(No Model.)

S. W. WILKINSON.

APPARATUS FOR CASTING METALS.

No. 412,687. Patented Oct. 8, 1889.

Fig: 1.

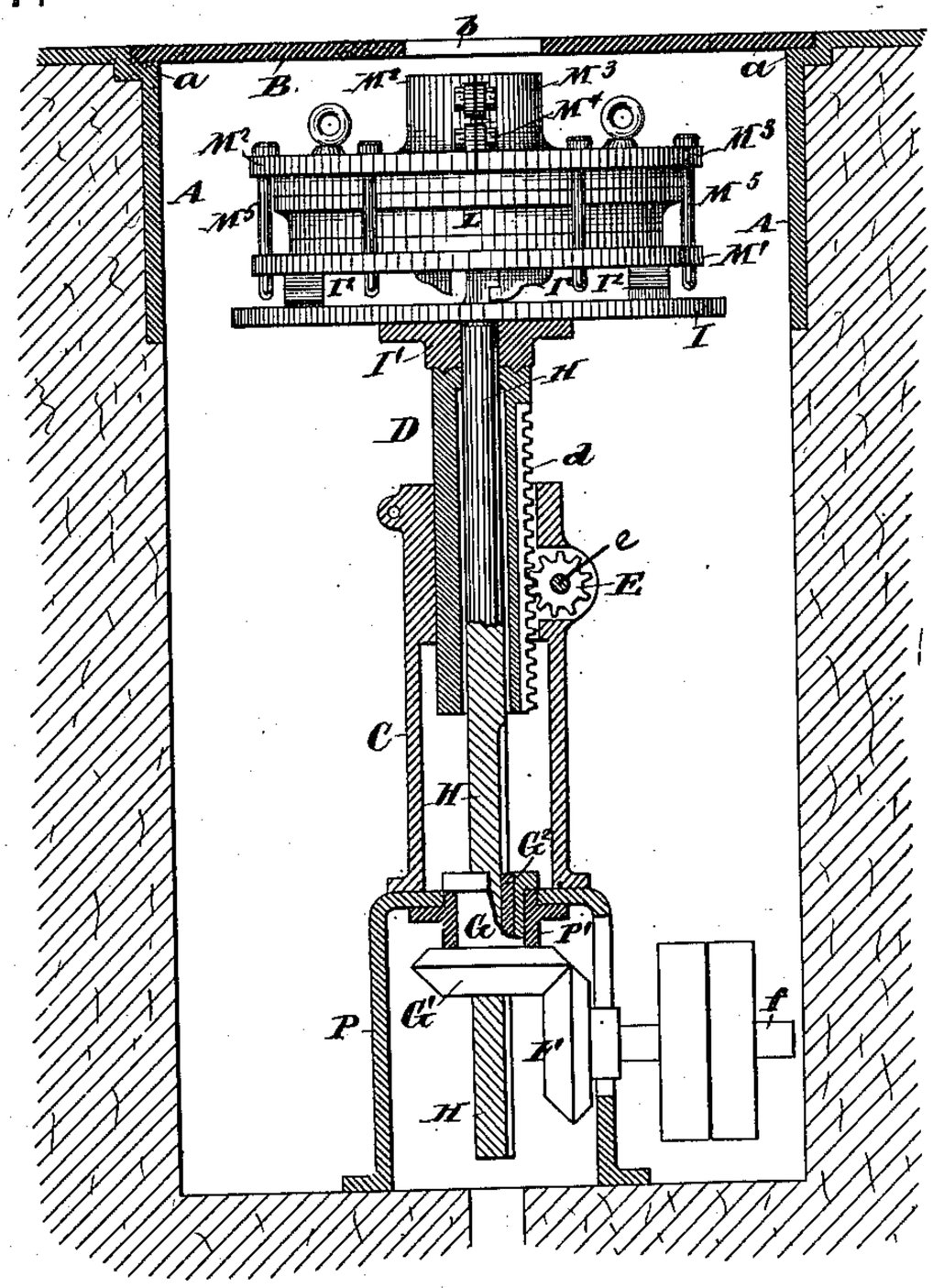


Fig: 2.

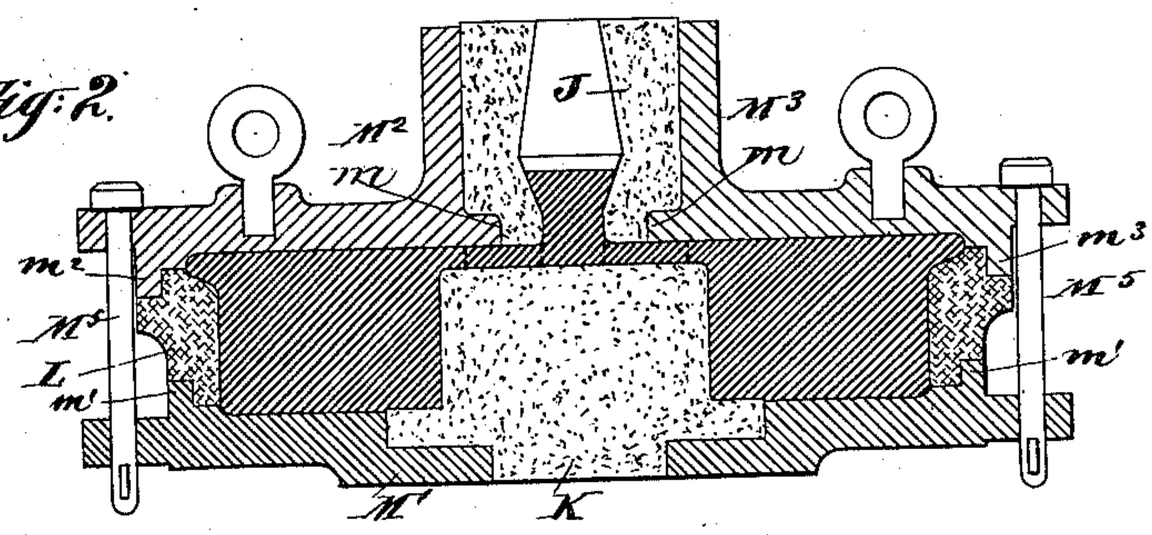
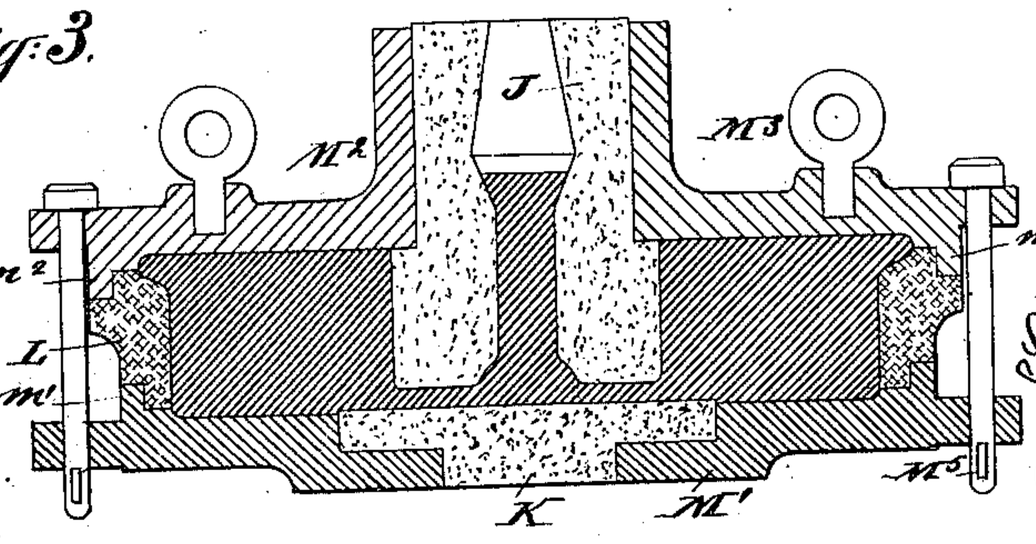


Fig: 3.



Witnesses:
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H. A. Johnstone.

Inventor:
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UNITED STATES PATENT OFFICE.

SYDNEY WM. WILKINSON, OF SHEFFIELD, COUNTY OF YORK, ENGLAND, ASSIGNOR OF TWO-THIRDS TO JOHN B. FOXWELL, OF EAST ORANGE, AND FRANK WILKINSON, OF ORANGE, NEW JERSEY.

APPARATUS FOR CASTING METALS.

SPECIFICATION forming part of Letters Patent No. 412,687, dated October 8, 1889.

Application filed January 30, 1889. Serial No. 298,048. (No model.)

To all whom it may concern:

Be it known that I, SYDNEY WILLIAM WILKINSON, of Sheffield, York county, England, have invented certain new and useful Improvements in Apparatus for Casting Metals, one of which is fully described in the following specification.

The invention is intended for the production of circular ingots of steel to be subsequently enlarged by rolling to form tires or flattened by hammering or rolling to form circular saw-blades, or to be treated in the same or other ways for the manufacture of other articles requiring the densest metal at the periphery. I have devised and practically worked out means for conveniently applying centrifugal force so as to cause the bubbles of gas and all light foreign matter in the fluid metal to find their way to the center. I provide a removable floor of metal over the mold, with a hole for pouring directly over the axis of the revolving mold, and provide for raising and lowering the mold below, so as to use molds of different thicknesses and bring the top of each up close to, but not touching, the floor. I make the mold of cast-iron or other suitable strong material adapted to endure high temperatures, with a ring of sand core composition separating the top from the bottom. This endures the strain by being well supported on its outer face at the upper and lower edge, so that the violent centrifugal force will not destroy it, yet is ready by its nature to crumble when required to allow of any distortion due to the expansion of the metal parts of the mold. The floor and pit preserve the men from injury if the fragile earthy material in the periphery shall by any chance fail prematurely. I make the top of the mold with provisions for holding an earthy molded part around the gate at the center. The top is, furthermore, made in two pieces, conveniently engaged together to allow their separation. These insure against any possibility of the mold becoming locked together by the casting and its gate.

The accompanying drawings form a part of this specification, and represent what I consider the best means of carrying out the invention.

Figure 1 is a vertical section showing the mold and connected mechanism, as also the pit and the floor-plate above, which performs an important function. Fig. 2 is a central vertical section through the mold alone on a larger scale. Fig. 3 is a corresponding section showing a modification.

Similar letters of reference indicate corresponding parts in all the figures where they occur.

The drawings show the novel parts, with so much of the ordinary parts as is necessary to show their relation thereto.

A is a fixed casing or rim inclosing a circular pit and having a rabbet *a* around its interior at the top, which receives the edge of a circular plate or metal floor B, in the center of which is a hole *b*, through which the melted metal may be conveniently poured. A hollow upright column C, fixed in the axial line of the pit, supports and guides a vertically-movable slide D, provided with a rack *d*, which is engaged by the teeth of a pinion E, mounted on a shaft *e*, supported in fixed bearings, and which may be turned and held in various positions, as required, to raise and lower the slide D. Below the column C and in line therewith is a sleeve G, turning in a fixed bearing and carrying on its lower end a bevel-wheel G′, which engages with a bevel-wheel F, fixed on a horizontal shaft *f*, turned by a steam-engine or other suitable power. The interior of the sleeve G carries a loosely-fitted key or feather G^2, which engages in a spline-groove in an upright shaft H, which is mounted concentrically within sleeve G and extends up through the slide D and carries on its upper end a stout horizontal wheel I, having a central hub I′, properly formed and circularly ridged to carry the weight imposed by the mold above when revolved at a high velocity.

The mold is marked M. Certain portions will be designated when necessary by super-numerals, as M′. Its lower portion M′ engages with the wheel I by hooks or dogs I^2, arranged to allow the engagement by the forward motion of the wheel and the disengage-

ment by momentum when the revolving motion of the wheel is rapidly stopped.

The upper part of the mold is formed of two half-circular pieces M^2 M^3. They are secured together by bolts M^4 and are secured to the bottom M′ of the mold by bolts M^5. The upper face of the bottom M′ is provided with a lip m', and the lower face of the top M^2 M^3 is provided with a lip $m^2 m^3$. An earthy molded part L is properly molded and baked to match within these lips and mold the exterior of the ingot to be cast in the mold, and is fitted snugly in place before the bolts M^5 are secured.

The mold is formed in the center, as in all machines of this class. The center of the bottom M′ carries an earthy molded part K, which produces a corresponding hole in the center of the ingot, sometimes slightly increased by the accumulation of bubbles of gas and particles of light foreign matters induced to separate from the melted iron or steel by the intense centrifugal force induced by the rapid whirling motion. The inner portions of the top pieces M^2 M^3 carry lips or partial lips of metal extending upward and properly formed to inclose a single annular core J, so engaged with the metal portions by means of a groove receiving the internal lip m that it is reliably retained against displacement downward by gravity before the metal is poured and against displacement upward by floating after the pouring. This earthy molded part or core is sufficiently strong to keep its place and properly guide the entering metal as it is poured and to keep the fluid metal from contact with the metal of the mold at that point, but is easily broken to allow the casting to be removed, or, rather, to allow one mold to be opened for the removal. This part J need not be core composition, but may be made of dense clay. I prefer fire-clay.

The bearing P′ for the sleeve G is in two pieces, and is fitted within a stout casting P, also in two pieces, as will be understood, firmly bolted together.

Modifications may be made without departing from the principle or sacrificing the advantages of the invention. I can hold the central molded part or core K down by other means than its upper face applying against the radially-channeled base of the mouth part J, and can hold the latter by other means than the internal lips m in the encircling metal.

Parts of the invention can be used without the whole. I can use the removable floor-plate B and the provisions for hoisting and lowering of the mold in connection with the provisions for revolving it in casting other articles, as shot and shell, and can thereby conveniently produce such castings with greater density at the front than at the rear.

I propose to employ the invention mainly to make ingots of steel in annular form with the periphery dense and sound, instead of being, as in ordinary steel castings, liable to be more or less deteriorated by the presence of bubbles of gas and particles of uncombined carbon or other foreign matter. Such ingots are to be afterward shaped by proper treatment to form wheel-tires for railway-cars and locomotives or to form circular saws or the like.

The central molded part K may extend from and be formed in one with the upper part J, instead of being held, as shown, mainly by the lower part of the mold. Fig. 3 shows such an arrangement.

I claim as my invention—

1. In apparatus for casting with centrifugal force, the slide D and means for raising and lowering it, in combination with the shaft H, feather G^2, sleeve G, and wheel G′, and with the mold M revolved thereby, and the floor-plate B, with its pouring-hole b, arranged for joint operation as herein specified.

2. In apparatus for casting with centrifugal force, the metal mold M′ M^2 M^3, being upper and lower portions separated by a considerable interval, in combination with the holding-bolts M^5 and with the peripheral earthy molded part L, arranged for joint operation as herein specified.

3. In apparatus for casting with centrifugal force, the mouth part J, central part K, and peripheral part L, in combination with each other and with the metal portion M′ M^2 M^3 of the mold, and with the wheel I, shaft H, and suitable means for rapidly revolving the whole, as herein specified.

In testimony whereof I have hereunto set my hand, at Sheffield, in the county of York, England, this 4th day of December, 1888, in the presence of two subscribing witnesses.

SYDNEY WM. WILKINSON.

Witnesses:

ARTHUR NEAL,
Solr., Sheffield.

FRANK HENRY MORTON,
Solr.'s Clerk, Sheffield.