(No Model.) 2 Sheets—Sheet 1.

C. M. PIELSTICKER & F. C. G. MÜLLER.

APPARATUS FOR CASTING STEEL AND OTHER METAL BARS, RODS, &c.

No. 326,147. Patented Sept. 15, 1885.

FIG. 2.

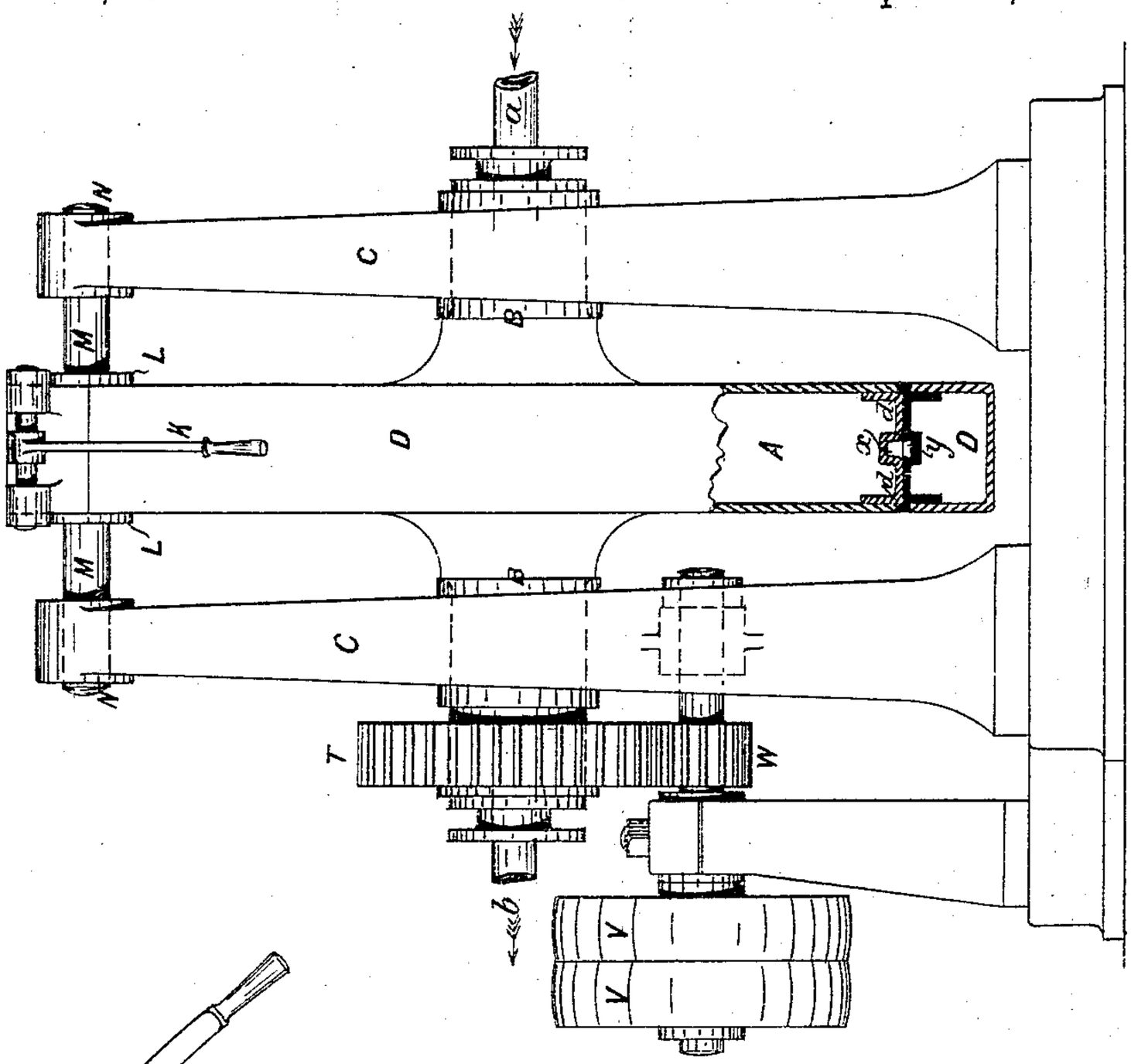

FIG. 1.

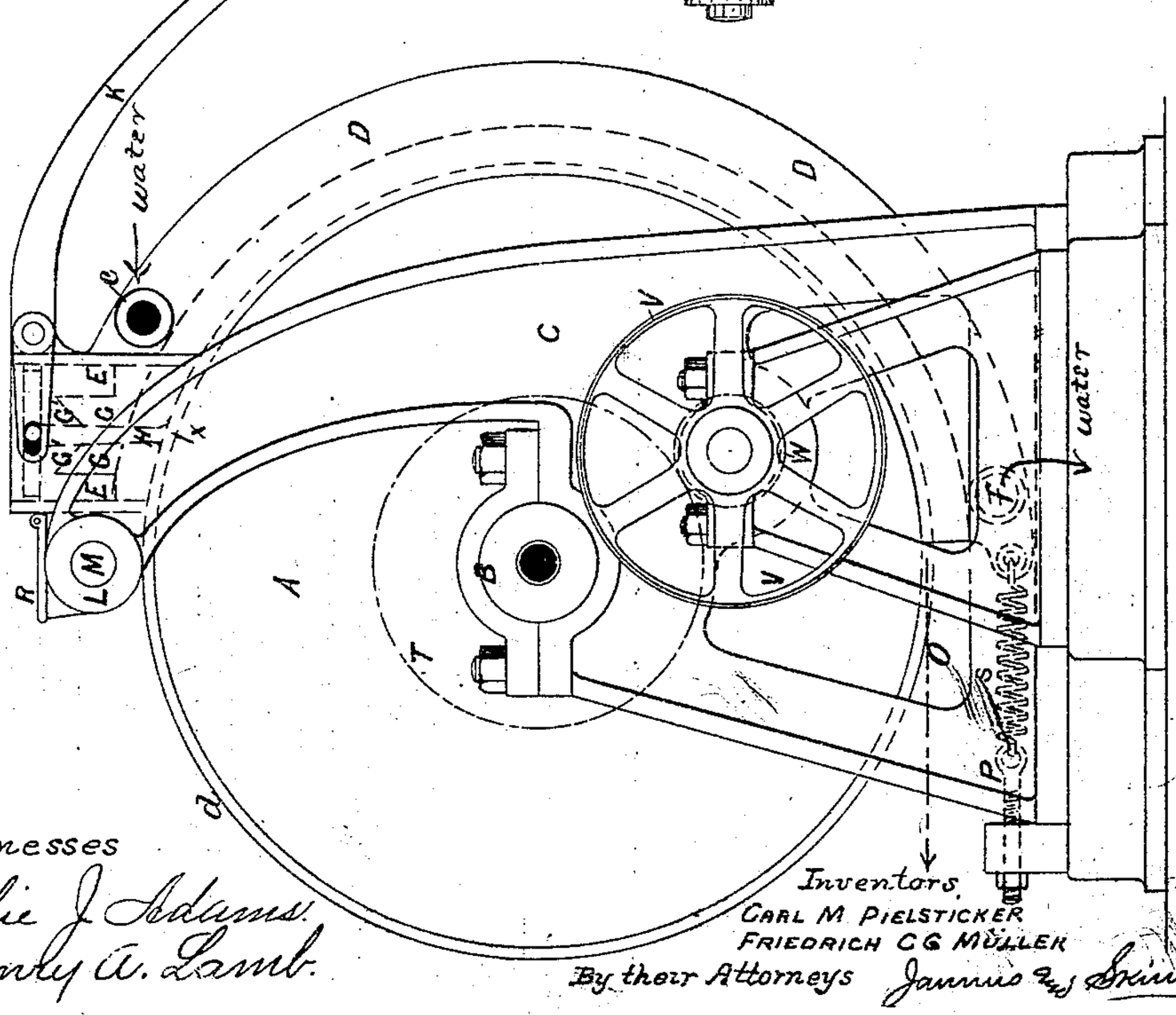

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FIG. 4.

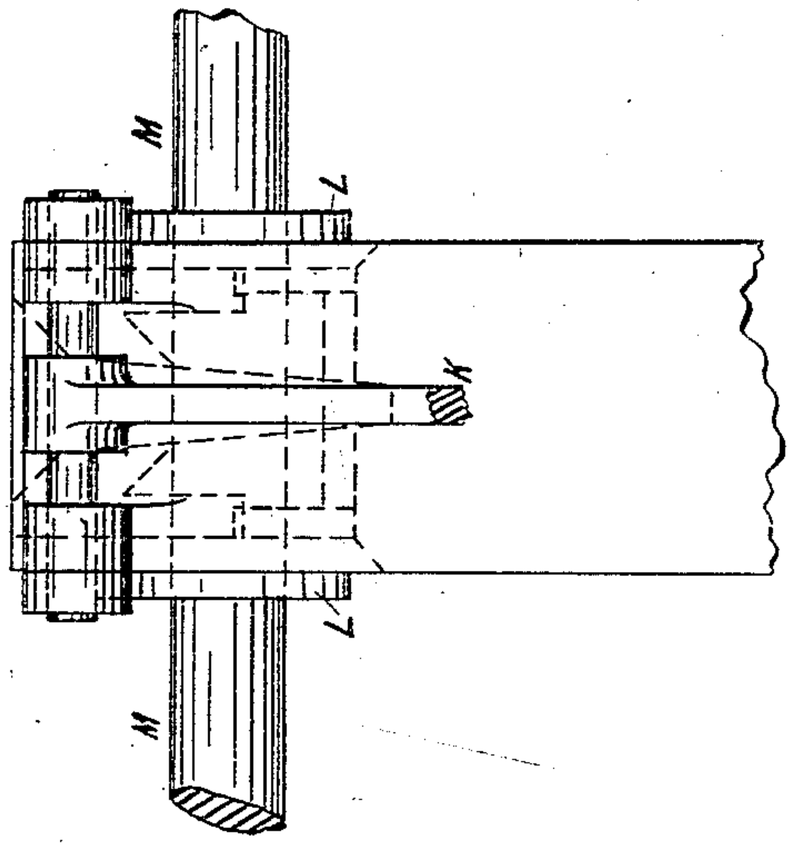


FIG. 3.

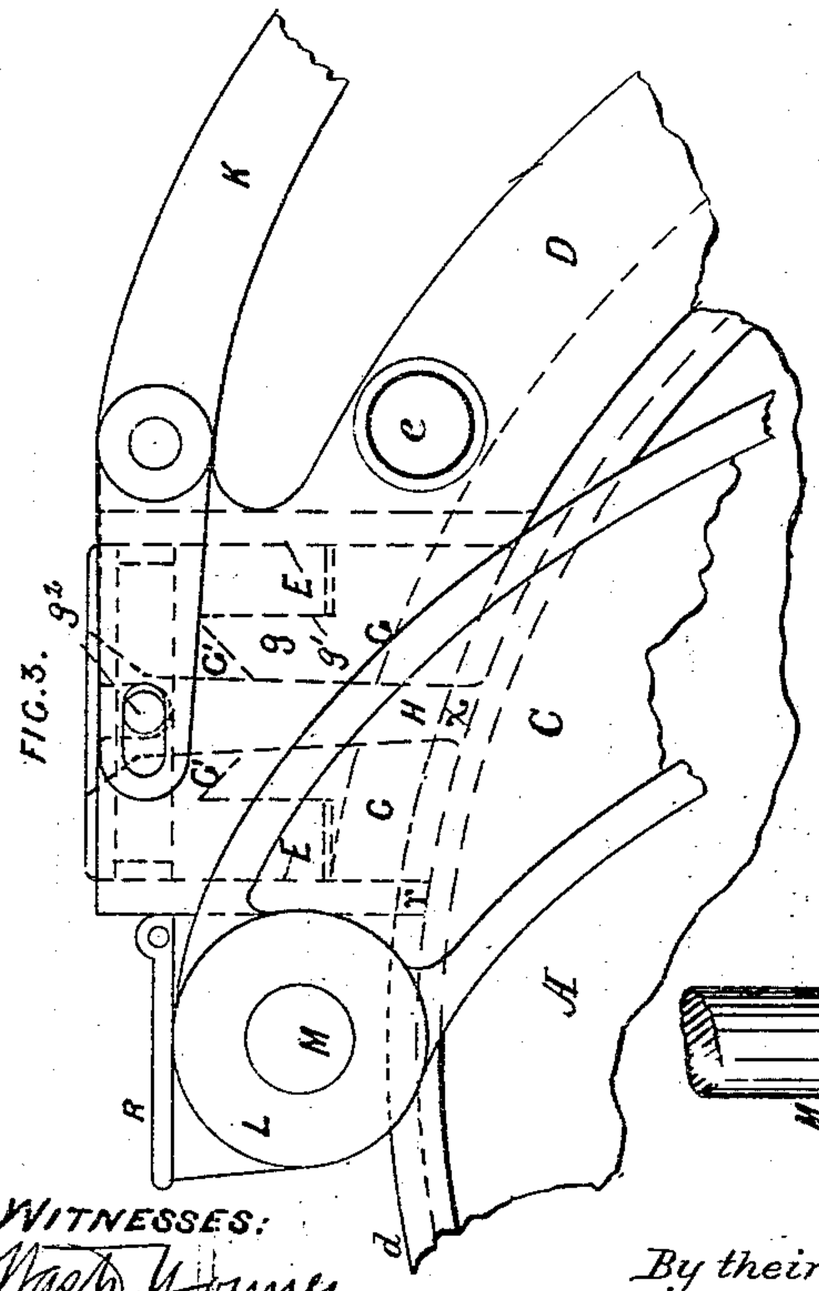
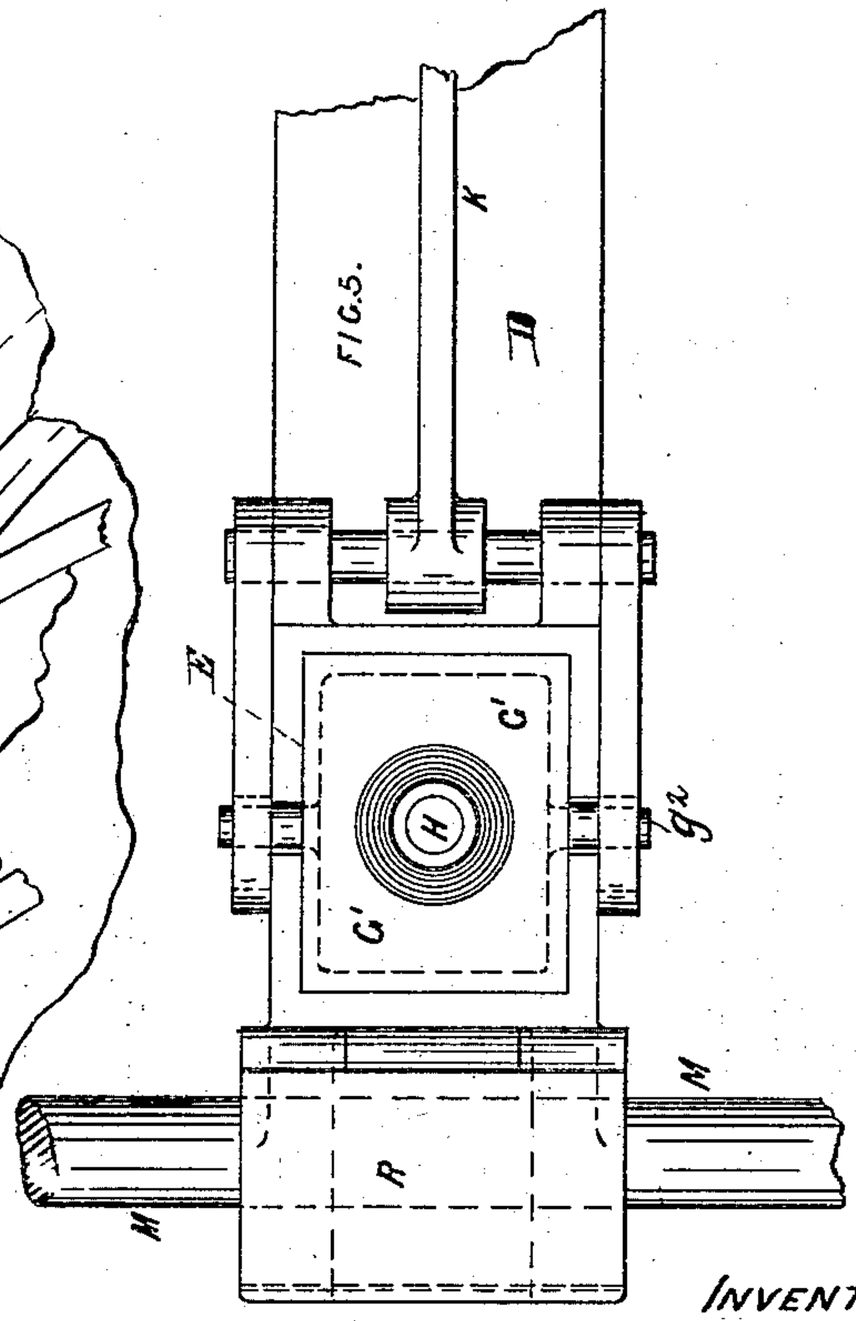


FIG. 5.



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UNITED STATES PATENT OFFICE.

CARL MARIA PIELSTICKER, OF LONDON, COUNTY OF MIDDLESEX, ENGLAND, AND FRIEDRICH C. G. MÜLLER, OF BRANDENBURG-ON-THE-HAVEL, PRUSSIA, GERMANY.

APPARATUS FOR CASTING STEEL AND OTHER METAL BARS, RODS, &c.

SPECIFICATION forming part of Letters Patent No. 326,147, dated September 15, 1885.

Application filed November 28, 1884. (No model.) Patented in England October 28, 1884, No. 14,252; in France December 2, 1884, No. 165,715, and in Germany December 12, 1884, No. 32,127.

To all whom it may concern:

Be it known that I, CARL MARIA PIELSTICKER, a subject of the Queen of Great Britain, residing at London, in the county of Middlesex and Kingdom of England, and FRIEDRICH C. G. MÜLLER, a subject of the King of Prussia, residing at Brandenburg-on-the-Havel, in the Kingdom of Prussia and Empire of Germany, have invented certain new and useful Improvements in the Production of Steel (and other metal) Wire, Plates, Rods, Bars, &c., and in Apparatus connected therewith, of which the following is a specification.

This invention relates to an improvement in an apparatus for the production of steel (and other metal) rods, bars, wire, plates, &c., and is a modification of the apparatus described in an application for Letters Patent of the United States No. 122,577, filed by us March 1, 1884. According to this latter process rods of indefinite length were produced direct from the molten metal by causing it to enter at one end of a fixed cooling-tube and drawing it out, when solidified, at the other end. The rod had therefore to find its passage through the whole length of the cooling-tube, and on account of the resulting friction there existed the danger of the rod breaking off while passing through the cooling-tube. In this our improved apparatus we entirely obviate this danger by dividing the casting or cooling tube into two parts lengthwise, casting the molten metal into this mold, and then moving forward the lower portion of the mold itself, which at the same time carries forward the solidified rod. In order to make the operation a continuous one the cooling or casting mold is of circular form instead of being of a straight line.

In the accompanying drawings, Figure 1 is an elevation of my apparatus. Fig. 2 is an end view, partly in section. Fig. 3 is an enlarged view of the top part of the apparatus as shown in Fig. 1. Fig. 4 is a plan view thereof; and Fig. 5 is an end view of the portion shown in detail in Figs. 3 and 4.

Similar letters denote like parts.

Our improved apparatus consists of a drum or wheel, A, made of iron or steel, mounted on the horizontal axis B, and rotating in bearings formed in the upright supports C, the diameter of the drum being, say, three feet, and the width of the periphery being, say, six inches or more. The drum A is made hollow in order to cool the periphery or face of the wheel, cold water entering at one end, *a*, of the axis through pipes connected with the hollow axis, and the heated water escaping at the other end, *b*, of the axis. In the middle of the face *d* of the drum and round the entire circumference runs a groove, *x*, of such section as the rod to be cast is to represent.

The edge of the wheel is beveled, and its face accurately inclosed by a segment, D, forming a semicircle, the face of the wheel and the concave side of the semicircular segment both being turned absolutely true. The semicircular segment is also made hollow in order to keep the concave surface cool, cold water entering at *e*, and the heated water escaping at *f*. In order to protect the inner or concave side of the semicircular segment still further against the action of the molten metal a groove, *y*, is provided for, opposite to and of the same width as the groove *x* in the circumference of the drum, the former groove, *y*, being well filled with refractory material; or a groove may also be formed in the concave surface of the semicircular segment corresponding with the groove in the face of the wheel, and both grooves together may form the section of the rod to be cast; but the face of the segment is usually smooth and unbroken, whether protected by refractory material or not, and when rods of a square or angular section are to be produced, it serves merely to close the groove in the periphery of the drum. When, however—as, for instance, in making round bars or bars otherwise curved in section—the face of the segment is grooved as well as the periphery of the drum, then both the grooves may be lined with refractory material.

The upper part of the semicircular seg-

ment D is formed with an opening, E, preferably rectangular in shape. This opening extends from the exterior of the segment through to the periphery of the drum A, and is fitted with a two-part block, G G′, of refractory material. One portion of this block is provided with a neck, *g*, and the other portion is correspondingly recessed at *g′* to receive it, the two parts when united forming a block completely filling the aperture E, which said block is perforated vertically at H, said aperture passing through the telescopic joint just described. Lugs g^2 are secured to the upper block, to which the hand-lever is pivoted and by means of which the upper block can be adjusted vertically to meet the spout of the pouring-ladle. The vertical channel H communicates with the groove *x* in the face of the drum A, through which the molten metal is conveyed through the block G G′.

Immediately in front of the rectangular opening are two eyes or bosses, L, through which the spindle M passes, resting in bearings N in the vertical supports C, the segment D being in this manner hung on to the spindle M. Between the two eyes or bosses is placed a box, R, as a receptacle for lubricating material, a narrow slit or opening being formed in the under side of the box for the lubricant to fall on the face of the drum A. The outer face-plate of the box R is provided with a short projection, *r*, going into the groove *x*, just clearing the sides, preventing the metal from escaping in the wrong direction.

S is a spring connected at one end with the foot of the semicircular segment and at the other end with a screw, P, passing through the foot of the upright supports, through which the semicircular segment is made to adjust itself to the face of the drum A when this latter rotates, the screw serving to regulate the relative positions of the wheel and semicircular segment to each other.

We lay most particular stress upon the manner in which the segment D is made to inclose the face of the drum A by hanging freely upon the spindle M, and upon the adjustment between the face of the drum A and the semicircular segment D by means of the spring S and set-screw P, which, while it permits to inclose the surface of the drum carrying the groove or movable casting-mold *x* so accurately that, when rotating, no metal poured in the groove can escape through the joint formed at the contact of the face of the drum A with the concave surface of the semicircular segment D, yet, on account of the elastic action of the spring, allows the drum freely to rotate, without causing undue wear and tear of the surfaces.

Motion is imparted to the pinion W from the pulley V upon the same shaft. This pinion gearing with the spur-wheel T causes the drum A to rotate.

A casting-ladle on wheels may be run on rails right over the vertical channel H in the refractory block G G′, or the channel may be directly connected with a furnace containing the molten metal.

At the beginning of an operation water is made to circulate in the body of the drum A, as well as through the semicircular segment D. The groove *x* in the face of the drum is temporarily closed with some fire-clay where the inclosing semicircular segment ends. The metal is then poured through the channel H of the refractory block G G′ into the groove *x* of the drum A, and, after waiting, say, a minute, the drum is made to rotate. The rod to be cast issues at O, at a tangent to the periphery of the drum, and while still red-hot is passed between rolls placed in front, and is so shaped and compressed.

We point it out as a matter of great importance in this invention that the rod issues at a tangent to the circumference of the drum and not under any angle, which not only greatly facilitates the passing of the rod subsequently between the rolls, but also, by obviating any strain or twist in the still soft metal, removes any danger (especially when dealing with rods of small sections) of the latter breaking or tearing off.

Instead of producing only one rod at a time, two or more may be cast simultaneously by providing two or more grooves on the face of the drum A.

When the production of plates or bars of a flat section is intended, the channel H in the refractory block G G′ forms a slit, extending across the width of the face of the drum, of such width as the plate or bar is to represent.

The word "rod" throughout the whole of this specification is to stand for steel (or other metal) of any section that can be dealt with by this process and apparatus.

Having now fully described our invention, what we claim, and desire to secure by Letters Patent of the United States, is—

1. An apparatus for the continuous production of rods, bars, or wire direct from the molten metal, consisting, essentially, of a hollow drum or cylinder formed with a groove in its periphery and having connections for constantly supplying water to its interior, and a hollow segment provided with a constant water-supply and pivotally supported in contact with the periphery of the drum or cylinder, the face of the segment closing the groove in the cylinder, and means for increasing or decreasing the pressure of the segment against the drum, substantially as set forth.

2. An apparatus for the continuous production of rods, bars, or wire direct from the molten metal, consisting, essentially, of a hollow drum or cylinder formed with a groove in its periphery and having connections for constantly supplying water to its interior, and a grooved segment also hollow and provided with a constant water-supply and pivotally supported in contact with the periphery of the

drum or cylinder, the groove in the segment registering with the groove in the cylinder, and means for increasing or decreasing the pressure of the segment against the drum, substantially as set forth.

3. An apparatus for the continuous production of steel and other metal wire, plates, rods, bars, direct from the molten metal, consisting, essentially, in a cooling-tube formed in two parts, the one part movable and consisting of a groove formed in the face or periphery of a hollow drum mounted upon a horizontal hollow axis, the other portion being fixed and consisting of a hollow semicircular segment inclosing and covering a portion of the groove, as set forth.

4. In an apparatus for the continuous production of rods, bars, or wires from molten metal, the combination, with a hollow drum or cylinder formed with a groove in its periphery and adapted to be constantly supplied with water, and means for rotating the same, of a segment corresponding to the periphery of said cylinder, means, substantially as described, for varying the pressure of the segment upon the drum or cylinder, and connections whereby the segment may be constantly supplied with water, as set forth.

5. The combination, with the supports C and the drum A, of the segment D, provided with the spindle M and suitable bearings therefor, the tension-spring S, and an adjusting-screw, P, substantially as set forth.

6. The combination, with the supports C and drum A, of the segment D, provided with spindle M, having bearings N, the stop *r*, a tension-spring, and suitable adjusting-screw, substantially as set forth.

7. The combination, with the pivoted segment and a revolving drum or cylinder, of the blocks G G′, formed with the channel H, the pivoted lever K, and connections between said lever and the block G′, whereby vertical motion can be communicated thereto by said lever, substantially as shown and described.

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FRIEDRICH C. G. MÜLLER.

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Witnesses to the signature of Friedrich C. G. Müller:
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AUGUST EIME.