

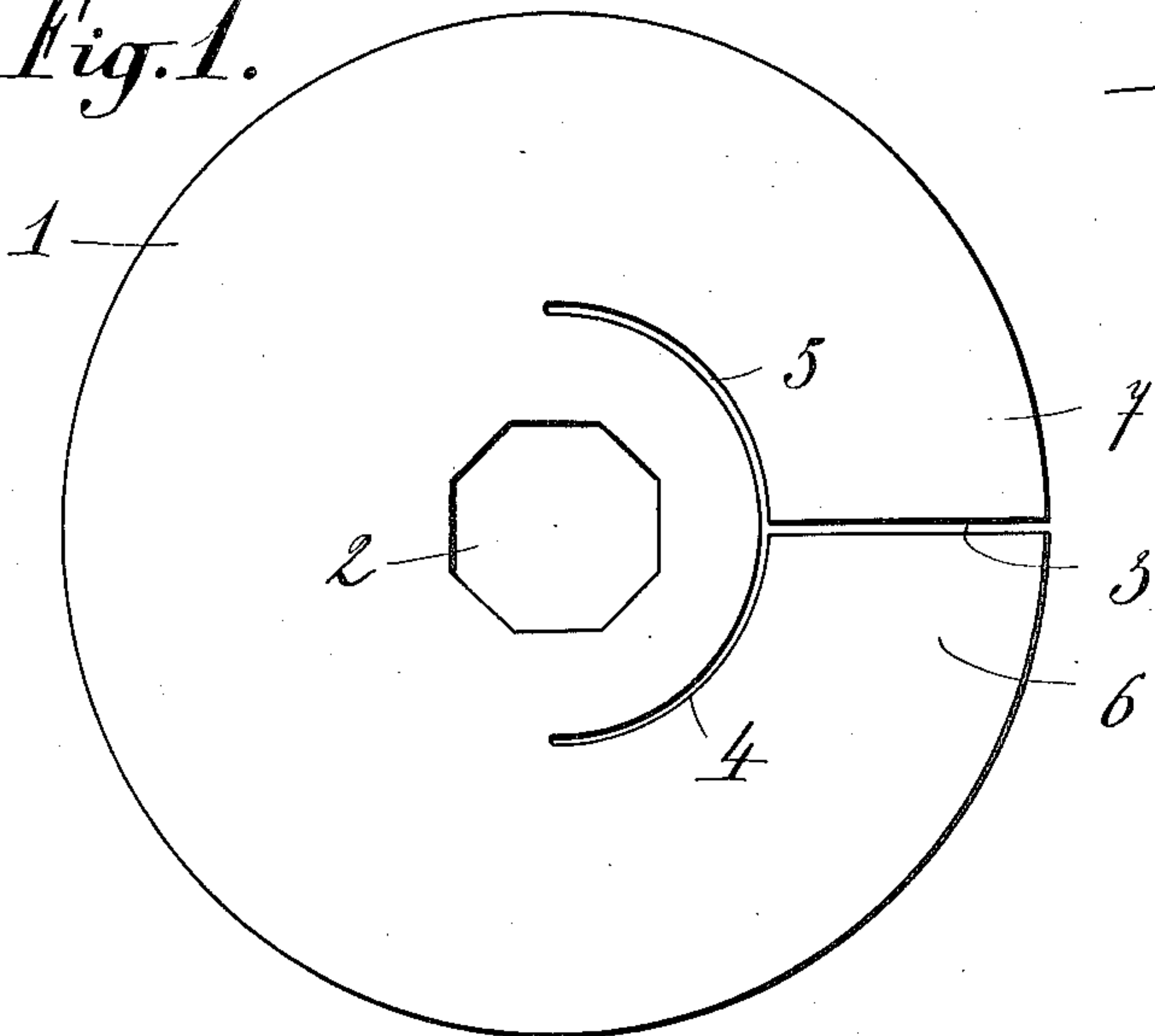
J. L. M. A. REIS.  
 MEANS FOR FACILITATING THE PRODUCTION OF STEAM.  
 APPLICATION FILED OCT. 27, 1908.

934,572.

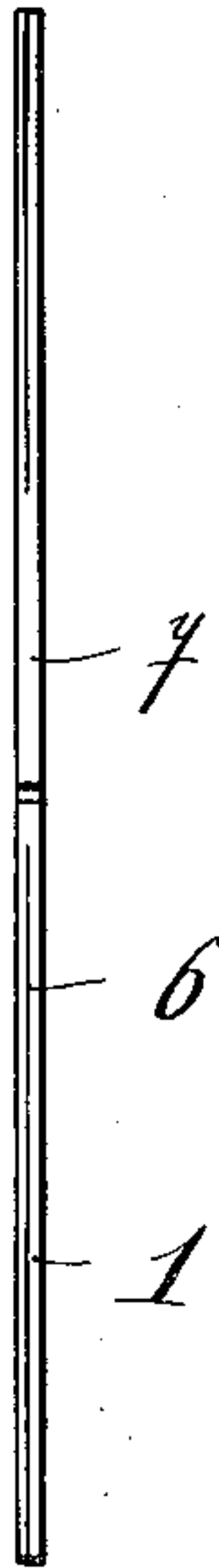
Patented Sept. 21, 1909.

2 SHEETS—SHEET 1.

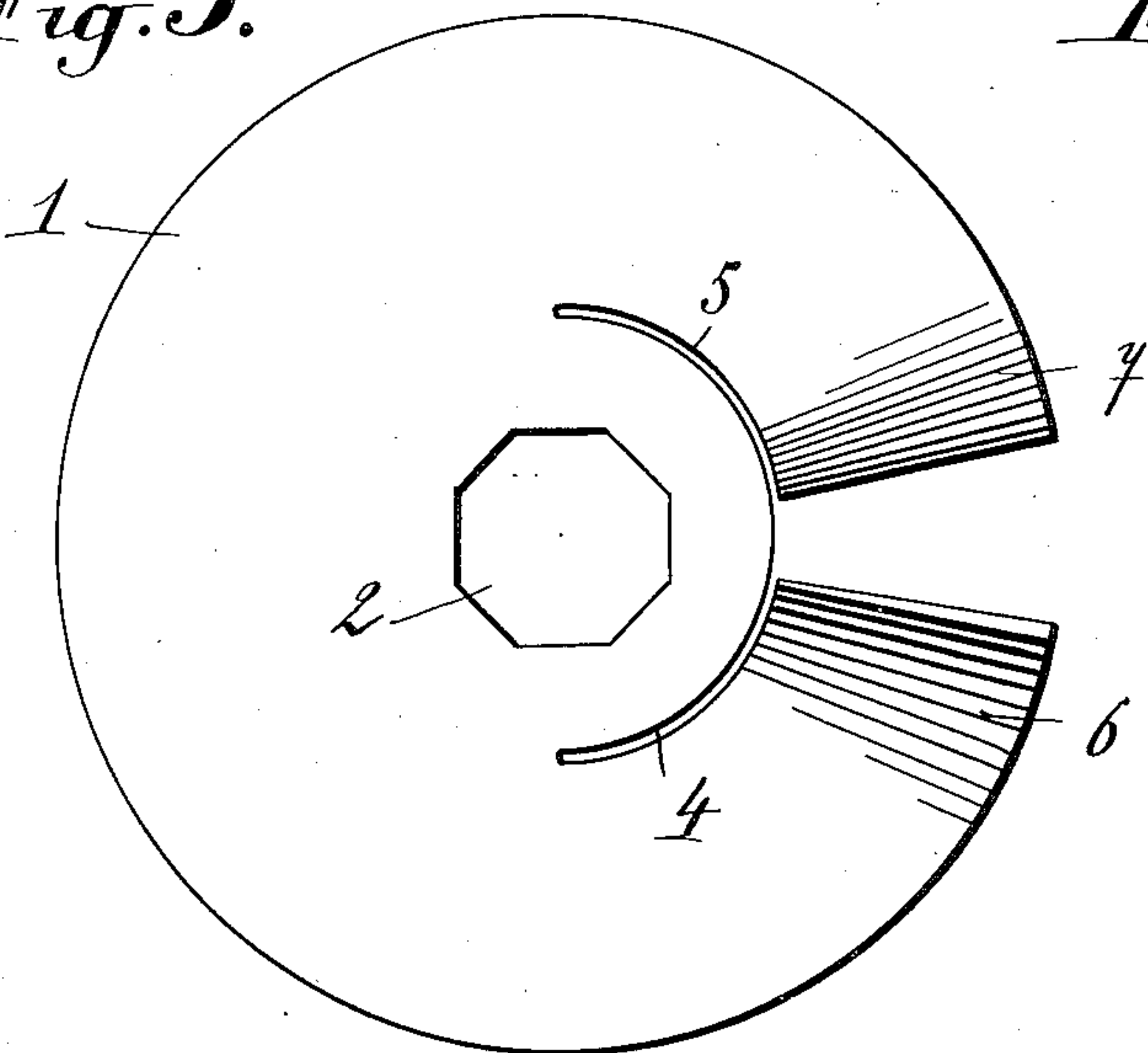
*Fig. 1.*



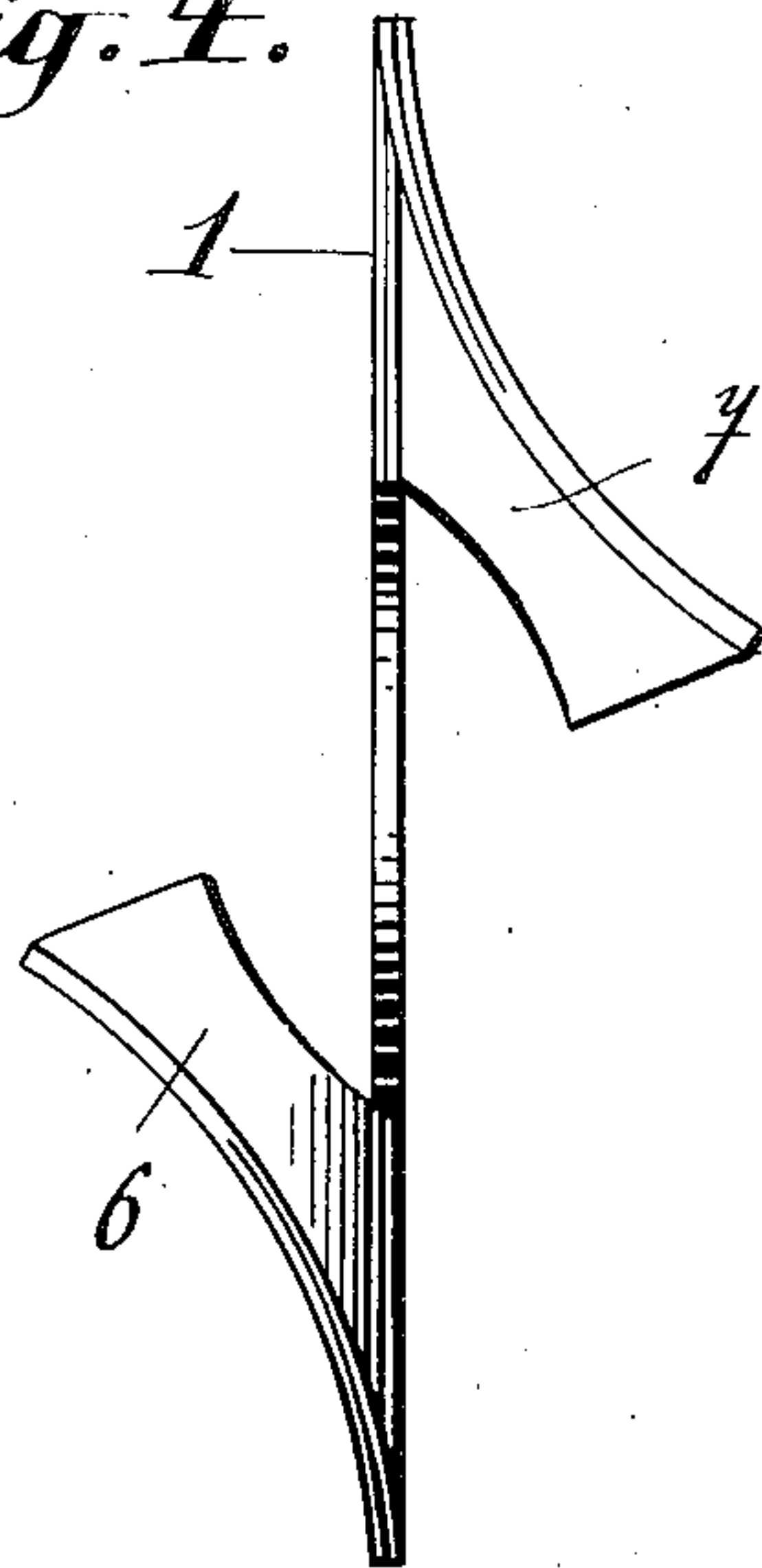
*Fig. 2.*



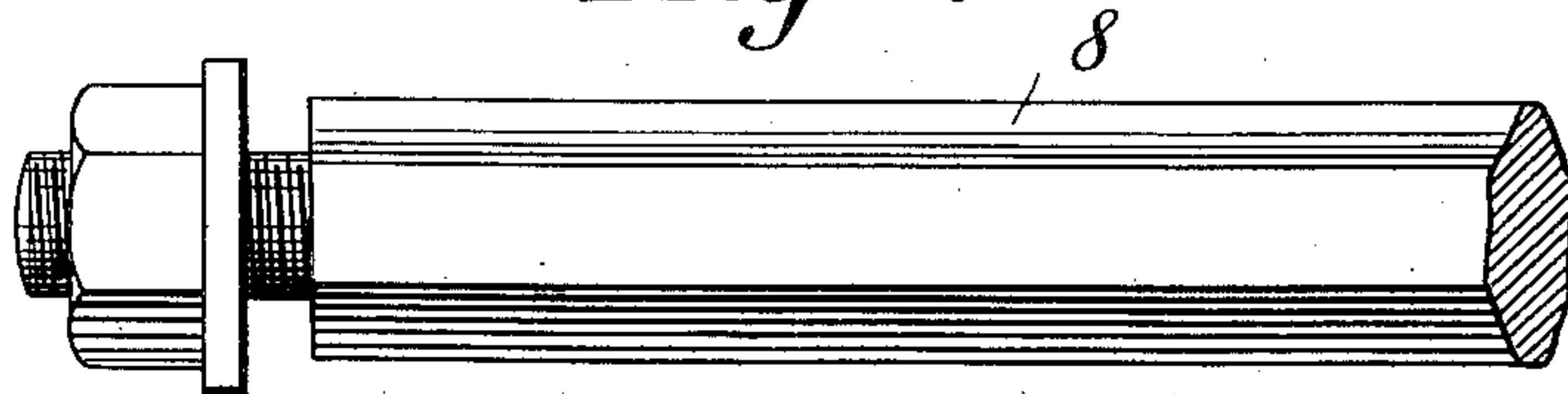
*Fig. 3.*



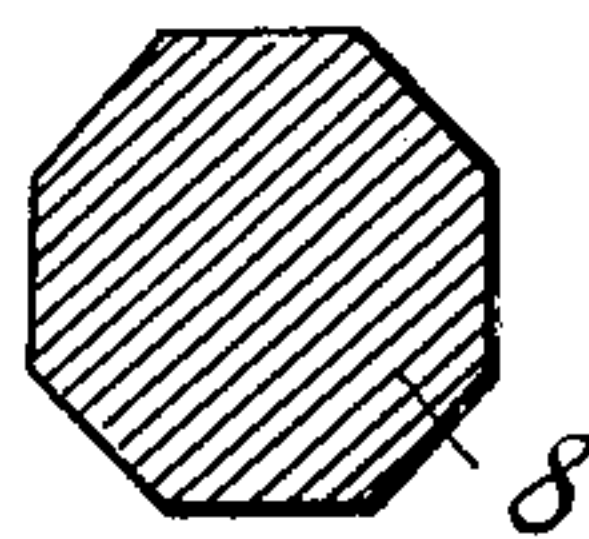
*Fig. 4.*



*Fig. 5.*



*Fig. 6.*



WITNESSES

W. P. Burke  
 H. M. Hopping

INVENTOR

Joseph Leon Marie Alphonse Reis  
 BY *J. M. McLean White* ATT'Y

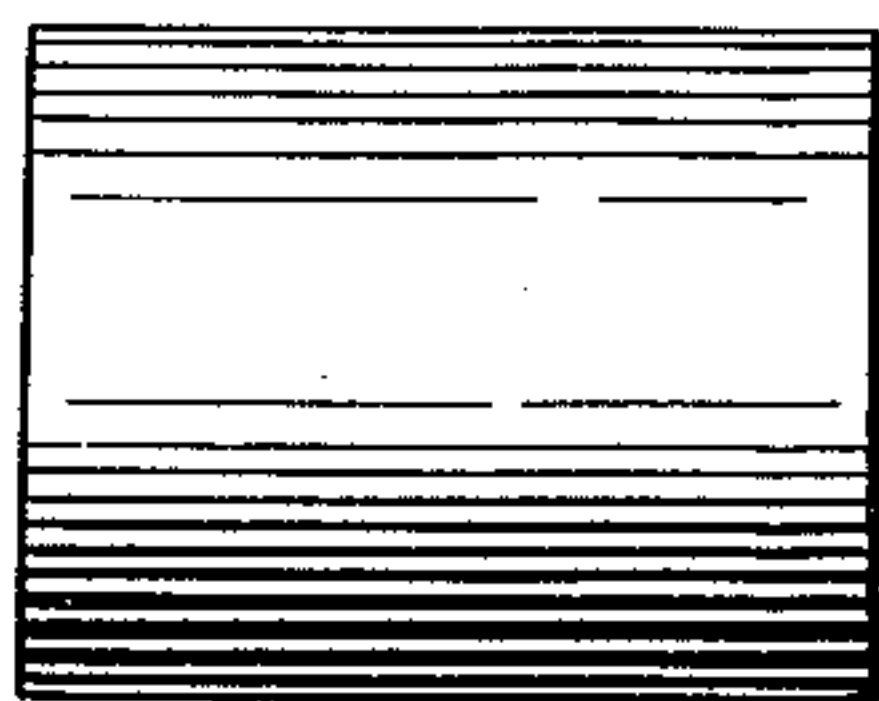
J. L. M. A. REIS.  
 MEANS FOR FACILITATING THE PRODUCTION OF STEAM.  
 APPLICATION FILED OCT. 27, 1908.

934,572.

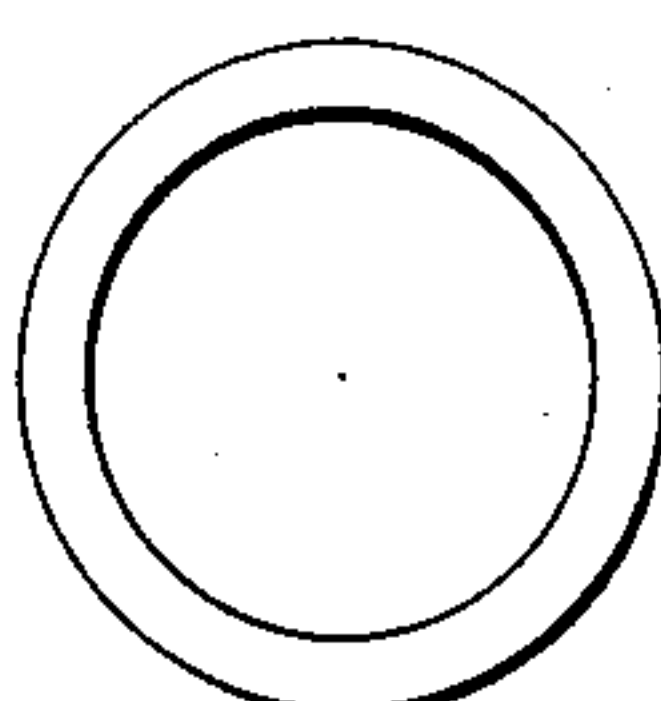
Patented Sept. 21, 1909.

2 SHEETS—SHEET 2.

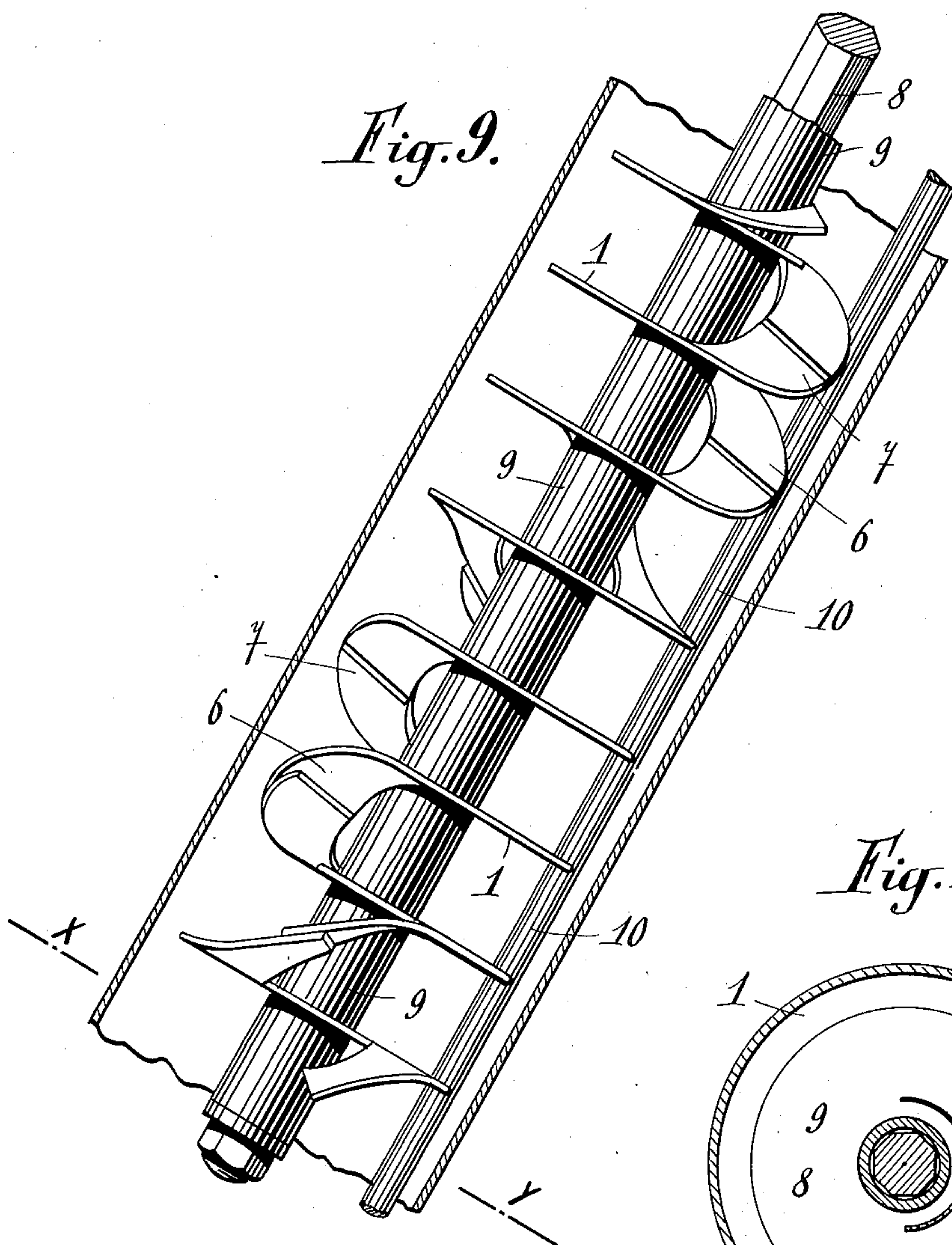
*Fig. 1.*



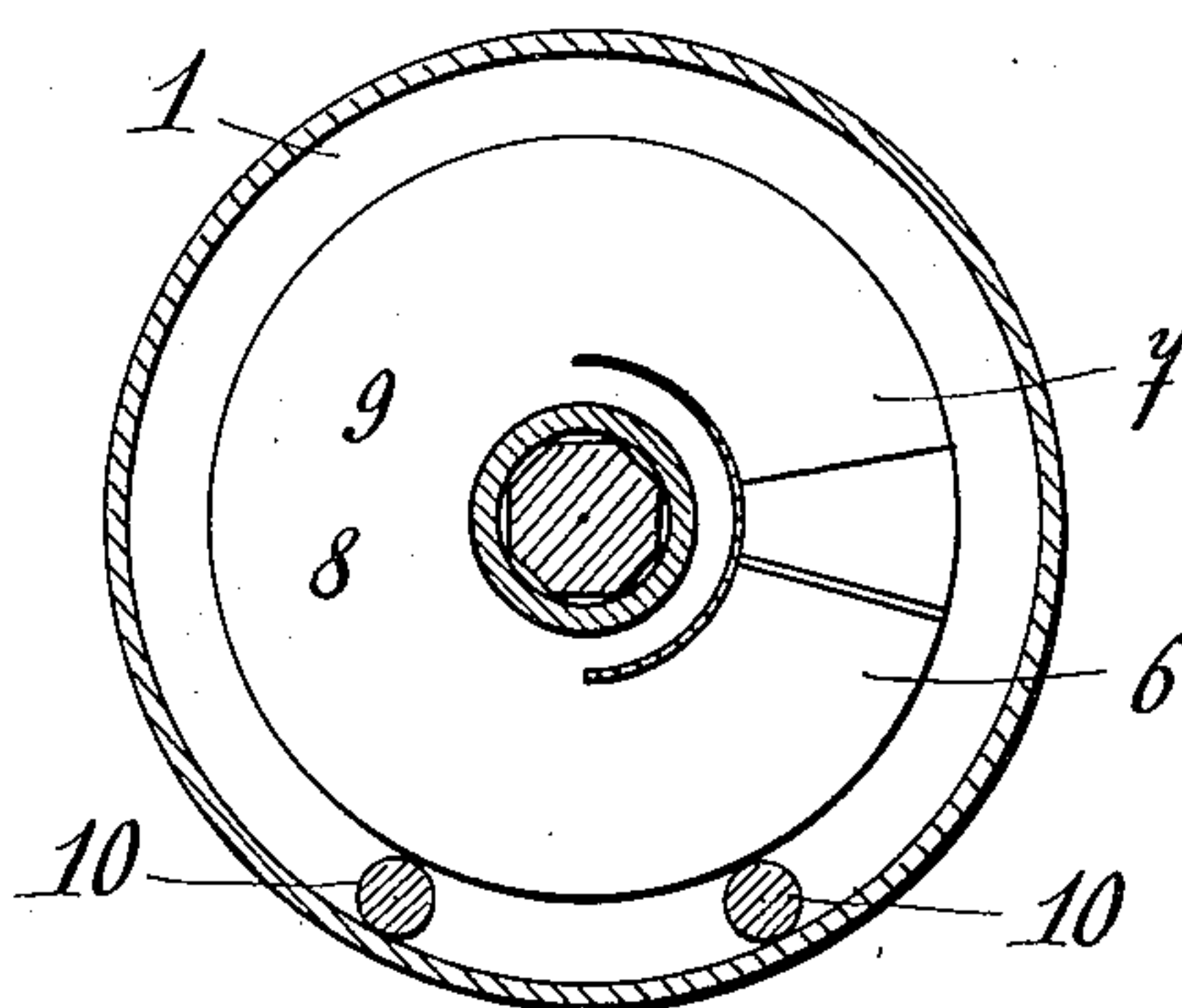
*Fig. 8.*



*Fig. 9.*



*Fig. 10.*



WITNESSES

W. P. Burr  
 W. M. Stopping

INVENTOR

Joseph Leon Marie Alphonse Reis  
 BY *W. M. Stopping*

ATTY.



# UNITED STATES PATENT OFFICE.

JOSEPH LÉON MARIE ALPHONSE REIS, OF ANTWERP, BELGIUM.

MEANS FOR FACILITATING THE PRODUCTION OF STEAM.

934,572.

Specification of Letters Patent. Patented Sept. 21, 1909.

Application filed October 27, 1908. Serial No. 459,791.

*To all whom it may concern:*

Be it known that I, JOSEPH LÉON MARIE ALPHONSE REIS, a subject of Belgium, residing at Antwerp, in the Kingdom of Belgium, have invented new and useful Improvements in Means for Facilitating the Production of Steam, of which the following is a specification.

This invention relates to improvements in those devices which are intended to be introduced into the water tubes of steam boilers in order to assist vaporization. Such devices as have been heretofore proposed have consisted either of a supporting bar or plate carrying wings which have been arranged at an incline to the axis of the tube, or they have consisted of bars or metal plates twisted into a helix. Now with either of the above stated forms of such devices as hitherto constructed, there has been the disadvantage that the said devices cannot easily be taken to pieces, nor can they be easily withdrawn from the tubes in which they are located; thus for instance owing to deposits and incrustations in the tubes the small clearance which the device inserted therein possessed is taken up and effectually prevents such constructions being withdrawn except with great inconvenience and the cost of much labor.

When the device inserted into a water tube of a boiler is in the form of a helix, the course of the bubbles of steam generated cannot be sufficiently elongated owing to the impossibility of twisting or bending a strip of sheet metal into the form of a helix, while at the same time giving it a sufficiently small pitch, that is, the coils cannot be brought sufficiently close together to obtain the maximum useful effect by a sufficiently elongated course of travel of the steam generated. Beyond this, as before stated, such a construction can only with the greatest difficulty be extracted from the tube in which it is placed after it has been used for a short period.

Now the object of the present invention is to so improve the construction of such devices that the same shall be constructed or composed of a number of separate parts so held together that they can readily be taken to pieces, or detached, one from another, and can thus be easily removed from the tube in which the structure is located, even when the said tube is badly incrustated. Beyond this, the object of the invention is to

obtain a helix of as small a pitch as desired so that the course of the steam in the tube can be elongated to such an extent as to obtain the maximum useful effect. To attain these ends, the device according to this invention which is to be introduced into the tube is constructed of a number of separate plates of a diameter slightly less than the interior diameter of the tube in which they are to be inserted, and these separate plates are threaded upon a bar or rod, the rod passing through perforations in the said plates, and means are provided whereby the said plates are held at the requisite distance apart, and also are held in some cases at the requisite angle relatively to each other in a circular direction. With such a construction, upon the rod carrying the said plates being withdrawn, the plates will become detached from one another and can then be easily extracted or allowed to fall from the tube in which they are located. With such a structure, a helix of the desired reduced pitch may be produced by constructing each of the separate plates in the form of a disk, and dividing the disk in a radial direction through the outer circumference for a distance and then continuing that division through segments of a circle on either side of same, and a disk so divided can have its two arms bent in reverse directions upon either side of the plane of the disk. The central perforation of such a disk may be of polygonal form and the disks can then be threaded upon a rod of corresponding polygonal section, one disk being placed upon the rod with an angular advance relatively to the preceding disk and so on, and thus a form of helix will be produced, the disks being separated from each other by loose separate tubular distance pieces, and the whole structure can be held together by nuts screwed upon the ends of the rod.

The invention will be more readily understood by the following description, having reference to the accompanying drawings, wherein,

Figure 1 shows in plan and Fig. 2 in side elevation one of the disks with the divisions formed therein, and Figs. 3 and 4 are similar views showing the bars or arms of the disk bent in reverse directions. Both Figs. 1 and 3 also illustrate the polygonal perforation. Fig. 5 is an elevation of one end portion of the rod on which the disks are to be threaded, and Fig. 6 is a cross section of the said



rod. Fig. 7 is an elevation, and Fig. 8 an end view of one of the tubular distance pieces. Fig. 9 is a sectional elevation showing the device assembled, and placed in the water tube of a steam generator, and Fig. 10 is a cross section taken on the line X Y of Fig. 9.

Referring to the drawings, a number of metal disks are provided of a diameter slightly less than the interior diameter of the tube in which the structure is to be placed, and each of these disks 1, as at Figs. 1 and 2, is formed with a central perforation 2 of polygonal form, it being understood that such perforation may be square, hexagonal, octagonal, or a polygon having any number of sides desired.

The disk 1 is radially divided as at 3, Fig. 1 and that division is continued in a segmental course for any desired distance as at 4 and 5 upon either side of the radial division. Each of what may be termed the arms 6 and 7 thus produced is then bent out of the plane of the disk as for example as shown at Figs. 3 and 4, where one arm 7 is bent to one side, of the plane of the disk, and the other arm 6 to the other side. A rod 8 is then provided, as shown for instance at Figs. 5 and 6 in order to form a core, and the rod is of a section as shown at Fig. 6 to suit and fit the polygonal perforation 2 of the disk, the rod being formed at its ends to receive nuts or the like. Beyond this, a number of distance pieces 9, Figs. 7 and 8 are provided, consisting of short lengths of plain tube.

To assemble the described parts to form an approximate helical agitator for insertion into the water tube of a steam generator, a distance piece such as 9 is slipped over the rod 8 until it rests against the flange of the nut, or washer retained thereby, at the end of the rod, and then one of the disks is threaded over the rod 8 and allowed to pass down until it rests in contact with the distance piece. Another tubular distance piece is then passed over the rod 8 and following this the next disk is threaded onto the rod, but is not threaded onto the rod so that its radial division is in the same plane as the radial division of the first disk, but instead it is threaded on so that the radial division is in angular advance of the radial division of the first disk, that is to say the second disk is given a slight turn in respect to the first disk. This mode of assembling is continued until the rod has received its full supply of distance pieces and disks, and then they are secured on the rod by applying a nut and washer or flanged nut to the end of the said rod, and it will be found that the arms of the disks contact and slightly overlap at their ends, the arms of one disk with the arms of the disks upon either side of it and so an approximate helix is formed, and this may be of any pitch according to the

lengths of the distance pieces and the degree to which the arms are bent outward from either side of each disk. This arrangement is clearly shown at Figs. 9 and 10.

At Figs. 9 and 10 there is also shown a means by which the built-up structure is centralized in the boiler tube and the means there shown consists of two circular section parts 10 which may be united at their ends or a single part bent into a U-shape. Such a part or parts is or are slid into the tube and then the built up agitator is passed into the said tube so that the disks slide upon the said parts. Such a structure according to this invention can be easily removed from the boiler tube whatever may be the degree of incrustation, and this can be effected by removing the bar 8 from the core and immediately all the distance pieces and disks will be detached from one another and will fall down the tube or can be removed piecemeal. It will be readily understood that with such a device the pitch of the helix can be varied to any extent without complicating the construction, and that although in the device illustrated by way of example the disks are arranged so that the contacting ends of their arms form an approximate helix, yet it will be obvious that the disks may be arranged upon the rod with other than a regular angular advance and so produce a sinuous course, or even the disks might merely each have a sector-like portion cut away and then be arranged upon the rod with a desired angular advance upon one another, but I have found the helical arrangement which I have described by way of example to be the most preferable form.

Having thus described my invention, what I claim is:

1. In a device of the character described, in combination, a core rod, a number of disks threaded on said core rod, said disks having openings therein, means whereby said disks are held at the requisite distance apart, and means whereby the disks are held with their openings at the requisite angle relatively to each other in a circular direction.

2. In a device of the character described, in combination a core-rod, a number of disks threaded on said core-rod, each disk having a portion of its surface bent out of the plane of said disk, means whereby the said disks are held at the requisite distance apart and means whereby the disks are held at the requisite angle relatively to each other in a circular direction.

3. In a device of the character described in combination a core-rod, a number of disks threaded on said core-rod, each disk having a portion of its surface bent out of the plane of said disk, and tubular distance pieces also threaded upon the core-rod, whereby the disks are held at the requisite distance apart.



4. In a device of the character described in combination a core-rod, a number of disks threaded on said rod, each disk having a portion of its surface bent out of the plane of said disk, tubular distance pieces also threaded upon the core-rod, whereby the disks are held at the requisite distance apart and means whereby the disks are held at the requisite angle relatively to each other in a circular direction.

5. In a device of the character described in combination, a core-rod, said rod having a polygonal section, a number of disks threaded on said rod, each disk having a portion of its surface bent out of the plane of said disk and a central perforation of a shape to suit the core-rod and tubular distance pieces also threaded upon the core-rod, whereby the disks are held at the requisite distance apart.

6. In a device of the character described, in combination, a core-rod, said rod having a polygonal section, a number of disks threaded on said rod, each disk being provided with a radial division and with segmental divisions forming arms, said arms being bent out of the plane of the disk and tubular distance pieces also threaded upon the core-rod, whereby the disks are held at the requisite distance apart.

7. In a device of the character described, in combination, a core-rod, said rod having a polygonal section, a number of disks threaded on said rod, each disk being provided with a central perforation of a shape to suit the core-rod and with a radial division and segmental divisions forming arms, said arms being bent out of the plane of the disk, the said disks being located upon the core-rod at angles in advance of each other in a circular direction and tubular distance pieces also threaded upon the core-rod, whereby the disks are held at the requisite distance apart.

8. In a device of the character described, in combination, a core-rod, said rod having a polygonal section, a number of disks threaded on said rod, each disk being provided with a central perforation of a shape to suit the core-rod and with a radial division and segmental divisions forming arms, said arms being bent out of the plane of the disk, the said disks being located upon the core-rod at angles in advance of each other in a circular direction, the arms of a disk contacting with the arms of other disks whereby an approximate helical passage is produced, and tubular distance pieces also threaded upon the core-rod whereby the disks are held at the requisite distance apart.

9. In a device of the character described, in combination, a core-rod, said rod having a polygonal section, a number of disks, each disk being provided with a central perforation of a shape to suit the core-rod and with a radial division and segmental divisions forming arms, said arms being bent out of the plane of the disk, the said disks being threaded on the core-rod at angles in advance of each other in a circular direction and the arms of a disk contacting with arms of other disks whereby an approximate helical passage is produced, tubular distance pieces also threaded upon the core-rod, whereby the disks are held at the requisite distance apart and means provided upon the ends of the core-rod whereby the whole structure is held together, substantially as described.

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

JOSEPH LÉON MARIE ALPHONSE REIS.

Witnesses:

GREGORY PHELAN,  
T. L. HAYE.