T. CRITCHLOW & J. KIDD.

Apparatus for Casting Steel.

No. 165,068. Patented June 29, 1875.

Fig 1

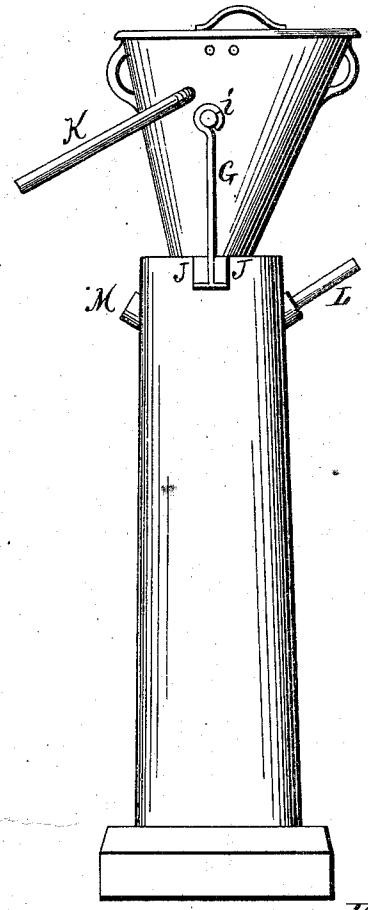


Fig 2

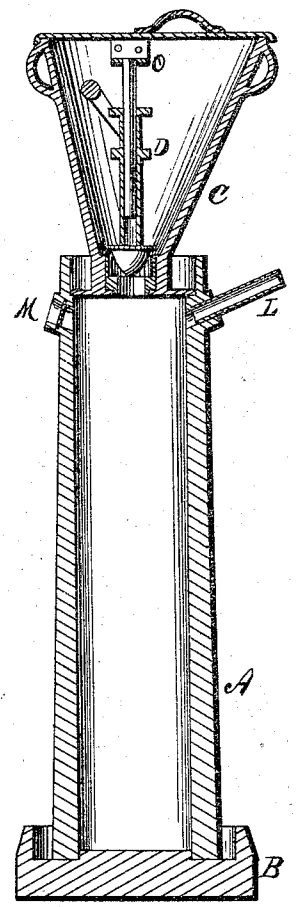
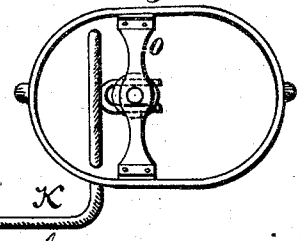


Fig 3



WITNESSES

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UNITED STATES PATENT OFFICE.

THOMAS CRITCHLOW AND JAMES KIDD, OF BALDWIN, PENNSYLVANIA.

IMPROVEMENT IN APPARATUS FOR CASTING STEEL.

Specification forming part of Letters Patent No. **165,068**, dated June 29, 1875; application filed June 18, 1875.

To all whom it may concern:

Be it known that we, THOMAS CRITCHLOW and JAMES KIDD, of Baldwin, in the county of Dauphin and in the State of Pennsylvania, have invented certain new and useful Improvements in Process and Apparatus for Casting Steel; and do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings and to the letters of reference marked thereon, making a part of this specification.

The nature of our invention consists in a process and apparatus for casting steel in a vacuum, for the purpose of separating from it all air and gases, as will be hereinafter set forth.

In the annexed drawings, making part of this specification, Figure 1 represents a side view of a mold; and Fig. 2, a longitudinal section, and Fig. 3 a top view.

In the figures, A represents a flask or mold, which is made in any of the usual ways, and of suitable size. The bottom of this flask rests in a base, which is flanged, as seen, so that wet sand or other material may be inserted between the flange and the bottom of the mold, to make the bottom air-tight. A short distance below the mouth of the flask is a ledge cut within the mouth. Resting upon this ledge is the bottom of a hopper, C. A flange is thus formed of the mouth of the flask, and between this and the hopper wet sand or other suitable material may be placed for making the mouth air-tight. M represents an opening in the flask, which is covered by glass, so that the interior of the flask may be seen. L represents a pipe, which is connected to the flask near its upper end, and which passes to an air-pump. The air is extracted from the flask by means of the air-pump through this pipe. D represents a pipe or sleeve, which passes over a suitable guide-stem, and which is provided on its lower end with a circular valve, *a*, to close a valve-opening, E, in the bottom of the hopper. The stem is connected to a cross-piece, *o*, at the top of the hopper. The valve-sleeve is raised or lowered by means of a crank, *k*, as seen.

In using this flask, the bottom and top are first made air-tight, as mentioned. The valve closes its opening, and then the molten metal is poured in the hopper. The air having been exhausted from the flask, the valve *a* is slightly raised, so that the metal will pass into the flask in a small stream. The metal, it will be seen, is divided by the circular valve in its middle, and thus passes to the flask in the shape of a thin hollow cylinder. The influence of the vacuum is thus brought to bear upon almost every particle of metal, and the gases and air which get into it during the process of decarbonization are removed and carried away by the air-pump.

It will be seen that the hopper is provided with a cover, which is intended to exclude the air or partially exclude the air from the hopper during the time the metal is passing down to the mold. We desire to prevent atmospheric pressure upon the metal. A partial vacuum may be formed, allowing a sufficient amount of air to remain to allow the metal to pass down slowly into the mold.

Having thus fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. The combination, with a flask in which a vacuum is maintained, of the closed hopper C, provided with a valve, the valve-opening constructed to allow the molten metal to flow into the flask in a thin stratum, for the purposes set forth.

2. The combination, with the flanged base B, of the flask A, provided with the air-pipe L, and annular shoulder near the top, the hopper C, with closed top and flanged base and valve-opening E, and the circular valve *a*, connected to the vertical sliding sleeve D, all substantially as set forth.

In testimony that we claim the foregoing we have hereunto set our hands this 14th day of August, 1874.

THOS. CRITCHLOW.
JAMES KIDD.

Witnesses:
E. G. PAINTER,
WILLIAM LONGENEBER.