

No. 779,953.

PATENTED JAN. 10, 1905.

A. E. MANCHESTER.
SMELTING FURNACE.

APPLICATION FILED MAY 9, 1903.

2 SHEETS—SHEET 1.

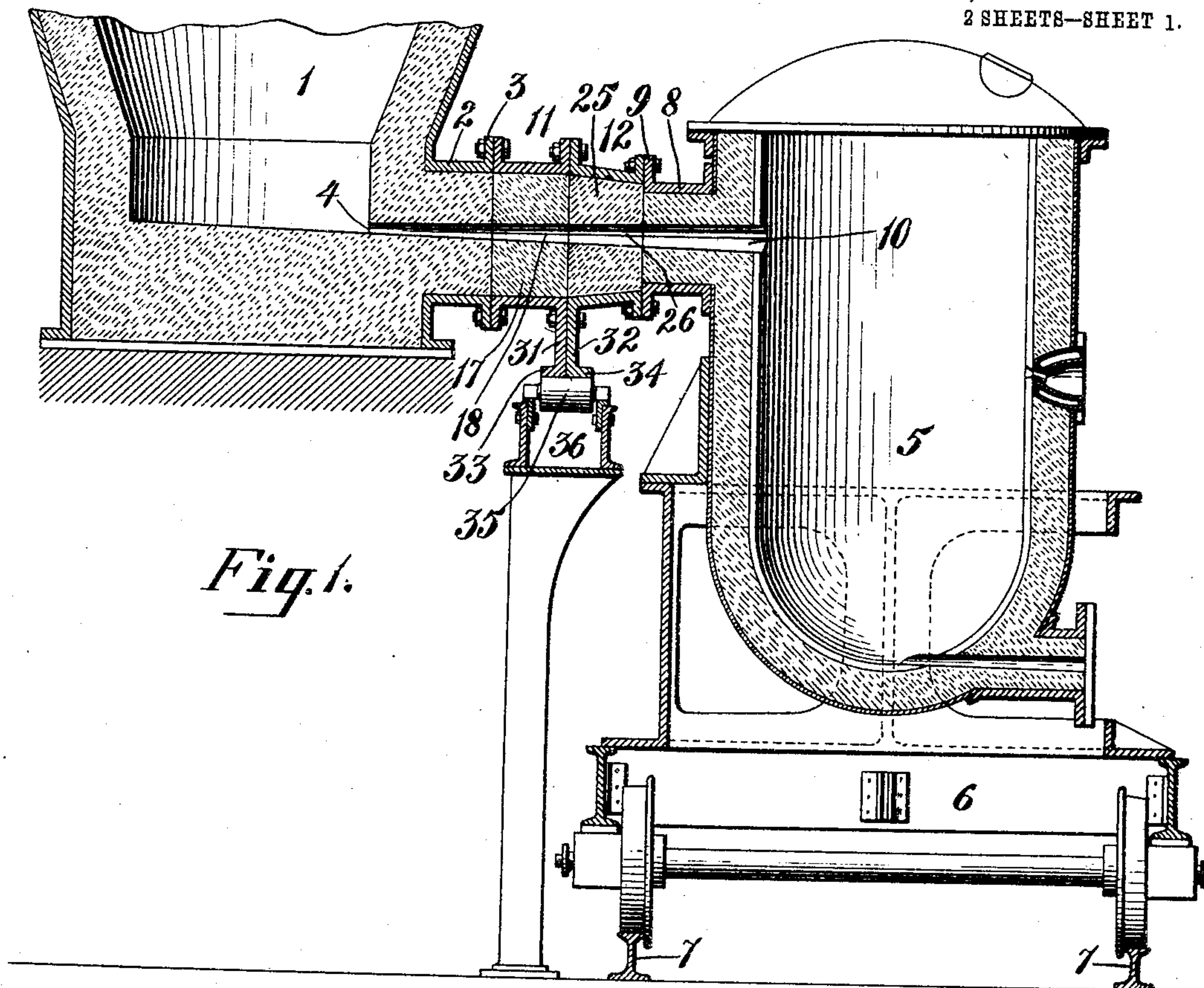
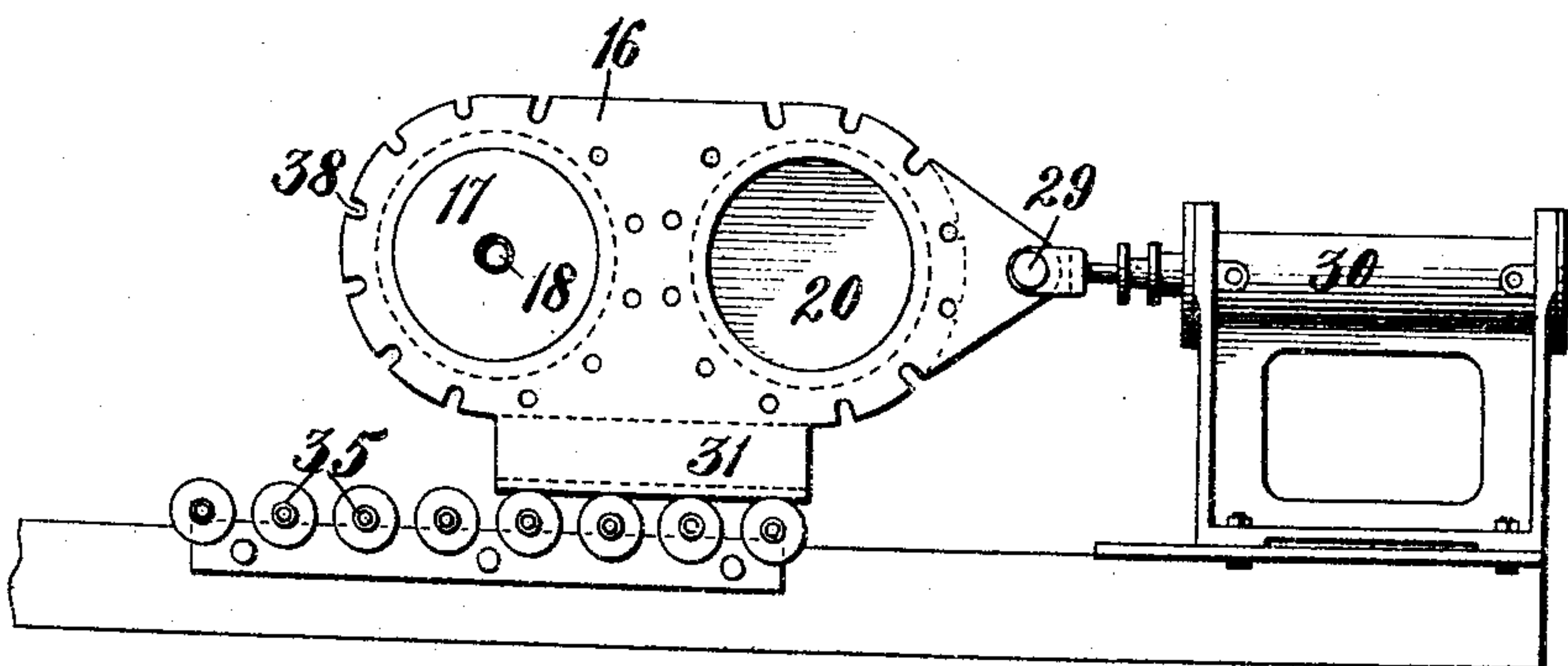


Fig. 1.

Fig. 2.



Witnesses:

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Inventor:

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by attorneys
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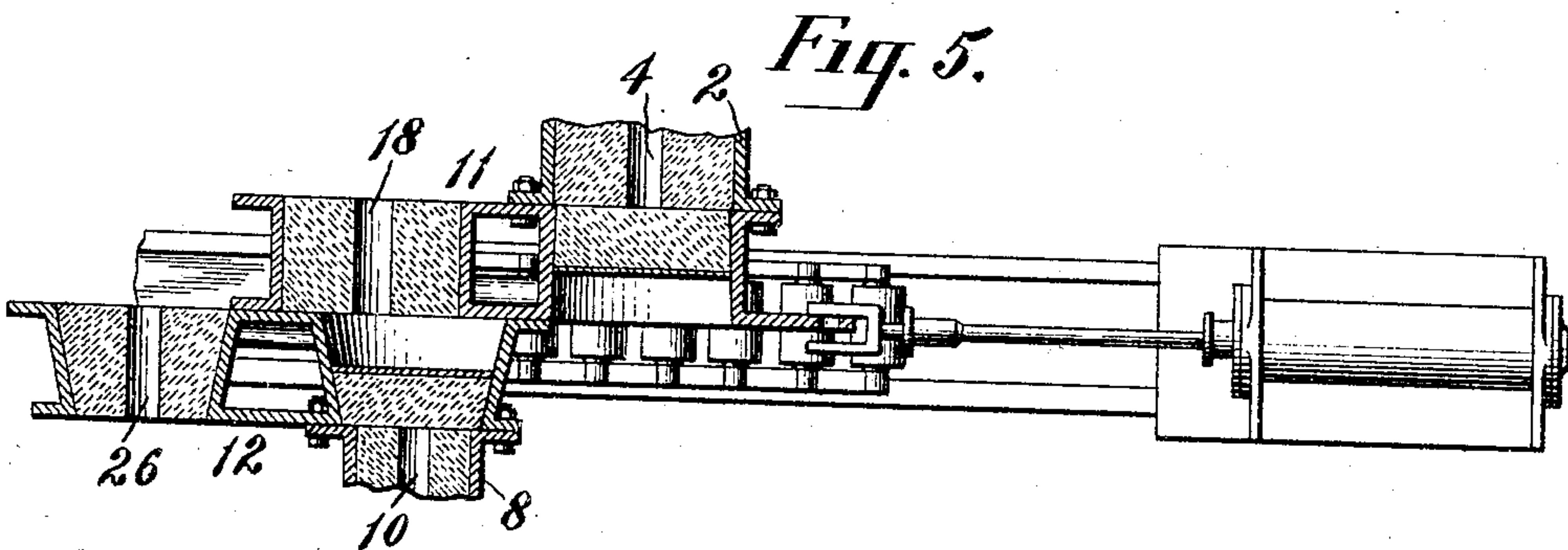
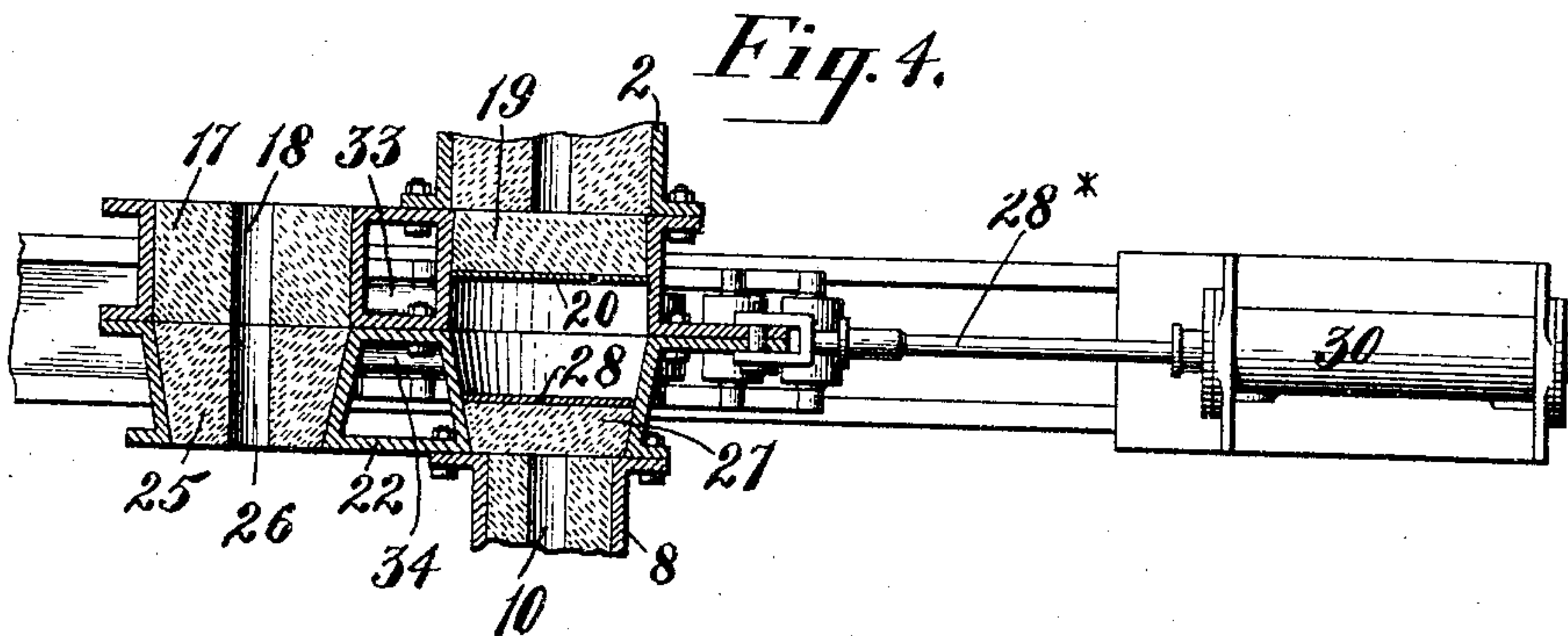
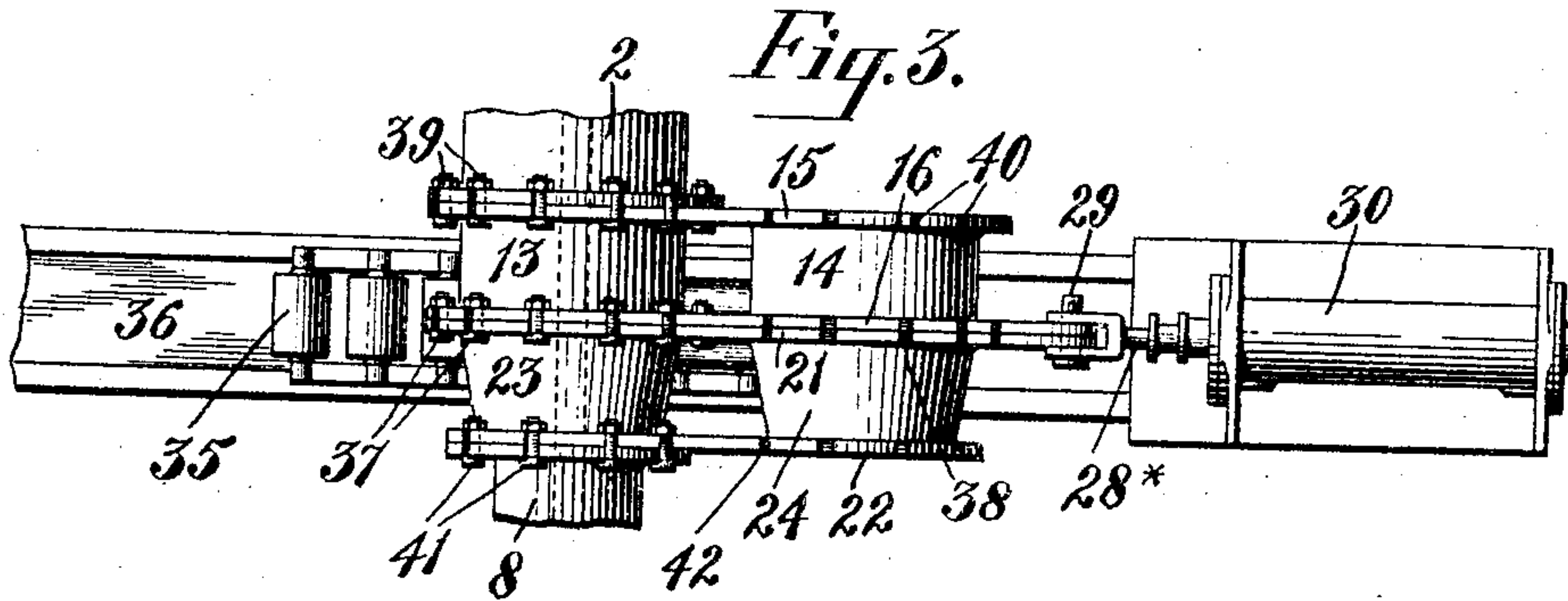
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

ALFRED E. MANCHESTER, OF NEWBURGH, NEW YORK.

SMELTING-FURNACE.

SPECIFICATION forming part of Letters Patent No. 779,953, dated January 10, 1905.

Application filed May 9, 1903. Serial No. 156,338.

To all whom it may concern:

Be it known that I, ALFRED E. MANCHESTER, a citizen of the United States, and a resident of Newburgh, in the county of Orange and State of New York, have invented a new and useful Improvement in Smelting-Furnaces, of which the following is a specification.

My invention relates to an improvement in smelting-furnaces, and has for its object to provide a new cut-off valve, which is interposed between the furnace and the forehearth, whereby the furnace and forehearth nozzles may be brought into open communication when the valve is in one position and be closed when the valve is in another position.

A further object is to provide a separable valve of the above character comprising two members arranged to be removably secured together and also arranged to be removably secured, the one member to the nozzle of the furnace and the other member to the nozzle of the forehearth.

A still further object is to provide a separable valve which is so arranged that when the two members thereof have been bolted to their respective nozzles for closing the same the forehearth may be removed with its valve member, thus permitting another forehearth, with its corresponding valve member, to be brought into position to be secured to the valve member carried by the furnace-nozzle.

A practical embodiment of my invention is represented in the accompanying drawings, in which—

Figure 1 represents in vertical central section the lower portion of a smelting-furnace, a forehearth and its traveling support, and the interposed separable valve, the valve members being in position to open communication therethrough between the nozzle of the furnace and the nozzle of the forehearth. Fig. 2 is a view in side elevation of the separable valve, its antifriction-support, and the means for operating the valve, the valve member nearest the observer being removed. Fig. 3 is a top plan view of the valve and a portion of the furnace-nozzle and forehearth-nozzle, the valve being shown secured in position to open communication between the furnace and forehearth. Fig. 4 is a horizontal longitudi-

nal section through the valve and portions of the furnace-nozzle and forehearth-nozzle, the valve being shown secured in position to cut off communication between the furnace and forehearth; and Fig. 5 is a similar view showing one member of the valve secured to the furnace-nozzle, the other member of the valve secured to the forehearth-nozzle, and the two members of the valve released from each other for permitting the removal of the forehearth with its valve member.

The smelting-furnace represented herein is denoted by 1, and it is provided with the usual nozzle 2, having a peripheral flange 3 and an outlet 4, leading from the interior of the furnace to the face of the nozzle.

The forehearth represented herein is denoted by 5, and it is mounted on a suitable movable carriage 6, fitted to travel along the track-rails 7.

The nozzle of the forehearth is denoted by 8, and it is provided with a peripheral flange 9 around its face and an inlet-bore 10 leading from the face of the nozzle to the interior of the forehearth. When the forehearth is brought into position in front of the furnace, their respective nozzles are located in alignment with each other.

A separable valve is interposed between the furnace and forehearth nozzles for opening and closing communication between the same, which valve comprises two longitudinal members 11 and 12. The member 11 comprises an open barrel or cylinder 13 and a closed barrel or cylinder 14, having inner and outer flanged face-plates 15 and 16. The barrel or cylinder 13 of the member 11 is partially closed by a lining 17, of fire-brick or other suitable material, through which a bore 18 leads from the inner to the outer face of the said member. The barrel or cylinder 14 is wholly closed by a filling 19, of fire-brick or other suitable material, which may be packed by a suitable plate 20, of steel, if so desired. The face of this filling 19 is flush with the face of the inner plate 15 of the said member 11. The other member, 12, is provided with inner and outer flanged face-plates 21 22, connected by an open barrel or cylinder 23 and a closed barrel or cylinder 24, co-

responding to the cylinders or barrels 13 and 14 of the member 11. The cylinder or barrel 23 is partially closed by a lining 25, of fire-brick or other suitable material, through
 5 which a bore 26 leads from the inner to the outer face of the valve member. The barrel or cylinder 24 is wholly closed by a filling 27, of fire-brick or other suitable material, which may be packed by a metal plate 28. The face
 10 of the filling 27 is flush with the outer plate 22 of the valve member. The valve is moved back and forth to open or close communication between the furnace and forehearth by any suitable means, that shown herein comprising a piston 28*, connected to the plates
 15 16 and 21 of the members by a removable clevis 29 and operated by a cylinder 30 of any desired form. This valve has an anti-friction-support, as follows: The plates 16 and
 20 21 of the two members are extended downwardly, as shown at 31 32, and are provided with flanges 33 34, which rest upon a series of rollers 35, mounted in a support 36. The two members of the valve are removably se-
 25 cured together by a series of bolts 37, which pass through the flanges around the peripheries of one or both of the pairs of barrels or cylinders 13 23 and 14 24. Wherever possible, I find it preferable to form open slots 38
 30 through the flanges for facilitating the insertion and removal of the bolts. The member 11 of the valve may be secured to the furnace-nozzle with its open barrel or cylinder 13 in communication therewith or its
 35 closed barrel or cylinder 14 in engagement with the face of the nozzle by means of a series of bolts 39, passing through the flange 3 of the nozzle and the flange-plate 15. Wherever possible, holes 40, through which the
 40 bolts pass in the flanges, are open through the periphery thereof for facilitating the insertion and removal of the said bolts. The member 12 of the valve may be similarly se-
 45 cured with its open barrel or cylinder in communication with the forehearth-nozzle or its closed barrel or cylinder in engagement with the face thereof by means of a series of bolts 41, passing through the nozzle-flange 9 and the
 50 flange-plate 22. The holes 42 in these flanges are also open through the periphery of the flanges wherever possible for facilitating the insertion and removal of the bolts.

The operation of my invention is as follows: Supposing the parts to be in the position in
 55 which they are shown in Fig. 1, the two members of the valve being bolted together and one member being bolted to the furnace-nozzle and the other member being bolted to the forehearth, with the bores 18 and 26 in aline-
 60 ment with the bores 4 and 10, the molten metal is free to flow from the furnace into the forehearth. When it is desired to cut off the flow into the forehearth, the members of the valve are unbolted from their respective nozzles

and the valve is moved a sufficient distance to
 55 bring the closed barrels or cylinders 14 and 24 into engagement with the faces of the nozzles. The two members are then bolted to the nozzles, thus securely closing their bores
 4 and 10. The two members of the valve are
 70 then unbolted from each other and the piston 28 disconnected by releasing the clevis 29. One member of the valve—viz., the member 12—may then be removed with the forehearth,
 as shown clearly in Fig. 5, while the other
 75 member is still secured to the furnace. Another forehearth may then be brought into position with its member of the valve and the parts secured in the position shown in Fig. 1.

It will be seen that by the use of the separable valve herein shown and described I am
 80 enabled to obtain a complete cut-off of the furnace and the forehearth before the forehearth is removed. Furthermore, it will be seen that I am enabled to more rapidly ma-
 85 nipulate a number of forehearth, so as to bring them into position to receive the molten metal from the furnace and to remove them while the furnace is in operation.

It is evident that changes might be resorted
 90 to in the form, construction, and arrangement of the several parts without departing from the spirit and scope of my invention. Hence I do not wish to limit myself strictly to the structure herein set forth; but
 95

What I claim is—

1. The combination with a furnace and a forehearth, of an interposed separable cut-off valve arranged to open and close communication between the two.
 100

2. The combination with a furnace and a forehearth, of an interposed separable cut-off valve and means for removably securing one member of the valve to the furnace, the other member of the valve to the forehearth and
 105 the two members of the valve together.

3. The combination with a furnace and a forehearth, of an interposed cut-off valve, means for operating the valve to open and close communication between the furnace and
 110 forehearth and an anti-friction-bearing for the valve.

4. The combination with a furnace and a forehearth, of a cut-off valve comprising two members, each member having an open por-
 115 tion and a closed portion and means for removably securing the open portion or the closed portion of each member to its respective furnace or forehearth.

5. A cut-off valve for furnaces and fore-
 120 hearths comprising two longitudinal members, each consisting of face-plates, an intermediate open barrel or cylinder and an intermediate closed barrel or cylinder.

6. The combination with a furnace and a
 125 forehearth having flanged nozzles, of an interposed cut-off valve comprising two members having flanged plates, bolts for securing the

adjacent flanged plates of the two members together and bolts for securing the remaining flanged plates of the members to their respective flanged nozzles of the furnace and fore-
5 hearth.

In testimony that I claim the foregoing as my invention I have signed my name, in pres-

ence of two witnesses, this 27th day of March, 1903.

ALFRED E. MANCHESTER.

Witnesses:

JOHN E. DWIGHT,
DYKE KEEDY.