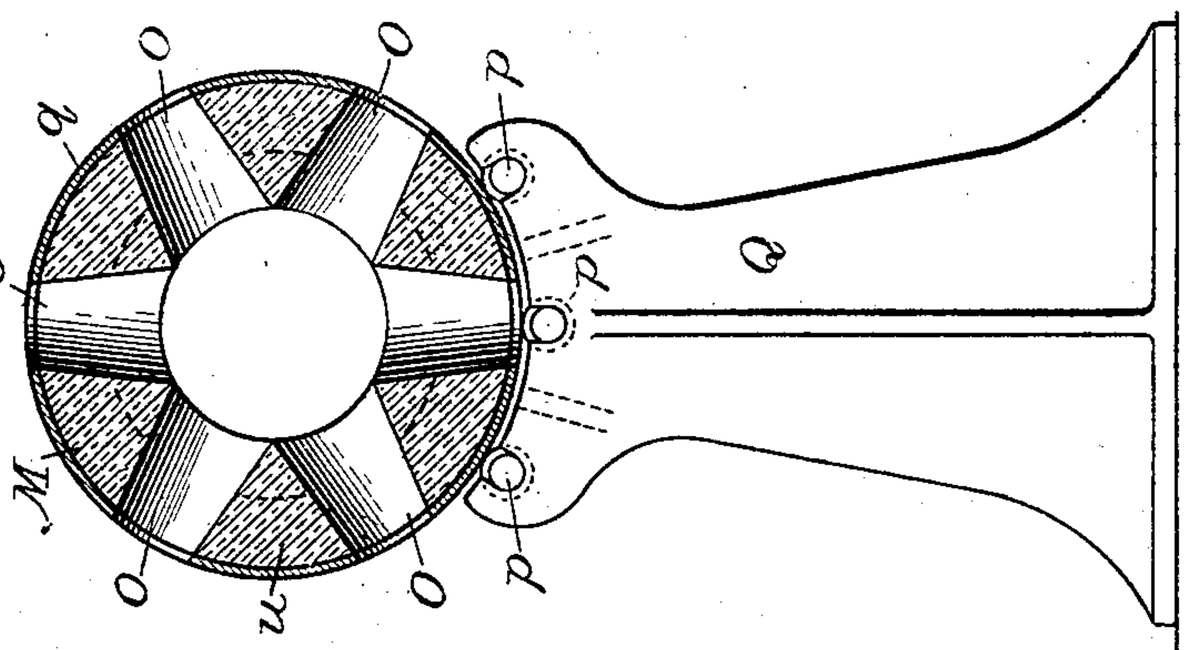
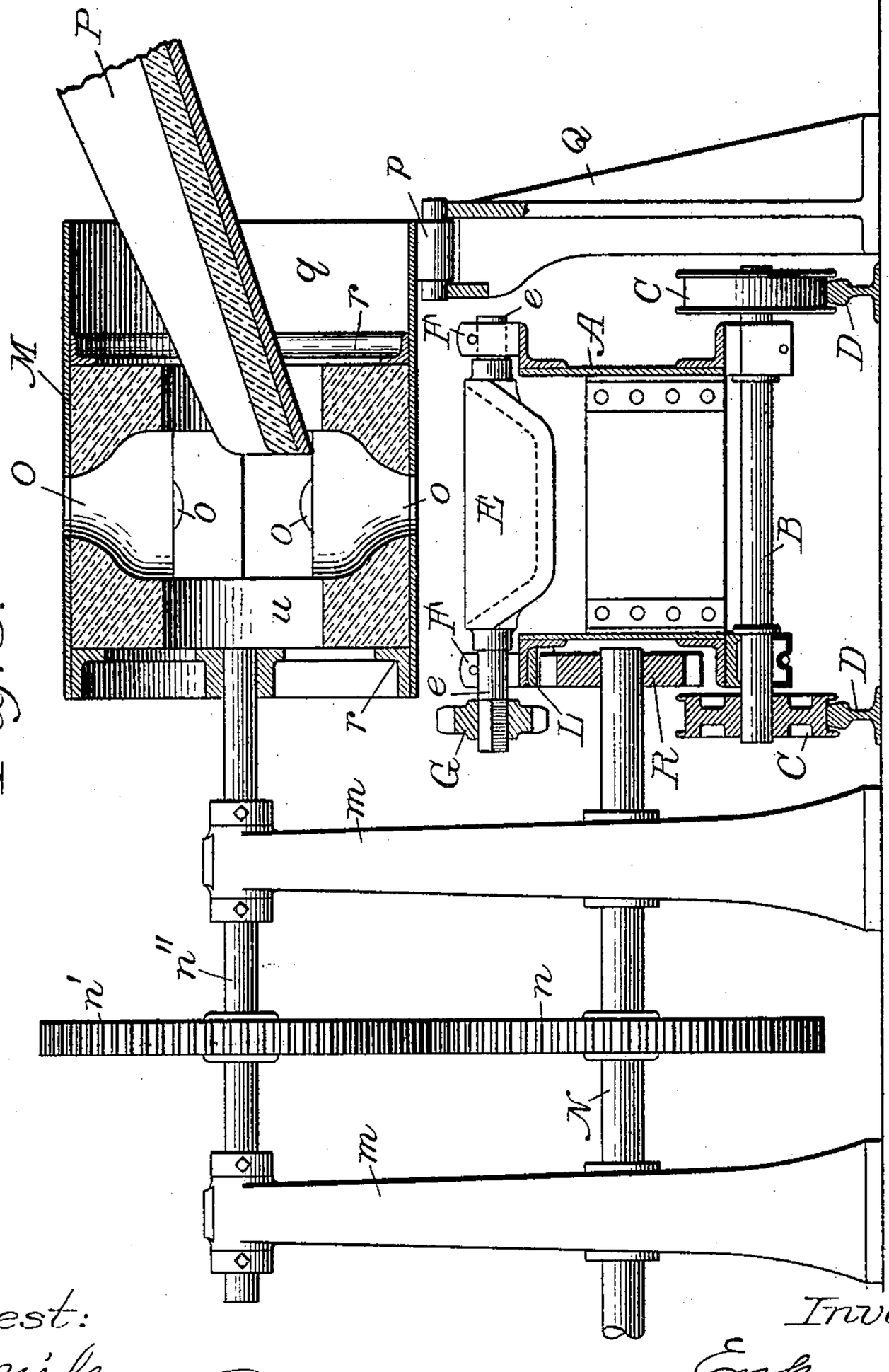


Fig. 3.



Attest:
M. A. Miller.
M. E. Durand

Inventor:
Erskine Ramsay,
By Howson & Howson,
his Attys

No. 620,494. Patented Feb. 28, 1899.

E. RAMSAY.

CASTING MACHINE.

(Application filed June 25, 1898.)

(No Model.) 3 Sheets—Sheet 3.

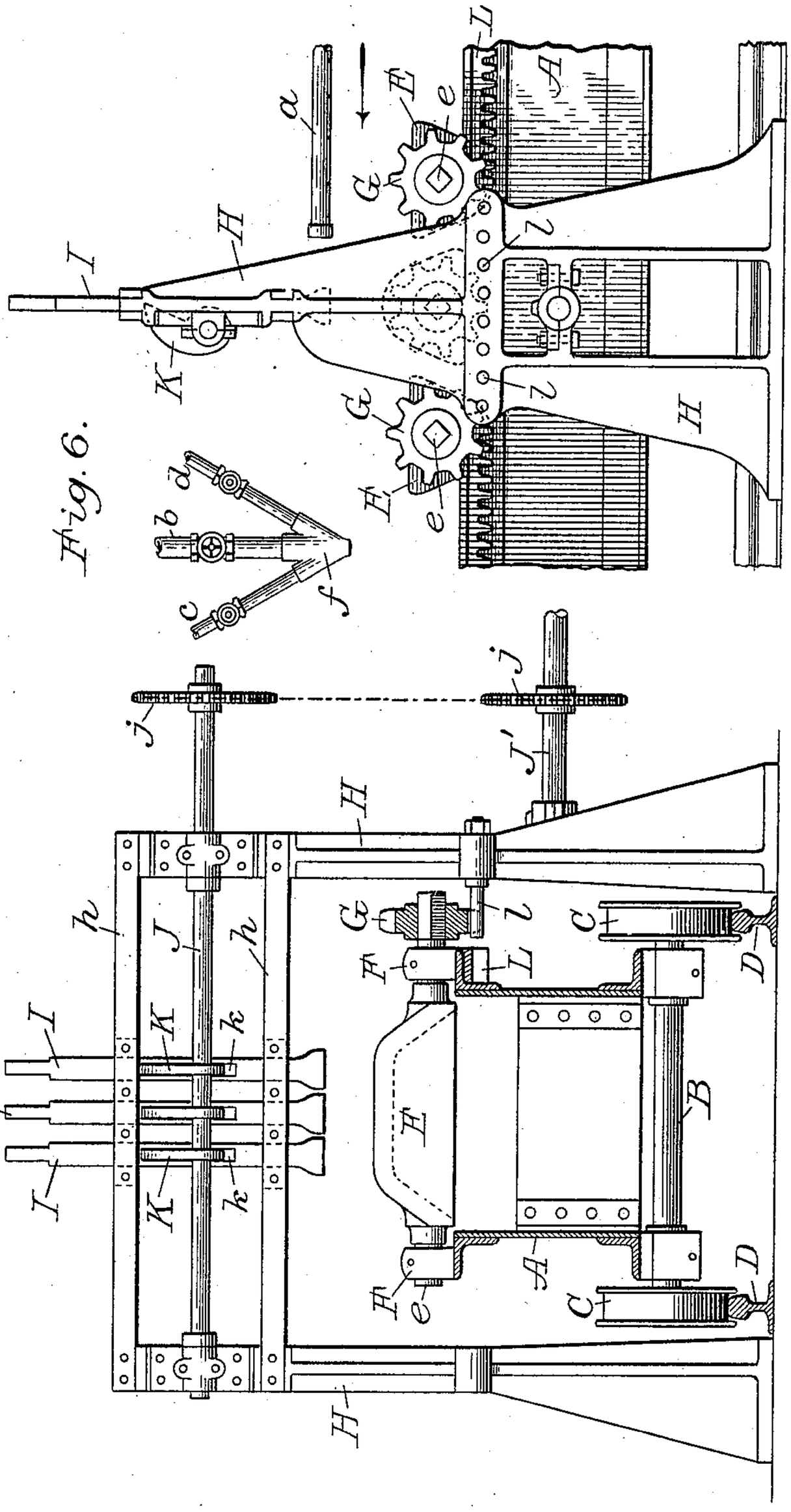


Fig. 6.

Fig. 5.

Attest:
M. A. Miles.
M. E. Durand.

Inventor:
Erskine Ramsay,
By Howson & Howson,
his Attys.

UNITED STATES PATENT OFFICE.

ERSKINE RAMSAY, OF BIRMINGHAM, ALABAMA.

CASTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 620,494, dated February 28, 1899.

Application filed June 25, 1898. Serial No. 684,444. (No model.)

To all whom it may concern:

Be it known that I, ERSKINE RAMSAY, a citizen of the United States, residing at Birmingham, Jefferson county, State of Alabama, have invented certain new and useful Improvements in Casting-Machines, of which the following is a specification.

My invention relates to metal-casting machines; and one object of my invention is to provide a continuously-operating pig-metal casting and conveying machine which will obviate the objection of the formation of scrap, as obtains in machines of this character now in use.

In metal-casting machines which employ endless-belt conveyers for carrying the molds under the pouring device to receive the molten metal it is customary to make the molds with overlapping flanges or devices to prevent the metal from falling between the molds; but in such constructions more or less scrap is made. By my invention I not only prevent the formation of scrap, but I obviate the necessity for the use of overlapping molds, although, if desired, my invention can be readily applied to constructions in which such molds are employed.

A further object of my invention is to insure the delivery of the metal from the mold to the receptacle, car, or other conveying means without bleeding. A further object is to provide a machine of the character indicated which will operate continuously and will be durable and effective in the performance of its work.

With these general objects in view my invention consists, essentially, in interposing between the charging mechanism and the moving molds a cut-off device or drum so arranged as to deliver to each mold as it arrives under the said cut-off device the proper quantity of metal for the mold and to cut off the supply during the time that the succeeding mold is passing into position, and thereby prevent the falling of any of the metal between the molds; and my invention further consists in the novel construction and details thereof, as hereinafter described with reference to the accompanying drawings, and more particularly pointed out in the claims.

In the drawings, Figure 1 is a top plan view of my improved casting-machine with the cooling-pipe removed. Fig. 2 is a sectional side elevation thereof. Fig. 3 is an enlarged detail sectional elevation of the charging and cut-off mechanism. Fig. 4 is a transverse vertical central section of the pouring-drum or cut-off device. Fig. 5 is a sectional front elevation of the discharging mechanism, and Fig. 6 is an end elevation thereof.

Referring now to the drawings, in which the same reference characters indicate the same or corresponding parts in all the views, I mount the metal-molds E upon a conveyer mechanism, preferably a circular framework A, which is composed of suitable metal sides and angle-web braces. This circular frame is mounted upon a series of wheels C, carried by axles B, forming trucks traveling upon ordinary rails D. The wheels C are preferably flanged at both sides, as shown, and are distributed at suitable intervals around the frame A, so that the said conveyer may rotate about a central axis.

In suitable bearings F, secured to the top of the frame, are the metal-molds E, which are provided with trunnions *e*, rotatably mounted in said bearings F, and attached to the inner side of the frame A is a circular rack L, with which pinions secured to the ends of the shaft N N′ are engaged for the purpose of giving rotation to the mold-carrying frame.

The shafts N N′ are mounted in suitable bearings *m* and derive their motion from any suitable source of power, such as an engine, (conventionally represented at W, Fig. 1,) which engine is connected to the shaft X, upon the latter of which is a pinion *x*, meshing with a spur-wheel *y*, mounted upon a counter-shaft Y, which also carries a pinion *t*, meshing with the spur-wheel *z*, which latter gives motion to one of four bevel-gears *z′*, the latter gear meshing with two similar bevel-gears, one on each of the shafts N N′, the fourth bevel-gear *z′* being mounted upon the shaft J′, journaled in bearings H H′, for the purpose hereinafter described.

The driving mechanism above described gives continuous rotation to the mold-carrying frame or conveying mechanism, and in order to deliver the molten metal to the metal-molds successively I provide a pouring-drum M, which is secured at one end to an angle-web *r*, attached to the outer casing *q*, forming

the drum, and to the horizontal shaft n'', rotatably mounted in the bearings m above the main driving-shaft N, from which latter the said shaft n'' is driven by a spur-wheel n, meshing with a similar gear n', secured to said shaft n''. The gears $n\,n'$ are of the same diameter and have the same number of teeth, so that the same speed of rotation of the pouring-drum and the mold-carrying frame is secured.

The outer end of the pouring-drum M is preferably mounted upon roller-bearings p, which are rotatably mounted in the standard Q. This pouring-drum is in the present instance provided with six perforations O, separated, preferably, by sharp ridges which pass through the outer casing q and the inner lining u, the latter of which is held in place between the angle-webs r, the said lining being preferably of a fireproof material and is recessed on each side of said perforations or holes O, as shown. Instead of sharp ridges between the holes or perforations O it is obvious that the walls between the perforations may be of other forms—for example, having a broad surface, as shown in dotted lines, Fig. 4; but the sharp ridge is usually desirable, because the metal will have less tendency to cool and adhere to the lining, and should the stream of metal strike the sharp ridge it will be discharged simultaneously through the holes on either side thereof into the mold, the flow of metal being absolutely cut off just as soon as the sharp edge of the lining passes the stream of metal. Entering the outer end of the drum is an inclined chute P, into which the molten metal is discharged from the ladle S, pivotally mounted upon a suitable truck s, running upon tracks on the elevated platform T, and by which the metal is brought direct from the furnace.

The quantity of metal discharged into the drum from the ladle S is regulated so that only such an amount of metal is allowed to enter the drum as will properly fill the molds as they pass successively under the drum, the molten metal in the drum immediately flowing out through the lower discharge openings or holes into the mold immediately below said lower discharge-openings, and as the mold which has been filled moves away from the drum the latter will be rotated so as to cut off the flow of metal from the drum during that time when the next succeeding mold is being brought into position under the drum, the imperforate walls between the adjacent perforations acting to cut off said flow of metal. When the next succeeding mold assumes the proper position, the next perforation or discharging-hole has taken position at the bottom, thereby permitting the metal to flow directly into the mold until it is filled, and this operation will be repeated, six molds being filled at each revolution of the drum shown, though it is obvious that a greater or less number can be filled, according to the number of pouring openings or holes in the drum.

It will be noted that when the sharp ridges are used the metal will divide and flow through the two lowermost perforations into the two molds immediately under the drum, the imperforate wall of said ridge at that time covering the space between two molds, and thereby preventing the metal from flowing between said molds.

As the molds move away from the pouring-drum they pass under a perforated water-pipe a, a portion of which is shown in Figs. 2 and 6. This pipe is located between the charging and discharging points and is arranged to spray water upon the metal in the molds, thereby cooling it sufficiently by the time it reaches the point of discharge to cause the said metal to retain its shape and prevent "bleeding" when dumped out.

At a suitable distance from the charging-point, in the present instance about three-fourths of a circle, is the discharging mechanism, under which is the loading-pit V, in which may be located any suitable receptacle or receptacles, conveyer, or car U, mounted upon trucks u immediately underneath the dumping or discharging mechanism.

Above the dumping-pit and on each side of the mold-carrying frame or conveying mechanism I preferably locate two standards H, the inner one of which is provided with a suitable rack l, adapted to engage the gear-wheels or sprockets G, mounted upon the inner trunnions of the molds E. This rack is of sufficient length to completely turn the molds E a full revolution, so as to bring them bottom upward and then right them.

In order to facilitate and insure the dumping of the metal from the molds, I provide a hammer or tapping mechanism so constructed that the bottom of the mold will be tapped at the proper time and insure the dumping of the metal in case there is any tendency to adhere to the mold. This tapping mechanism consists in the present instance of two or more hammers I, vertically movable in suitable guideways or slots in cross-beams h, supported by the standards H. Each hammer is provided with a vertical slot k, in which cams K are adapted to rotate. These cams are mounted on a horizontal shaft J, having at its outer end a sprocket j, driven by a suitable chain from a similar sprocket j on shaft J'. The cams are so timed that they will gradually lift the hammers to the highest point and release them at the moment each mold is turned bottom upward, thereby permitting the said hammers to fall and forcibly strike the bottom of the mold. When the mold has delivered its metal, it passes on and is turned by the rack l right side up in position to receive another casting.

At a suitable distance from the dumping-point I preferably locate a luting-pipe b for the purpose of coating the molds with a luting composed of clay, lime, or other suitable ma-

terial, thereby preventing the metal from burning or adhering to the molds. This luting is preferably sprayed into the molds by means of a steam-jet introduced from a pipe *c* into the nozzle or chamber *f* at the point of discharge of the luting from the pipe *b*, and in case the luting should not be plastic enough to adhere to the molds I provide the device with a water-pipe *d*, leading into said chamber *f*, so that any degree of moisture may be obtained. The steam-jet atomizes the said material and sprays it on the inside of the molds. When the molds arrive at the luting-point, they contain sufficient heat to dry the coat thoroughly before they can reach the pouring-drum M for the reception of another charge of molten metal.

After the metal has been dumped into the receptacle, conveyer, or car in the dumping-pit it may be sprayed with water, and is then ready to be distributed to any point in the works or to be shipped, if desired.

While I have shown my invention applied to a mold-conveyer in the form of a circular frame, it is obvious that my improvements may be applied to other forms of conveyers without departing from the essential features thereof as covered by the claims, and it is equally obvious that various changes may be made in the details of construction without departing from the spirit of my invention.

I claim as my invention—

1. In a casting-machine, the combination of mechanism for charging the molds, means controlled and operated by some moving part of the machine for cutting off the supply of metal to the molds in order to prevent any of the metal from flowing between adjacent molds, and a conveyer for moving the molds beneath said cutting-off mechanism, with molds mounted upon said conveyer, substantially as described.

2. In a casting-machine, the combination of a continuously-moving conveyer, a series of molds mounted thereon, mechanism above the molds controlled and operated by some moving part of the machine for cutting off the supply of molten metal to the molds as they are moved in succession under said cutting-off mechanism, and means for charging the molds, substantially as described.

3. In a casting-machine, the combination of a conveyer and a series of molds rotatably mounted thereon, mechanism for charging the molds, mechanism above the molds controlled and operated by the movement of the machine for cutting off the supply of metal to the molds while they are being moved successively under said cut-off mechanism, mechanism for turning the molds bottom upward when they arrive at the point of discharge and righting the said molds after discharge, mechanism for tapping the bottom of the molds, to insure the discharge of the casting therefrom, and a suitable receptacle for receiving said casting, substantially as described.

4. In a casting-machine, the combination of a conveyer, a series of molds rotatably mounted thereon, mechanism for discharging the molds, mechanism above the molds controlled and operated by some moving part of the machine for cutting off the supply of metal as the molds are moved in succession under said cut-off mechanism, mechanism for turning the molds bottom upward to discharge the casting therefrom, and a suitable receptacle or receptacles for receiving the casting, with a perforated pipe located between the charging mechanism and the discharging mechanism and arranged to spray water upon the metal in the molds, substantially as described.

5. In a casting-machine, the combination of a conveyer, a series of molds rotatably mounted thereon, a charging mechanism for filling the molds with molten metal, a cutting-off device above the molds controlled by some moving part of the machine and arranged to stop the flow of molten metal after each mold is filled and during the time that the succeeding mold is being brought into position under said cutting-off device by the conveyer for filling, means for turning the molds over so as to discharge the casting therefrom into a suitable receptacle or receptacles, one or more hammers located at the discharge-point above the molds, and means for causing the said hammers to tap the bottoms of the molds to facilitate the discharge of the casting, substantially as described.

6. In a casting-machine, the combination of a conveyer, a series of molds rotatably mounted thereon, a charging mechanism for filling the molds with molten metal, a cut-off device above the molds controlled by some moving part of the machine and arranged to stop the flow of molten metal after each mold is filled and during the time that the succeeding mold is being brought into position under said cut-off device by the conveyer for filling, means for turning the molds over so as to discharge the casting therefrom into a suitable receptacle or receptacles, one or more hammers located at the discharge-point above the molds, means for causing the said hammers to tap the bottom of the molds to facilitate the discharge of the casting, and a perforated water-pipe located over the molds between the charging and discharging points and adapted to spray water upon the metal in the molds, substantially as described.

7. In a casting-machine, the combination of a conveyer, a series of molds rotatably mounted thereon, a charging mechanism for filling the molds with molten metal, a cut-off device controlled by some moving part of the machine and arranged above the molds to stop the flow of molten metal after each mold is filled and during the time that the succeeding mold is being brought into position thereunder by the conveyer for filling, means for turning the molds over so as to discharge the casting therefrom into a suitable receptacle or receptacles, one or more hammers located

at the discharge-point above the molds, means for causing the said hammers to tap the bottom of the molds to facilitate the discharge of the casting, a perforated water-pipe located over the molds between the charging and discharging points and adapted to spray water upon the metal in the molds, and means for conveying luting in the molds on their way to the charging device, substantially as described.

8. In a casting-machine, the combination of a circular frame, a series of metal molds rotatably mounted thereon, means for conveying molten metal to a point above the molds, and a drum having perforations therein rotatably mounted above the molds and into which drum the molten metal is discharged, and means for rotating the circular frame and drum so as to cause the said drum to fill each mold through the perforations in the drum and to cut off the supply of metal to the mold during the time when the molds are successively brought into position for filling under the drum, whereby the formation of scrap is prevented, substantially as described.

9. In a casting-machine, the combination of the circular frame and a series of molds rotatably mounted thereon, means for rotating said frame, a chute for delivering molten metal to a point above the molds, a drum having a series of perforations therein and rotatably mounted above the molds and into which drum the molten metal is delivered by the chute, and means for rotating said drum and frame at the same speed, whereby the molds are completely filled through the lower perforation in the drum and the supply of metal is cut off while each mold is being brought into position for filling, thereby preventing the formation of scrap, substantially as described.

10. In a casting-machine, the combination of the circular frame and a series of molds rotatably mounted thereon, means for rotating said frame, a chute for delivering molten metal to a point above the molds, a drum having a series of perforations therein and rotatably mounted above the molds and into which drum the molten metal is delivered by the chute, means for rotating said drum and frame at the same speed, whereby the molds are completely filled through the lower perforation in the drum and the supply of metal is cut off while each mold is being brought into position for filling thereby preventing the formation of scrap, and means for turning the molds over to discharge the casting into a suitable receptacle or receptacles, substantially as described.

11. In a casting-machine, the combination of the circular frame and a series of molds rotatably mounted thereon, means for rotating said frame, a chute for delivering molten metal to a point above the molds, a drum having a series of perforations therein and rotatably mounted above the molds and into which drum the molten metal is delivered by the chute, and means for rotating said drum and frame at the same speed, whereby the molds are completely filled through the lower perforation in the drum and the supply of metal is cut off while each mold is being brought into position for filling thereby preventing the formation of scrap, and means for turning the molds over to discharge the casting into a suitable receptacle or receptacles, one or more hammers vertically guided above the molds at the discharging-point, and means for raising said hammer or hammers vertically and releasing the same as each mold is turned bottom upward thereunder, substantially as described.

12. In a casting-machine, the combination of the circular frame and a series of molds rotatably mounted thereon, means for rotating said frame, a chute for delivering molten metal to a point above the molds, a drum having a series of perforations therein and rotatably mounted above the molds and into which drum the molten metal is delivered by the chute, means for rotating said drum and frame at the same speed, whereby the molds are completely filled through the lower perforation in the drum and the supply of metal is cut off while each mold is being brought into position for filling thereby preventing the formation of scrap, means for turning the molds over to discharge the casting into a suitable receptacle or receptacles, one or more hammers vertically guided above the molds at the discharging-point, means for raising said hammers vertically and releasing the same as each mold is turned bottom upward thereunder, and a device for spraying luting into the molds when they are turned right side up, substantially as described.

13. In a casting-machine, the combination of a circular frame, a series of molds rotatably mounted thereon, gear-wheels fixed to the inner ends of the molds, a rack mounted on the circular frame, a shaft or shafts having pinions engaging said rack, means for driving said shaft or shafts, a drum rotatably mounted in suitable bearings above the circular frame and provided with a series of perforations, connections between the drum and the shafts for driving the circular frame, so timed as to rotate the two said parts at the same speed and means for delivering the molten metal into the drum whereby a charge of molten metal is delivered into each mold through the lower perforation of the drum as the said molds are brought into position thereunder, and a rack adapted to engage with gears on the molds for discharging the casting from the molds into a suitable receptacle or receptacles, substantially as described.

14. In a casting-machine, the combination of a mold-conveyer having a series of molds mounted thereon, mechanism for successively filling the molds with molten metal, mechanism for discharging the castings from the molds, a luting device consisting of a pipe

for supplying the luting material, a nozzle through which said material is discharged, a steam-pipe connected therewith and a water-pipe also connected to said nozzle, substantially as and for the purpose set forth.

15. In a casting-machine, the combination of a circular frame and means for rotating said frame, a series of molds journaled thereon, charging mechanism for successively filling said molds with molten metal, and mechanism interposed between said charging mechanism and the rotating frame for cutting off the supply of metal, in succession to the molds as they are successively brought beneath said cut-off mechanism, said cutting-off mechanism being controlled and operated by some moving part of the machine, substantially as described.

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

ERSKINE RAMSAY.

Witnesses:
J. R. VAIL,
C. A. BLAEBLOEB.