

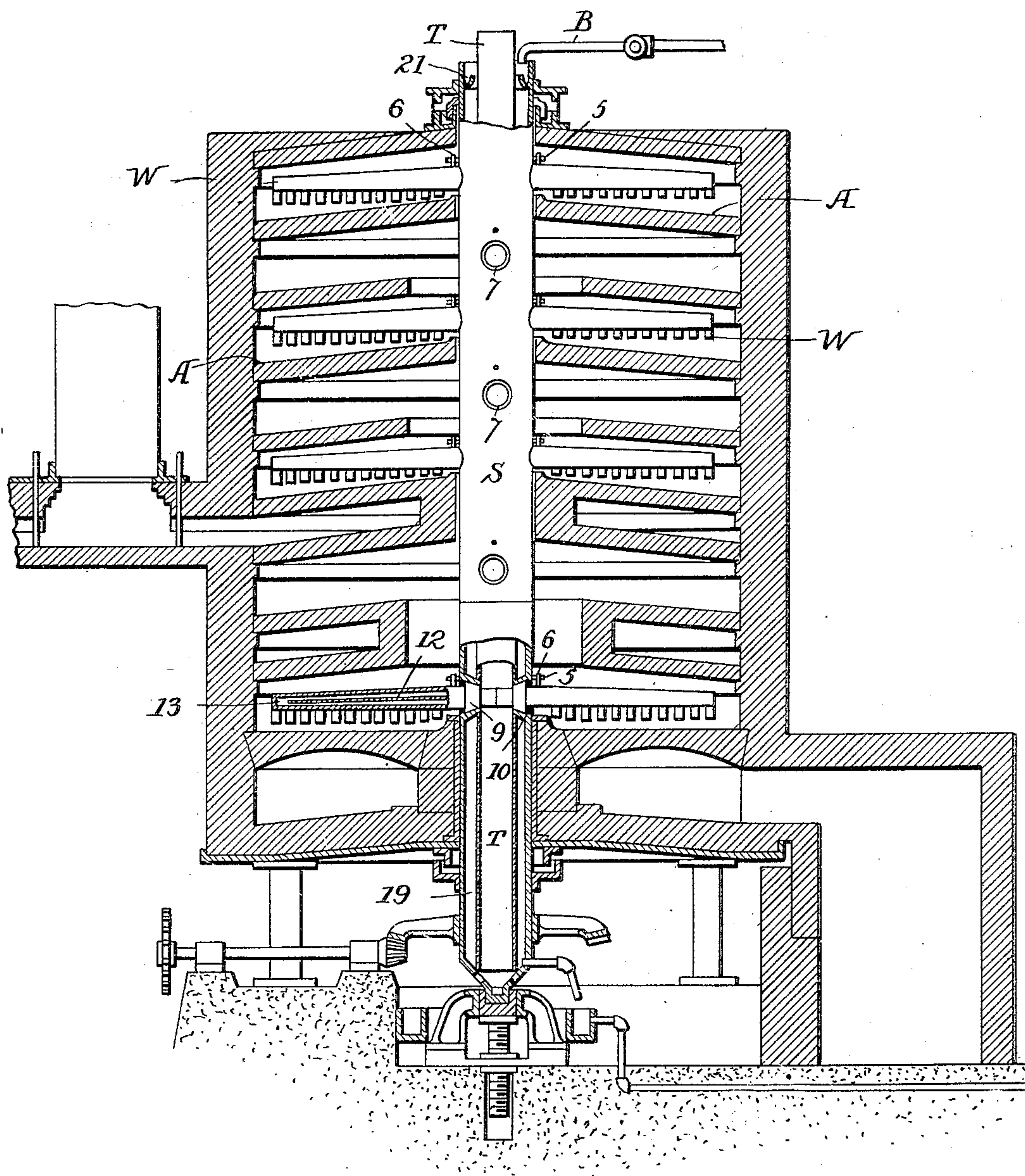
No. 804,752.

PATENTED NOV. 14, 1905.

A. R. MEYER.
ROASTING FURNACE.
APPLICATION FILED MAR. 17, 1904.

2 SHEETS—SHEET 1.

Fig. 1

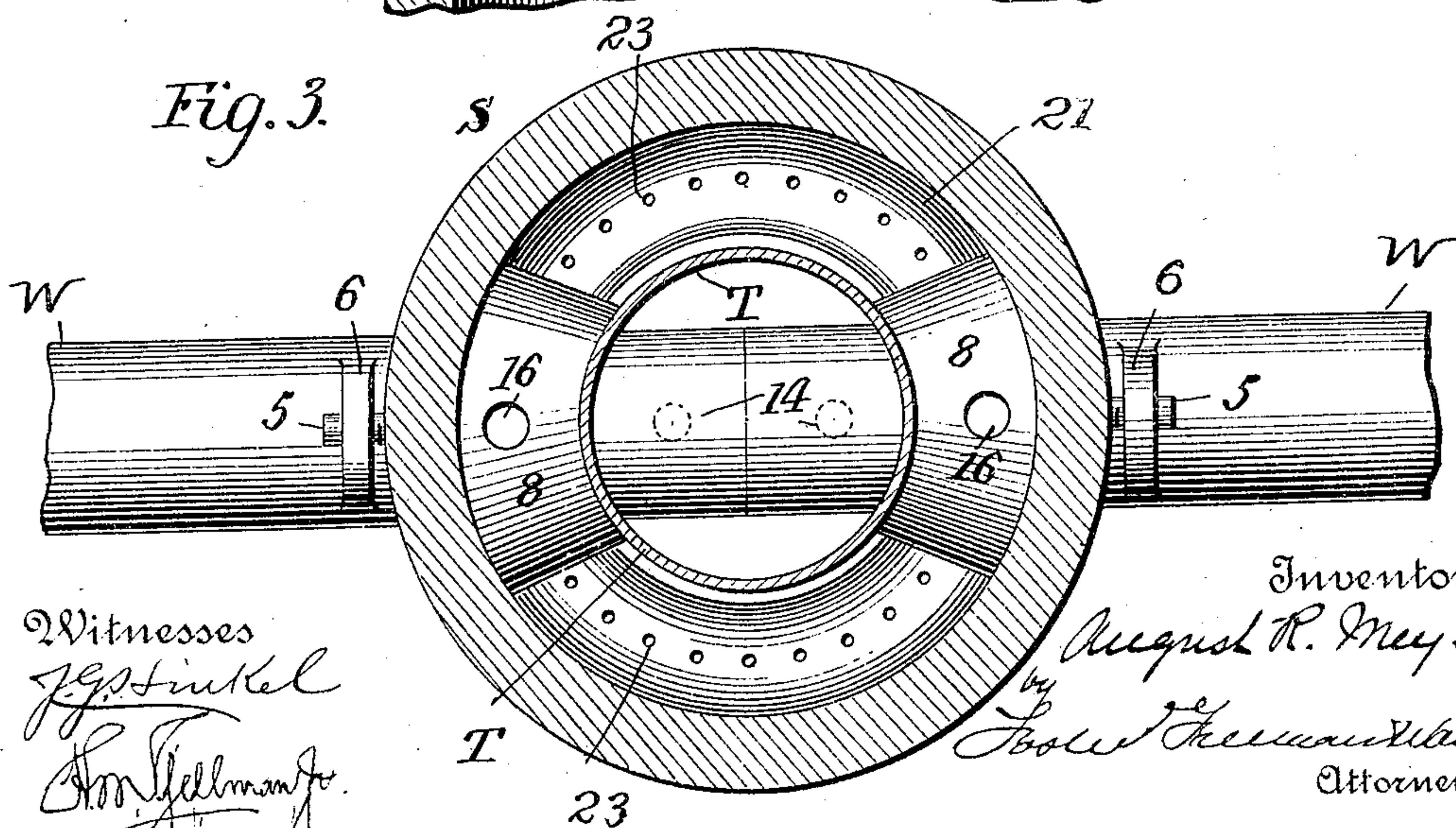
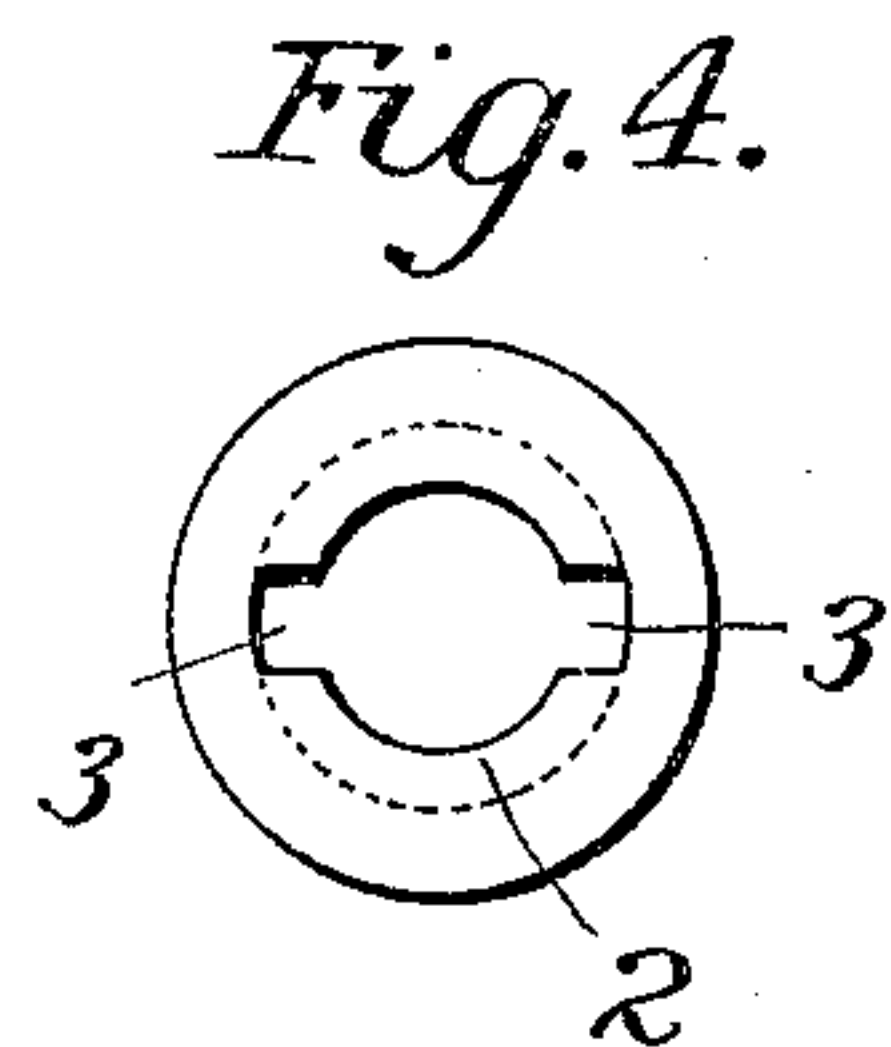
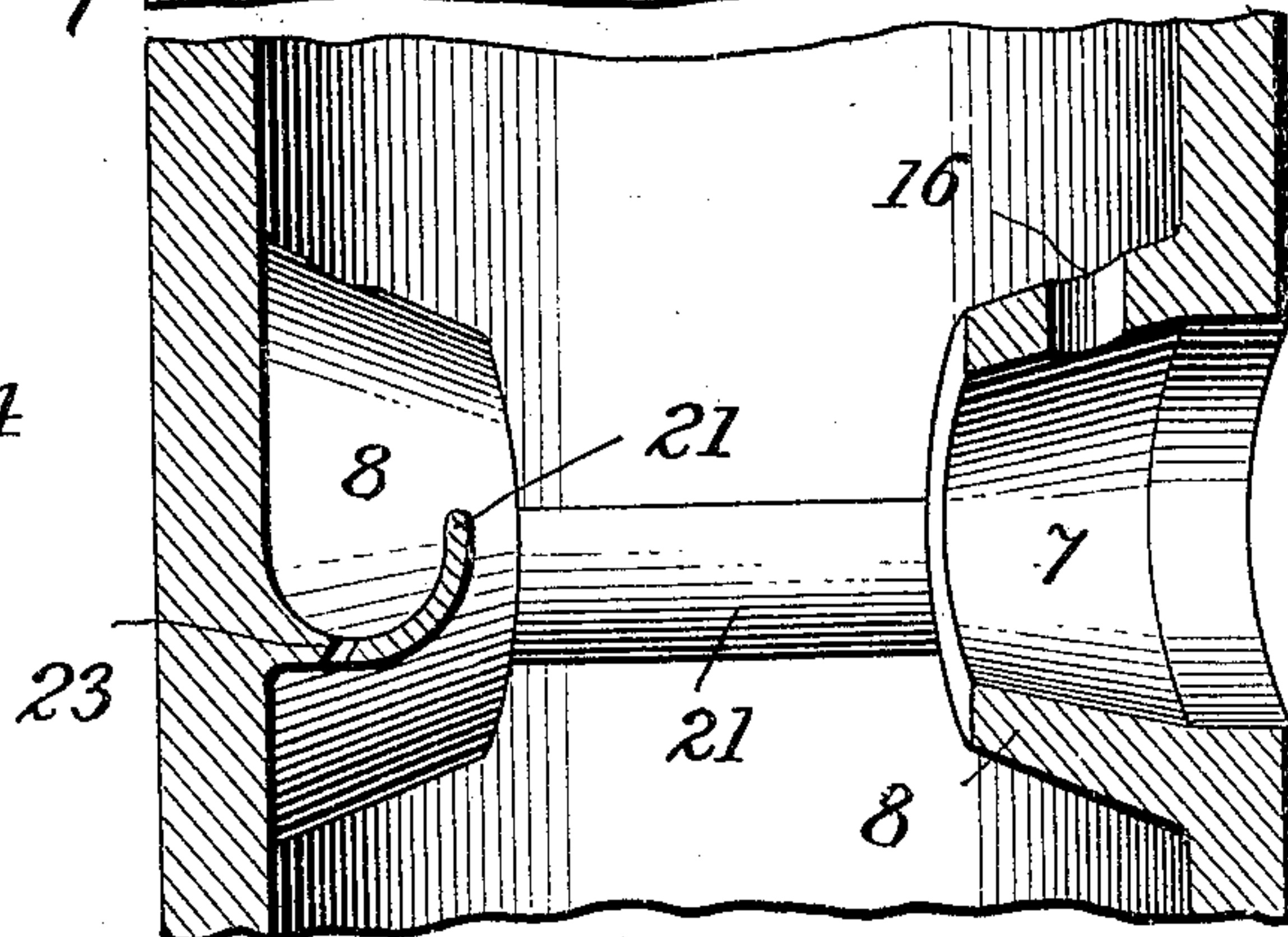
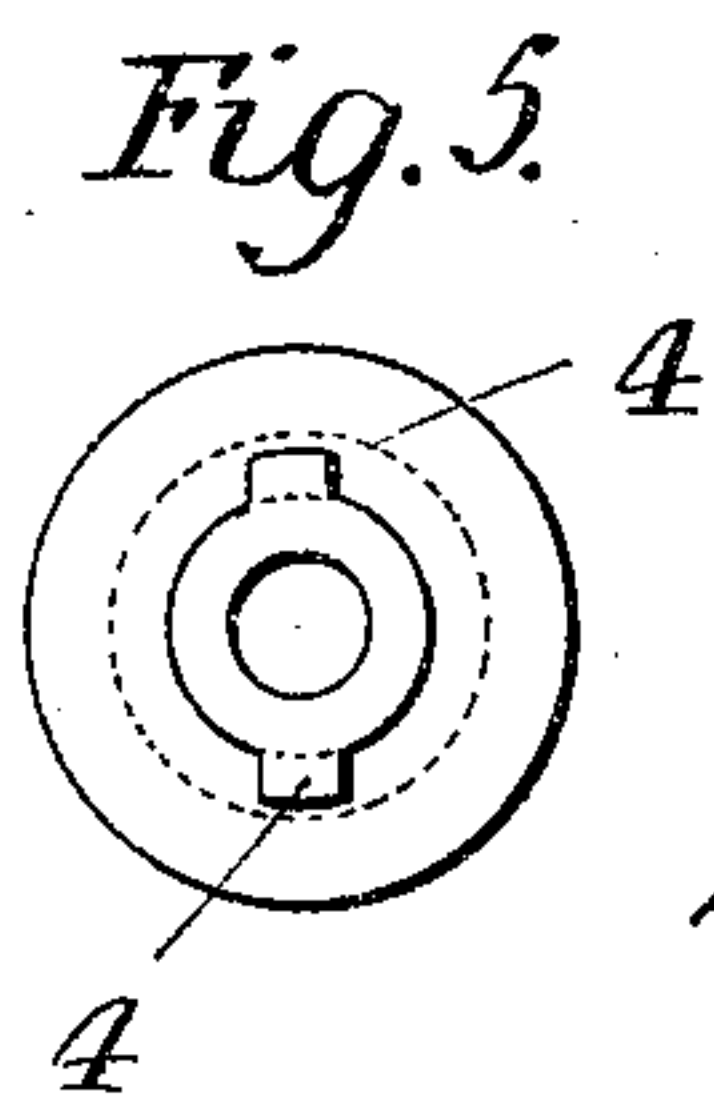
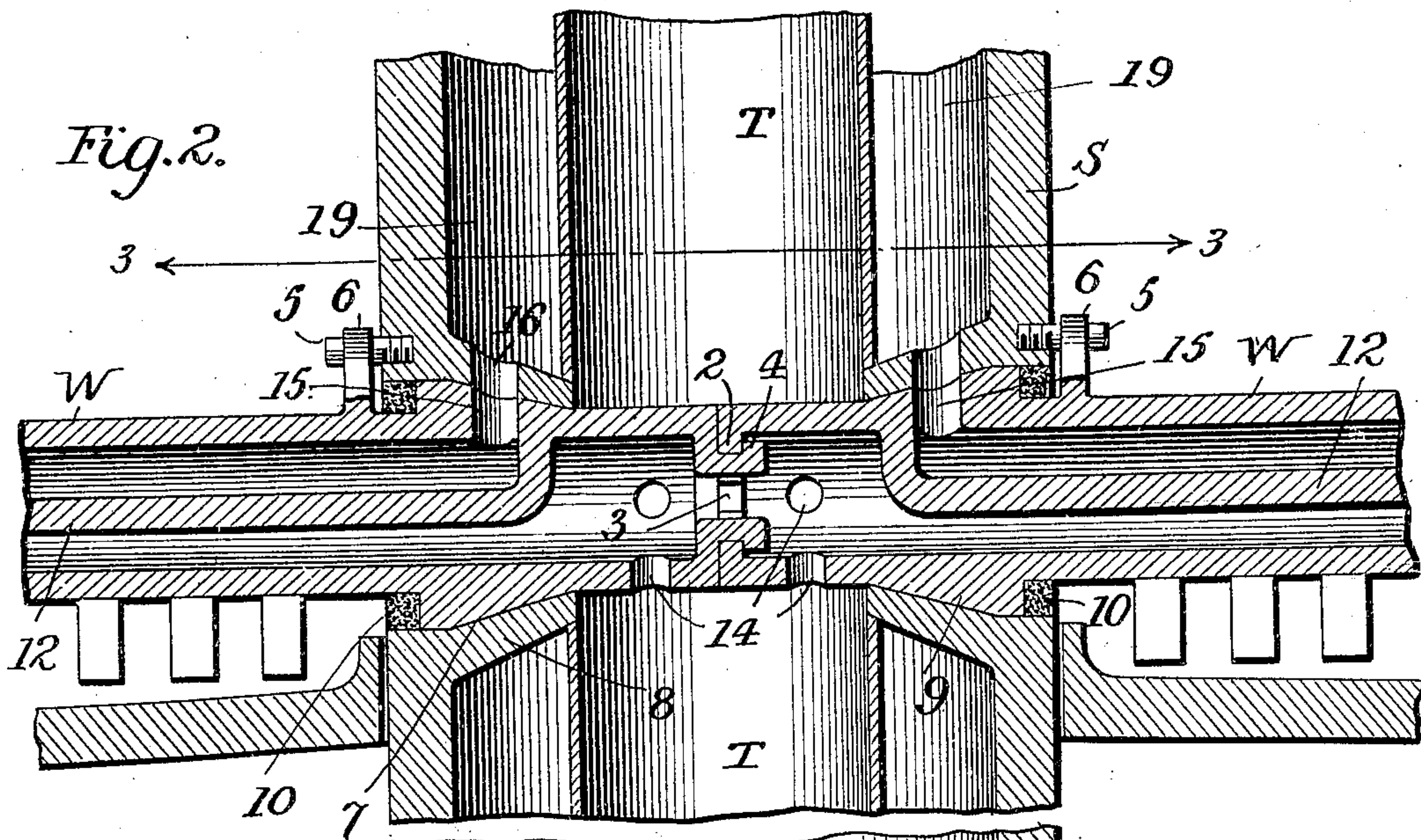


Witnesses
J. G. Stinckel
Wm. J. Gillman Jr.

Inventor
August R. Meyer
John Freeman Watson
Attorneys

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2 SHEETS—SHEET 2.



Witnesses
J. G. Stinkel
J. H. Hillman Jr.

Inventor
August R. Meyer
by
John H. Hillman & Son
Attorneys

UNITED STATES PATENT OFFICE.

AUGUST R. MEYER, OF KANSAS CITY, MISSOURI, ASSIGNOR TO THE
UNITED ZINC AND CHEMICAL COMPANY, OF KANSAS CITY, MIS-
SOURI, A CORPORATION OF NEW JERSEY.

ROASTING-FURNACE.

No. 804,752.

Specification of Letters Patent.

Patented Nov. 14, 1905.

Application filed March 17, 1904. Serial No. 198,647.

To all whom it may concern:

Be it known that I, AUGUST R. MEYER, a citizen of the United States, residing at Kansas City, Jackson county, Missouri, have invented certain new and useful Improvements in Roasting-Furnaces, of which the following is a specification.

My invention relates to that class of furnaces in which bodies of material to be heated are placed upon platforms or hearths and are agitated by means of blades upon arms either carried over the hearths or by revolving the hearths below stationary arms; and my invention consists in means for connecting the arms to the supporting pipe or shaft and means for securing the proper flow of cooling fluid through the shaft and arms and in means for securing a cooling fluid consisting of air saturated with moisture, as fully set forth hereinafter and as illustrated in the accompanying drawings, in which—

Figure 1 is an elevation, partly in section, of a roasting-furnace embodying my improvement. Fig. 2 is a vertical section, on an enlarged scale, of part of the apparatus; Fig. 3, a section on the line 3 3, Fig. 2; Fig. 4, an end view of one of the arms; Fig. 5, an end view of the opposite or engaging arm.

The body of the furnace of any suitable construction is provided with hearths A, upon which the material to be treated is placed and on which it is stirred and carried by the blades of stirrer-arms W, extending from a pipe or hollow shaft S, the latter being stationary if the hearths or platforms revolve or rotating when the hearths are stationary. As shown, there is a rotating shaft resting at its lower end in a suitable step. The arms W instead of being secured to the shaft by appliances connected with the latter are so disposed and constructed that the arms of each pair extending radially from the shaft serve to hold each other in place—that is, the arms extend through oppositely-placed sockets and abut and are connected together in line with each other at the inner ends. Different modes and means of connection may be employed; but, as shown, one of the arms has a flange 2 at the inner end in which are notches 3 3, through which may be passed hooks 4, extending from the end of the opposite arm, which upon then being rotated to bring the hooks opposite the flange 2 is connected to the other arm, and a

suitable retainer or stop is used to prevent further rotation and the disengagement of the arms. As shown, the retainer consists of a screw-bolt 5, extending from an ear 6 on the arm into a threaded recess in the shaft S. In order to secure a tighter joint, I prefer to make each socket 7 tapering or conical within an inwardly-projecting boss 8 and to provide each arm with a corresponding tapering enlargement 9, and to further insure the sealing of this joint a portion of the enlargement may be cylindrical, the enlargement not filling the socket, so as to leave room for a suitable packing 10.

While in some instances the above means of connecting the arms to the shaft may be employed, where no means is used for cooling the arms themselves I prefer to make use of hollow arms provided with longitudinal partitions 12, having ports 13 at their outer ends (formed either by perforating the partitions or making them shorter than the arms) and providing the latter also with ports 14 near their inner ends, so that a suitable cooling fluid may be passed back and forth longitudinally through the arms, and each arm preferably has an exit-port 15 adjacent to the inner end and above the partition, so that the cooling fluid will flow first outward below the partition and then inward above the same, and in the construction shown the port 15 communicates with a port 16 in the boss 8.

To insure with certainty the flow of the cooling fluid through the arms as set forth, I prefer to put all of the ports 14 in communication with a supply-flue and all of the ports in communication with a discharge-flue. These flues may be differently arranged; but, as shown, a tube T is arranged within the shaft S so as to leave an intervening flue 19, and as the fluid in the shaft S becomes heated and tends to rise it will create a draft that will carry the fluid in the supply flue or tube T into the ports 14, out and back along the arms, and into the discharge-flue 19, and if it is desired to secure a more positive and vigorous action this may be obtained by increasing the pressure in the flue T or by exhausting from the flue 19 in any of the well-known ways.

By the construction shown I am enabled to make use of a limited supply of water to secure a better cooling effect and a better regu-

lation of the temperature of the shaft and arms than can be obtained by the use of either air or water alone. This I secure by admitting air to the tube T near the bottom of the latter and by permitting a flow of water from an inlet-pipe B down the inner surface of the shaft S, so that it will be heated and vaporized by the heat of the shaft, and the air which flows upward becomes charged with this vapor and is carried back and forth through the arms. It will be seen that by this means much less water will be required than is necessary to circulate a solid body of water through the arms, while the latter are prevented from becoming unduly chilled.

In order to retain the water in larger bodies in contact with the shaft S, I prefer to provide receptacles 21 at different points in the shaft, preferably in the form of gutters, and, as shown, these may extend around the interior of the shaft in line with the bosses 8, forming two curved gutters at opposite sides of each pair of bosses, as best shown in Fig. 3, and the bottoms of these gutters may have perforations 23, that will allow the water to pass at any desired rate of flow downward from one gutter to the other, the perforations inclining outward, so as to discharge the water from each gutter against the inner face of the shaft.

It will be seen that while I have provided means for making joints tight it is not essential to the operation of the apparatus that the joints be absolutely close, as there is no body of water the escape of which at any time will be detrimental to the operations and as the arrangement of flues is such that the air carrying with it or saturated by the moisture will tend naturally to flow in the proper course. It will be seen, however, that the construction shown may be used in connection with different systems of cooling.

I do not here claim, broadly, cooling the shaft and arms by air saturated with moisture, as this is not my invention, nor do I here claim, broadly, producing a vapor for cooling the shaft by passing water down the inner face of the shaft, nor the arrangement of gutters within the shaft, nor the partitioned arms, as these features are the subject of separate applications for Letters Patent, filed March 17, 1904, and bearing Serial Nos. 198,645 and 198,646.

Without limiting myself to the precise construction and arrangement of parts shown, I claim—

1. The combination with the pipe or hollow shaft S, of arms extending into the shaft and having their inner ends interlocked within the shaft, substantially as set forth.

2. The combination with the pipe or hollow shaft S, of arms extending into the shaft and each of said arms having at its inner end means for engaging the other arm, substantially as set forth.

3. The combination of the shaft S having oppositely-arranged sockets and arms extending through the sockets, one arm having a notched flange and the other provided with hooks for engaging the flange after passing through the notches, substantially as set forth.

4. The combination of the shaft S having oppositely-arranged sockets and arms extending through the sockets, one arm having a notched flange and the other provided with hooks for engaging the flange after passing through the notches, and means for preventing the arms from turning after being adjusted in place, substantially as set forth.

5. The combination with a hollow shaft having oppositely-arranged sockets, of arms extending through the shaft abutting end to end and provided with ports forming communications between the arms and the shaft, substantially as set forth.

6. The combination of the shaft S having oppositely-arranged sockets, and arms extending through the sockets and abutting at their inner ends, said arms being engaged one with the other independently of their connection by said shaft.

7. The combination of the shaft S having oppositely-arranged sockets, and arms extending through the sockets and abutting at their inner ends, one of said arms being provided at its inner end with hooks engaging notches in the inner end of the other arm.

8. The combination of the shaft S having sockets oppositely arranged, arms extending through the sockets and provided with inlet and outlet ports and supply and discharge flues or channels, the inlet-ports of the arms connecting with the supply-flue and the outlet-ports with the discharge-flue, and means for insuring a flow of water down the face of the discharge-flue, substantially as set forth.

9. The combination of the hollow shaft having tapering sockets oppositely arranged, and arms having tapering ends fitted to said sockets, one arm having terminal hooks and the other a notched flange, whereby the ends of the arms may be connected within the shaft, substantially as set forth.

10. The combination of the hollow shaft having inwardly-extending oppositely-arranged bosses, and arms extending through said bosses and provided at their adjacent ends with interlocking means, substantially as set forth.

11. The combination of a shaft having sockets partly cylindrical and partly tapering with arms extending through the sockets connected end to end provided with enlargements partly tapering and partly cylindrical, and packings arranged within the sockets outside the cylindrical portions of the enlargements, substantially as set forth.

12. The combination with the shaft having sockets oppositely arranged, of arms extending through said sockets and having their ends within the shaft interlocked, and supplied

mental means for preventing rotation of the arms after adjustment to position, substantially as set forth.

13. The combination with the shaft having 5 oppositely-arranged sockets, of arms extending through said sockets and connected end to end, each arm having a lateral projection outside of the shaft, and means connecting said lateral projections with the shaft, to prevent rotation of the arms relative to the shaft, 10 substantially as set forth.

14. The combination of the shaft having inwardly-projecting bosses with sockets and ports in said bosses, arms extending into said 15 bosses and having ports communicating with those of the bosses and other ports nearer the inner ends of the arms, a flue communicating with the inner ports, another flue communicating with the ports in the bosses, and means 20 for securing a flow of water downward at the inside of the shaft and for admitting air to the inner flue, substantially as set forth.

15. The combination with the shaft, socketed bosses, arms, and inner and outer flues, of a pipe admitting water to the top of the 25 shaft, and a series of receptacles or gutters arranged to hold the water at different points within the shaft, substantially as set forth.

16. The combination with the shaft, hollow arms, and inner and outer flues, of a pipe admitting water to the top of the shaft, and a 30 series of receptacles or gutters arranged to hold the water at different points within the shaft, said gutters provided with perforations inclined to discharge the water toward the 35 inner face of the shaft, substantially as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

AUGUST R. MEYER.

Witnesses:

JNO. P. METCALF,
C. M. BULKLEY.