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J. O. E. TROTZ.

## APPARATUS FOR CASTING BARS OR RODS.

APPLICATION FILED JULY 7, 1902.

NO MODEL.

FIG. 1.

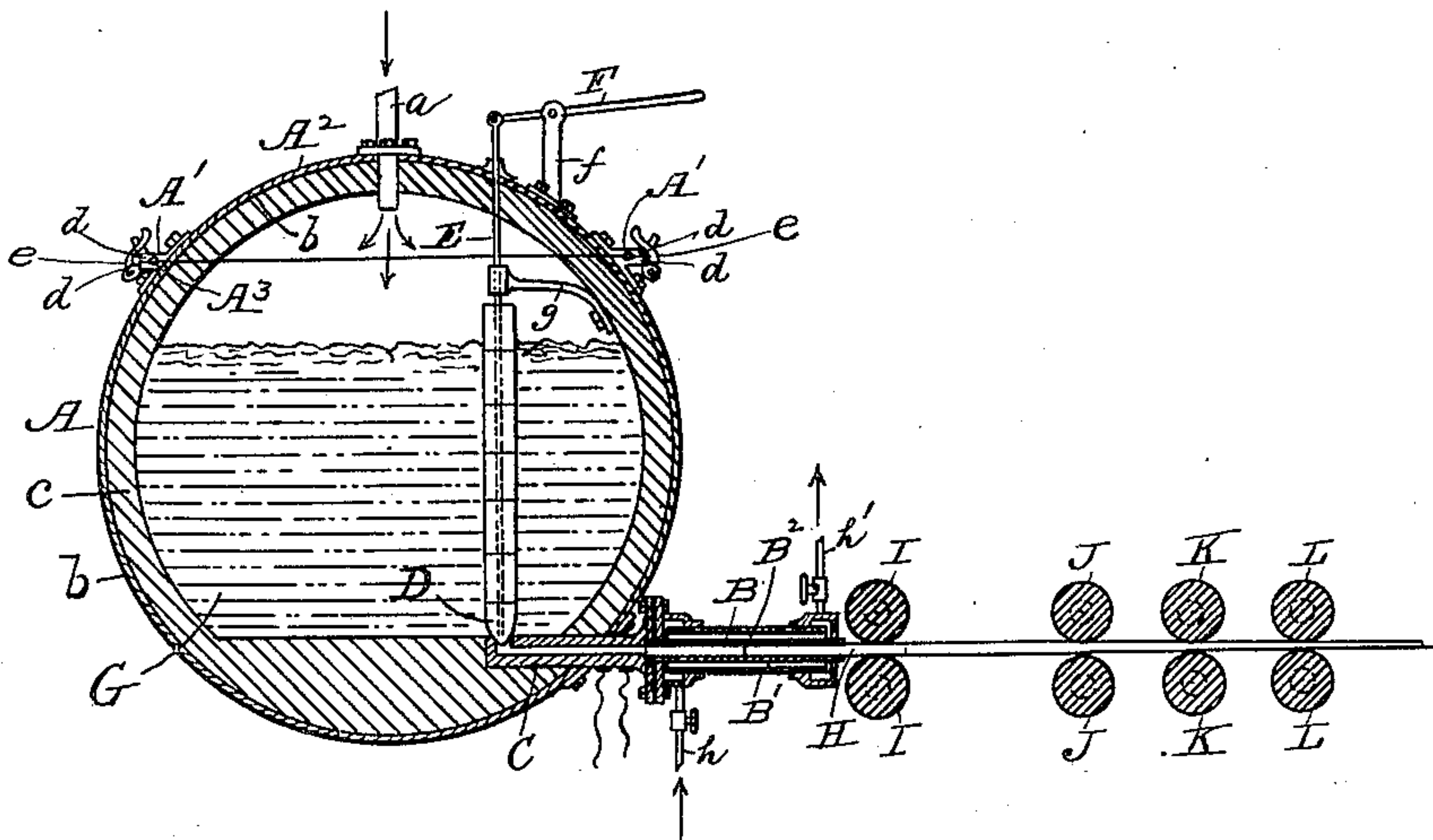
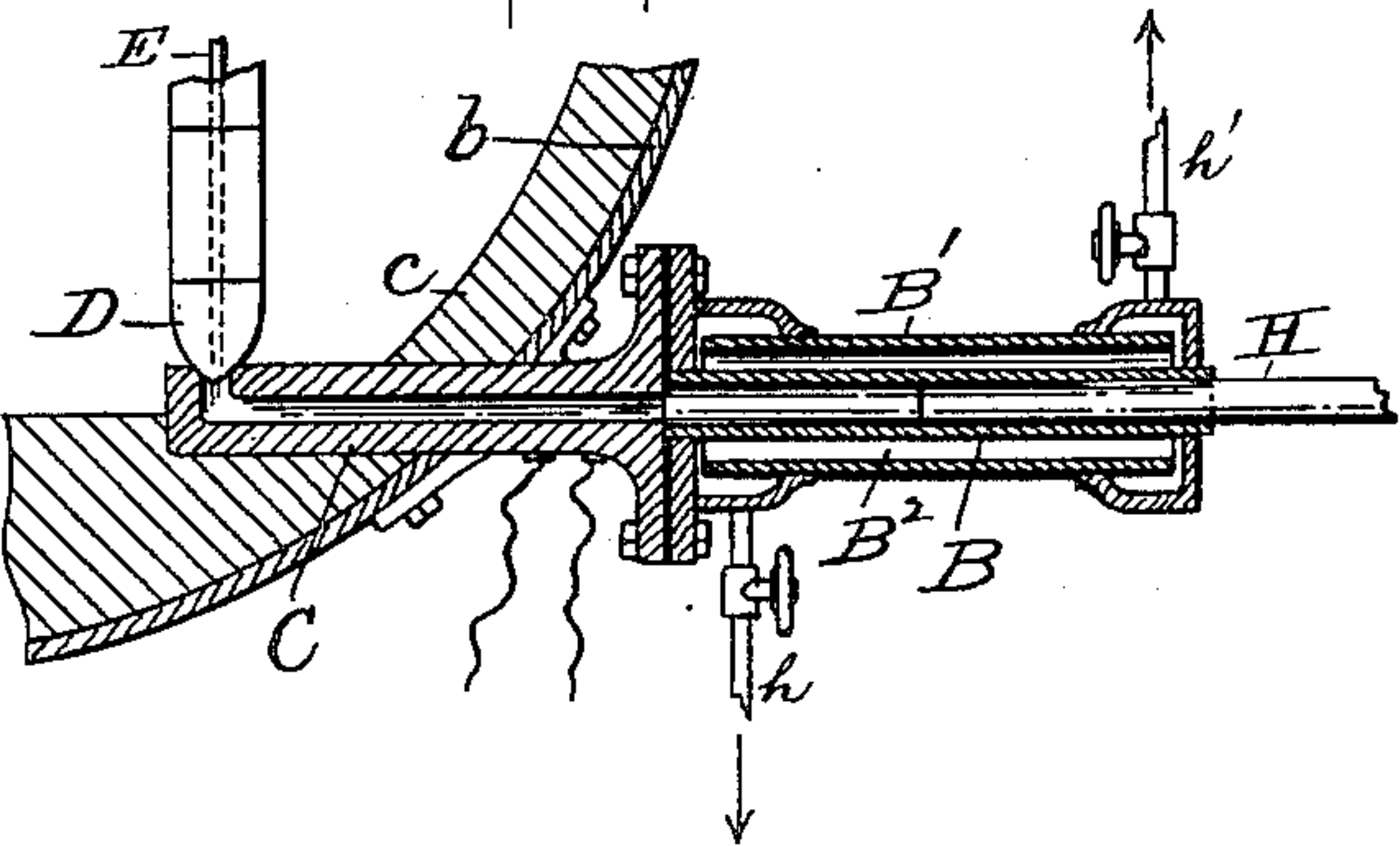


FIG. 2.



Witnesses;

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# UNITED STATES PATENT OFFICE.

JOHAN O. E. TROTZ, OF WORCESTER, MASSACHUSETTS.

## APPARATUS FOR CASTING BARS OR RODS.

SPECIFICATION forming part of Letters Patent No. 770,130, dated September 13, 1904.

Application filed July 7, 1902. Serial No. 114,565. (No model.)

*To all whom it may concern:*

Be it known that I, JOHAN O. E. TROTZ, of the city and county of Worcester and State of Massachusetts, have invented certain new and  
5 useful Improvements in Apparatus for Casting Bars or Rods; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, forming a part  
10 of this specification, and in which—

Figure 1 represents a central vertical section through an apparatus embodying my improvements, and Fig. 2 is an enlarged view of the lower part of said apparatus.

15 The object of my invention is to provide an apparatus whereby bars, rods, and other shapes of metal in cross-section may be cast in continuous long lengths direct from fluid metal; and it consists of a ladle or vessel into  
20 which said fluid metal is poured from the furnace in the usual way, said ladle or vessel being provided with a tight removable cover and with means for applying a high pressure to the fluid metal contained therein, also being  
25 provided with one or more hollow steel molds artificially cooled and means whereby the molten metal may be conducted thereto from the ladle through graphite nozzles whose inner end may be opened or closed by a suitable  
30 stopper, the vertical rod of which extends up through the ladle and is provided above said ladle with a suitable operating device for elevating and lowering the same.

Said invention also consists in combining  
35 the aforesaid parts with rolls for regulating the forward feed motion of the metal as it is cast and passes forward continuously out of the mold, and also in combining reducing-rolls therewith, substantially as and for the purpose  
40 hereinafter more fully set forth.

To enable others skilled in the art to which my invention appertains to better understand the nature and purpose thereof, I will now proceed to describe it more in detail with reference to the accompanying drawings.

In said drawings, A represents the ladle, which in practice is provided with suitable trunnions A' A' at the sides whereby it may be supported from the usual supporting-crane.

50 A<sup>2</sup> is the removable cover, which is made

tight at its intersecting joint with the ladle by means of suitable packing A<sup>3</sup> or otherwise. Through said cover A<sup>2</sup> is inserted the pipe *a* for supplying the compressed air or gas under high pressure for subjecting the fluid metal  
55 in the ladle to a high pressure, said pipe being made tight at its juncture with the cover in any suitable way and connected with a suitable compressor.

The outer shell *b* of the ladle and its cover  
60 are in practice made from heavy sheet-metal plate well riveted together and calked to make the same tight. They are lined with refractory material *c*, of such quality as shall stand a high pressure. The ladle and  
65 cover are preferably provided at their abutting edges with angle-flanges *d d*, riveted thereto and having suitable clamps *e*, whereby the cover may be quickly and securely fastened and also easily removed. The side of  
70 the ladle at or near its bottom is provided with a horizontal mold B, into which the molten metal is poured from said ladle through a graphite nozzle C, the inner end of whose opening may be opened or closed by means  
75 of a suitable stopper D, whose rod E extends up vertically through the cover A<sup>2</sup> and is operated by a lever F, pivoted to the fixed bearing *f* on the cover and at its inner end to the upper end of said rod E. Any other suitable  
80 device may be employed in lieu thereof, if desired, for operating it.

The mold B is in practice made with a perfectly-straight polished interior surface to facilitate the passage of the metal therethrough  
85 in the process of continuous casting.

That portion of rod E coming in the molten metal G is protected, as usual, with a covering of sleeve-bricks, and there should be a space between said stopper-rod and sleeve-  
90 bricks filled with plumbago or similar material. The stopper D is also made of suitable refractory material. Said stopper-rod is arranged to come vertically over the center of the inner end of the opening in nozzle C and  
95 may be guided in its vertical movements by means of one or more fixed guides *g*.

The graphite nozzle C is arranged centrally in alinement with the mold B. It may be fastened to the ladle in any well-known way and  
100



is preferably heated by electricity to prevent the fluid metal from "freezing" therein in passing through. The manner of applying said electricity is not essential, and, if preferred, any other kind of heating may be employed in lieu thereof. The mold, which is arranged outside of the nozzle, is before the pouring of the fluid metal provided with a rod or plunger H the same shape as said mold, which serves the same purpose in the mold as the bottom of a mold in the common ingot-mold. It is held in position by friction-rolls I I, which after the stopper D has been raised to allow the metal to pass out are started and run at a speed equal to the desired speed of the delivery of the metal from the ladle. Said mold is in practice artificially cooled, the same being surrounded by a jacket B', leaving an annular chamber B<sup>2</sup> between the two to receive water or other cooling medium and also being provided with suitable pipes h h' for admitting and discharging said water or other cooling medium.

By the use of my aforesaid apparatus for continuous casting direct from fluid metal said metal may as it is passed from the mold and thence between and past the friction-rolls be fed between other sets of rolls, as J J, K K, and L L, for reduction to any desired size and shape.

The nozzle C, mold B, and its jacket B' may be fastened in position in any well-known way, and it will of course be understood that the ladle may be provided in practice with more than one mold, if desired.

By the aforesaid method of casting under high pressure it is obvious that the metal in the mold being thus compressed must of necessity be of uniform texture, and consequently a superior quality of metal is produced. A large saving in labor is also effected by said method or process over the usual way

of casting, as several manipulations of the metal are dispensed with in turning out the finished product.

In casting rods or bars of small size in cross-section the friction-rolls I I may be dispensed with in practice by making the mold B of sufficient length to cool the metal to the proper consistency to sustain itself and admit of its being passed direct from said mold to a reel or to the reducing-rolls without departing from the principle of my invention.

Having now described said invention, what I claim therein as new, and desire to secure by Letters Patent, is—

In an apparatus for casting rods, bars and other shapes of metal in cross-section in continuous long lengths direct from fluid metal, a ladle or vessel A, for holding said metal and provided with a readily-removable cover A<sup>2</sup>, a pressure-supply pipe a and a discharge pipe or nozzle C, in combination with the vertical, lever-operated rod E, having means for supporting and protecting the same from the molten metal, and also provided with the stopper D adapted to close and open the inner end of said discharge pipe or nozzle C, a mold B, connected with the outer end of the discharge pipe or nozzle C and having a straight smooth, interior, surface, jacket B', surrounding said mold and forming an annular chamber around the same for containing a cooling medium, supply and discharge pipe h, h', connected with opposite ends of said jacket B', a rod or plunger H, fitting the mold, friction-rolls I, I, and reducing-rolls J J, K K, and L L, substantially as and for the purpose set forth.

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Witnesses:

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