

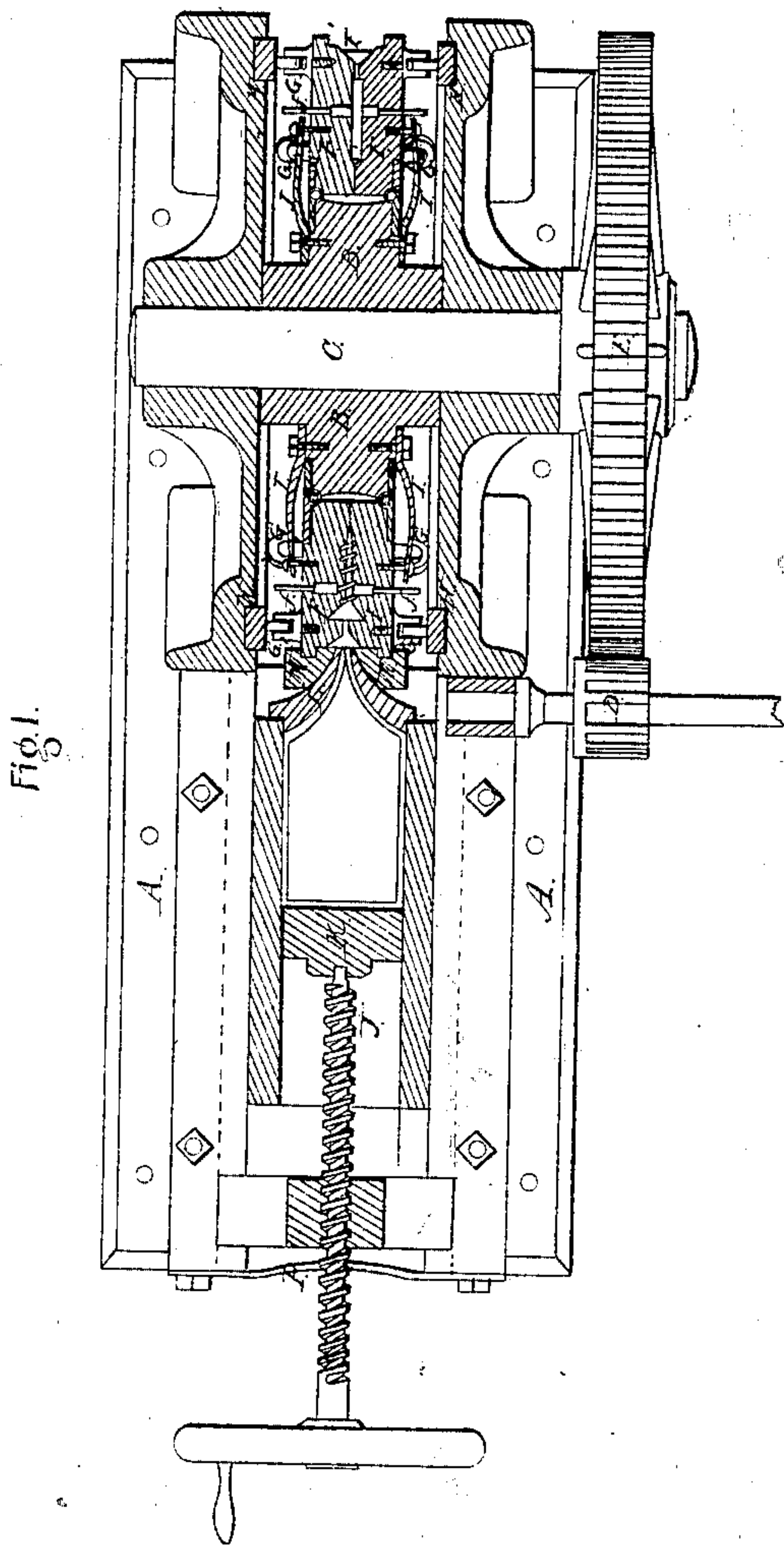
Sheet 1 - 2, Sheets.

J. J. C. Smith.

Casting Metals Under Pressure.

Nº 90,318.

Patented May 18, 1869.



Witnesses:

Wm. H. Brereton Jr.

W. B. Deming

Inventor:

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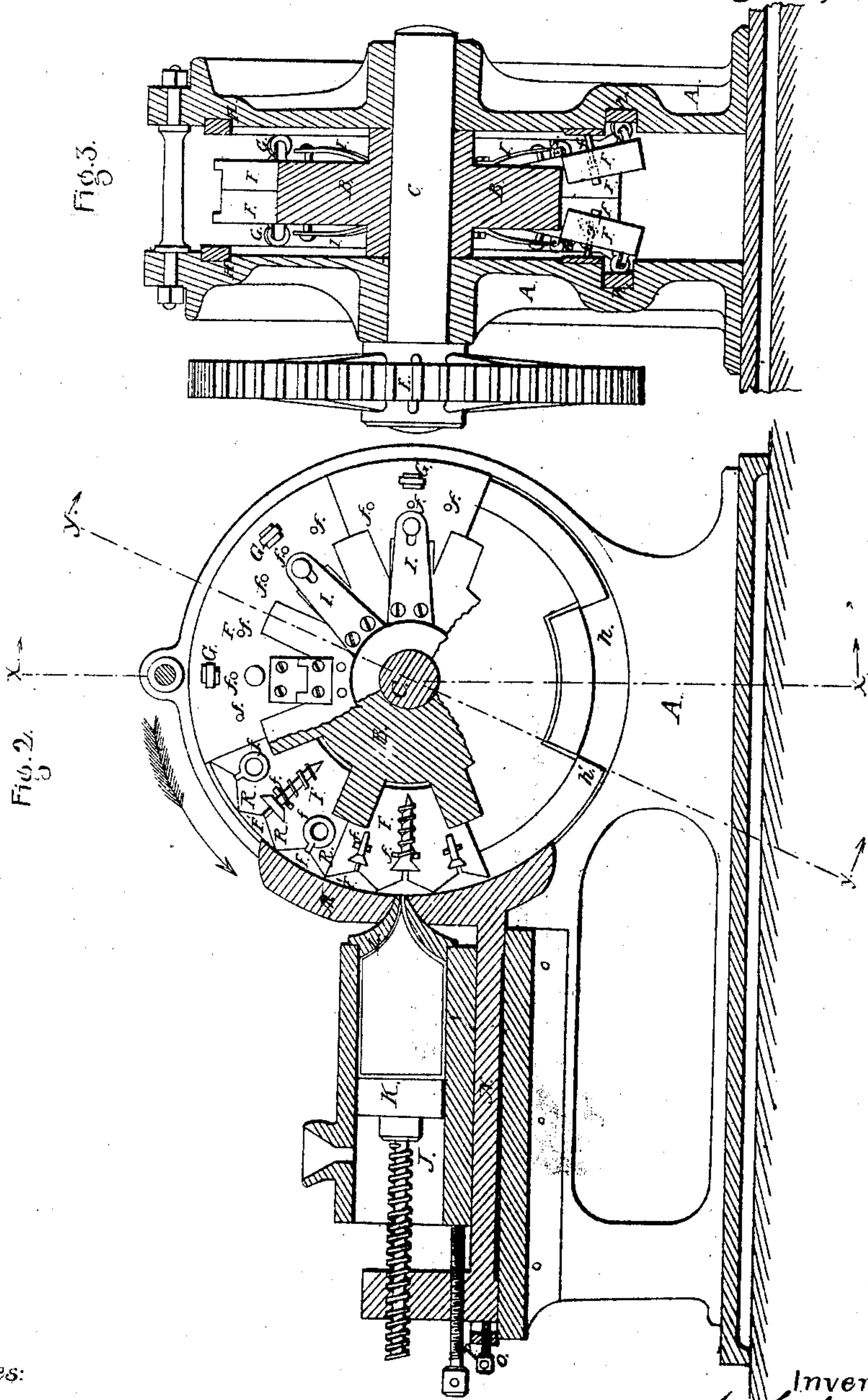
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Sheet 2-2, Sheets

Casting Metals Under Pressure.

No. 90,318.

Patented May 18, 1869.



Witnesses:

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UNITED STATES PATENT OFFICE.

JOHN JOSEPH CHARLES SMITH, OF PHILADELPHIA, PA., ASSIGNOR TO THE
METALLIC COMPRESSION CASTING COMPANY, OF BOSTON, MASS.

IMPROVEMENT IN METHOD OF CASTING METALS UNDER PRESSURE.

Specification forming part of Letters Patent No. 99,318, dated May 18, 1869.

To all whom it may concern:

Be it known that I, JOHN JOSEPH CHARLES SMITH, of Philadelphia, in the State of Pennsylvania, have invented a new and Improved Apparatus for Casting Metals under Pressure; and without restricting myself to the precise details laid down, I declare that the following is a sufficiently full and exact description of the apparatus, in its preferred form, to enable one skilled in the art to which the invention appertains to carry it into effect, reference being had to the accompanying drawings, which form a part of this specification.

My apparatus in its preferred form consists of a rotary wheel or cylinder, on the periphery of which is arranged a series of molds, each formed of a pair of hinged metallic plates, which, while the casting is being performed, are held firmly together between stationary housings, suitable rollers being interposed between the rotary mold-plate and the stationary housings to reduce the friction. Each of the mold-plates is provided with one or more springs, which, as the rotation brings the molds successively opposite recesses in the housings, cause the mold-plates to separate with a sudden movement, causing a jar which effectually detaches and discharges the casting. This effect is assisted by pins, which are driven inward as the mold-plates separate, and in their retracted position form parts of the mold. The continued rotation of the wheel carries the mold-plates between converging planes, which gradually close the molds, and conduct their rollers between the parallel parts of the housings, by which the plates are held to receive the molten metal, which is injected into the molds, as hereinafter explained.

For injecting the molten metal into the molds I employ the apparatus and process described in Letters Patent granted to Michael Smith on the 23d of October, 1867, the same consisting of a cylinder for containing the molten metal, a piston for forcing the same out of this reservoir and into the molds, and a detachable non-conducting lining, which is applied to the interior of the cylinder each time before it is filled, and serves the combined purposes of preventing the molten metal settling or adhering to the metallic cylinder, and effectually packing the joint between the

moving piston and the cylinder. From this reservoir the metal is forced through a contracted aperture directly into the molds, the gates of the latter being funnel-shaped, so as to cause no interruption to the passage of the metal. A continuous pressure is applied to the metal within the cylinder during the casting operation, and the partitions between the molds, being tapered to an edge, cause no perceptible interruption to the flow as they pass the discharge-orifice of the reservoir.

The reservoir is mounted upon a sliding bed, provided at its forward end with a segmental plate or standard, which fits around the periphery of the cylinder, so as to tightly close the gates of the molds, and serves also as a mouth-piece for the injecting-cylinder. The sliding bed is held up to the cylinder by a screw and spring, the latter permitting it to yield, so as to avoid danger of breakage, in the event of any hard matters getting between the mouth-piece plate and the cylinder.

In the drawings, Figure 1 is a horizontal section of the apparatus. Fig. 2 is a longitudinal section thereof, with part of the revolving wheel in elevation, part in section, and part entirely removed. Fig. 3 is a vertical transverse section, the stationary parts being represented in the plane indicated by the line *a x*, and the rotary mold-wheel in the plane of line *y y*, Fig. 2.

Similar letters of reference indicate corresponding parts in the several views.

A A represent various parts of the stationary frame. *B* is a wheel or cylinder, attached to a shaft, *C*, which is rotated by gearing *D E*, or other means. *F F* are mold-plates, hinged in pairs to the periphery of the wheel, and so constructed that each pair will form, when closed, a matrix to produce the article which it is desired to cast. *f f* represent pins employed to aid in the detachment and ejection of the castings from the molds, as hereinafter explained. The inner ends of the said pins are flush with the inner surface of the mold, when the latter are closed. The outer faces of the hinged mold-plates are furnished with friction-rollers *G*, which bear against the housings *H*, so as to hold the molds in their closed condition to receive the metal. *h h* represent recesses in the housings, permitting

the molds to be opened by the springs I I when the castings are to be discharged. These recesses begin with abrupt shoulders *h'*, to permit the molds to open suddenly, and they converge, so as to conduct the friction-rollers gradually up to the parallel parts of the housings H.

The reservoir for molten metal consists of a cylinder, J, provided with a piston, K, as described in Michael Smith's patent, hereinbefore referred to. The nozzle L of the cylinder J passes into a mouth-piece or guard-plate, M, which serves to close the gates of the molds, and is rigidly attached to or forms a part of the bed N, which supports the cylinder J. The bed N is adapted to slide, and is held up to its work by a screw, O, and spring P, so that under the ordinary working of the machine the gates will be tightly closed, so as to prevent any escape of metal from the molds until it is firmly set; but in the event of a fragment of metal or other matter passing between the periphery of the wheel and the guard-plate M, the latter will yield, and thus avoid injury to the apparatus.

R R represent the tapering partitions between the gates F' of the molds F. The said partitions converge to edges, so as to cause but momentary obstruction in passing the nozzle L, and to impart a funnel shape to the gates or sprues.

Operation.

Any number of the reservoirs J K L may be prepared for use by coating their inner surfaces with a suitable non-conducting paste and filling them with molten metal, the nozzle L being closed with clay to prevent the escape of metal.

The cylinder J being placed in the position shown in the drawings, the wheel B is set in motion, and then pressure is applied to the piston K, so as to cause a continuous discharge of molten metal through the nozzle L. The small clay plug or stopper in the nozzle, being driven out with the first discharge of metal, may pass into one of the molds and cause the production of a single imperfect casting; but after this a continuous jet of pure molten metal is kept up. The metal is thus injected and compressed into each mold as the rapid rota-

tion of the wheel carries it in front of the nozzle.

The guard-plate M prevents the escape of any of the metal until it has had time to become set, and as the bearing-rollers G of each mold reach the shoulders *h'* of the recesses *h* the springs I cause the mold-plates to separate instantaneously with a concussion, which discharges the casting from the mold; or, if the jar should be insufficient, the driving of the pins *f* inward through the mold-plates insures the detachment of the casting.

The continued rotation of the wheel carries the rollers up the converging faces of the recesses *h* until they pass between the parallel faces of the housings H, so as to effect the tight reclosure of the mold in readiness for filling. For casting articles of larger weight than a quarter of a pound, the motion of the wheel may preferably be intermittent instead of continuous.

Having thus described my invention, the following is what I claim as new and desire to secure by Letters Patent:

1. The arrangement of a series of hinged metallic mold-plates radially around the periphery of a revolving wheel or cylinder, so as to admit of injecting the fluid metal at the periphery of the wheel and discharging the castings automatically, substantially as set forth.

2. The gates F', so constructed as to form between them wedge-shaped partitions, substantially as and for the purposes described.

3. The mouth-piece or guard-plate M, operating substantially as described, in combination with the series of molds F, passing in succession an injecting-vessel, in the manner and for the purposes stated.

4. The combination of the separate injecting-vessel, having a non-conducting detachable lining, with the series of molds F F F, passing in succession the mouth or opening for the emission of fluid metal from the said injecting-vessel, substantially in the manner described.

JOHN JOS. CHAS. SMITH.

Witnesses:

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