

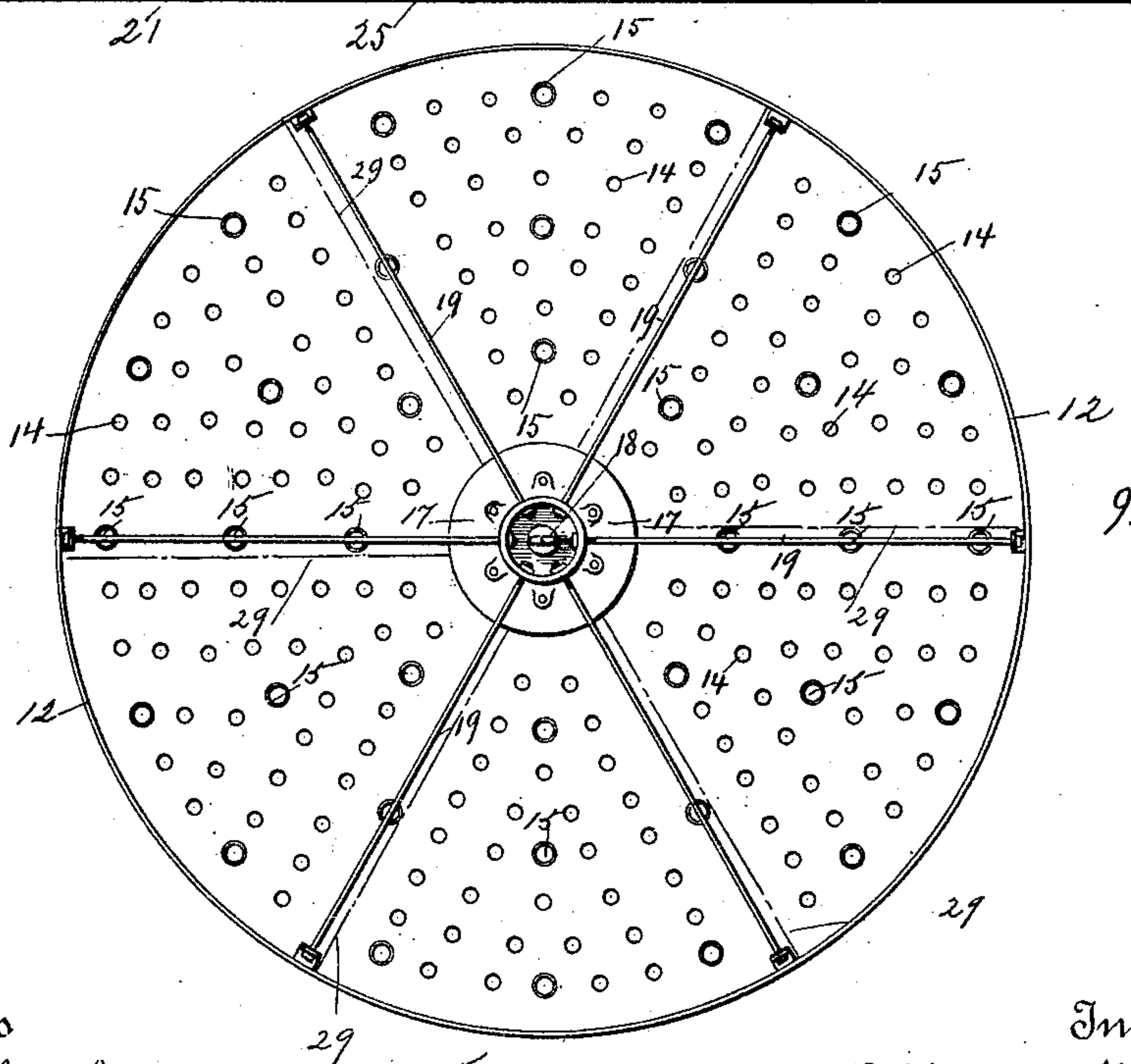
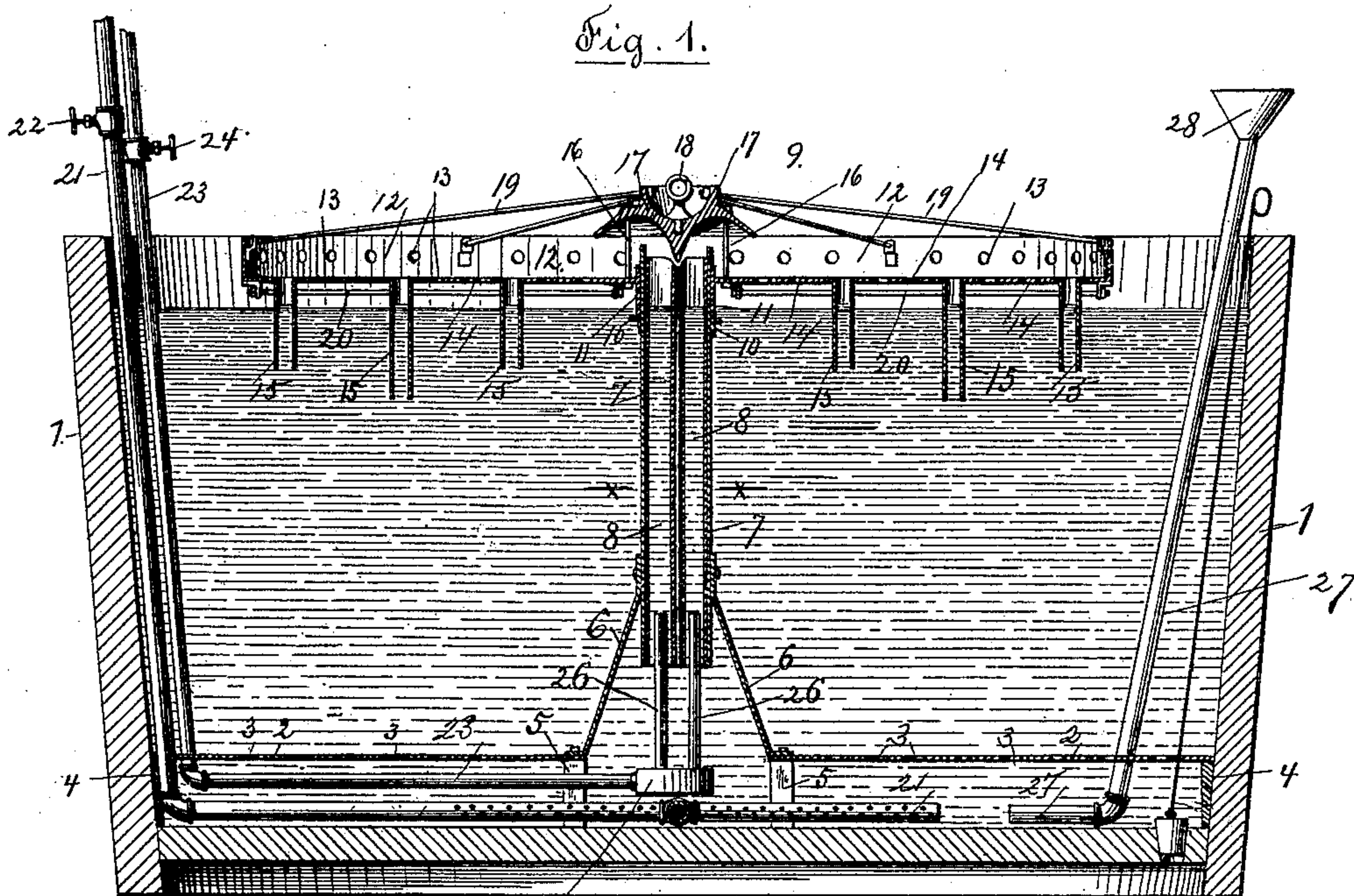
(No Model.)

2 Sheets—Sheet 1.

A. A. SPRAGUE.
APPARATUS FOR DYEING.

No. 410,744.

Patented Sept. 10, 1889.



Witnesses
Chas. F. Schmelz,
J. B. Dewey

Inventor
Albert A. Sprague,

By his Attorney
John C. Dewey

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Fig. 3.

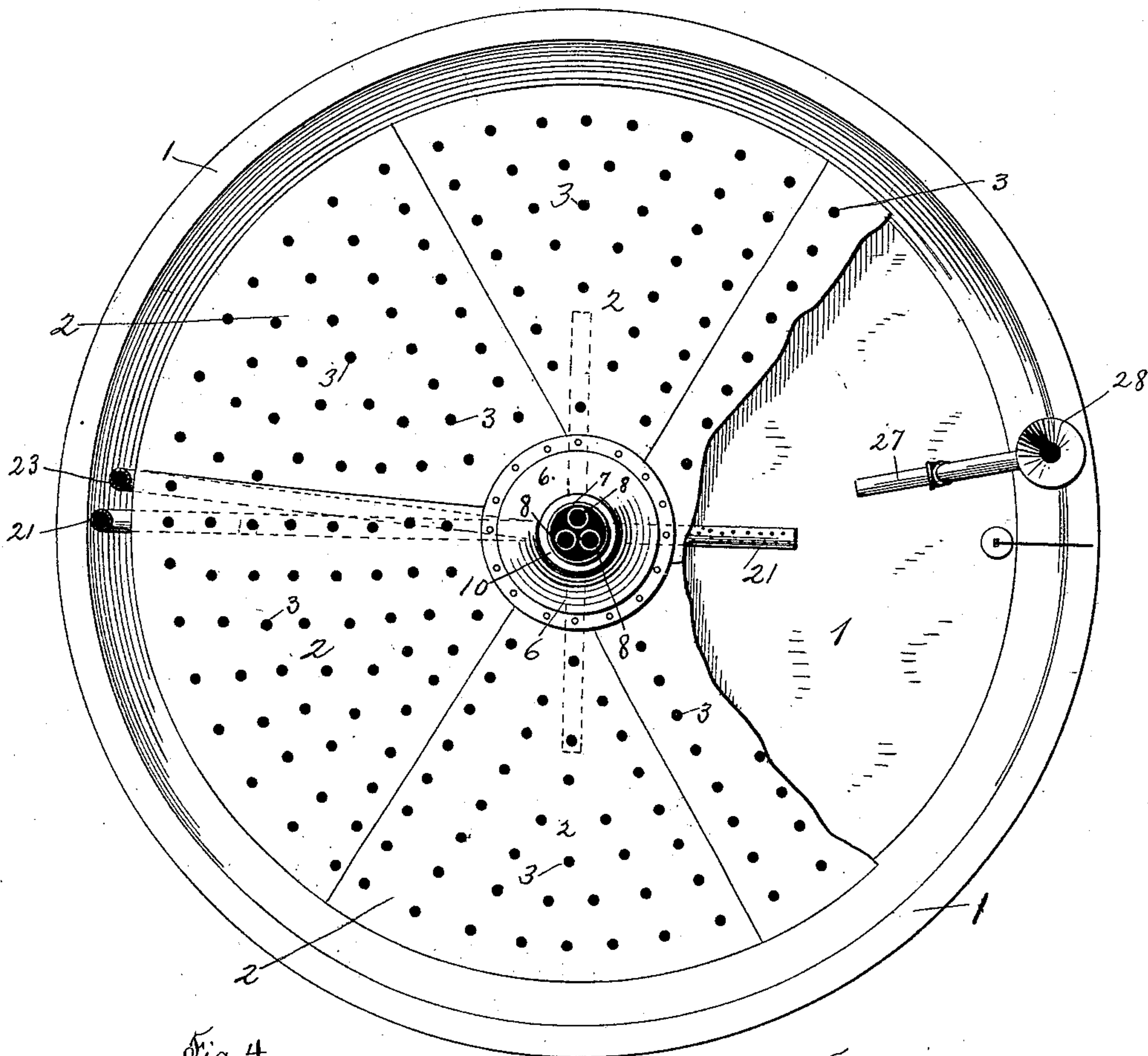


Fig. 4.

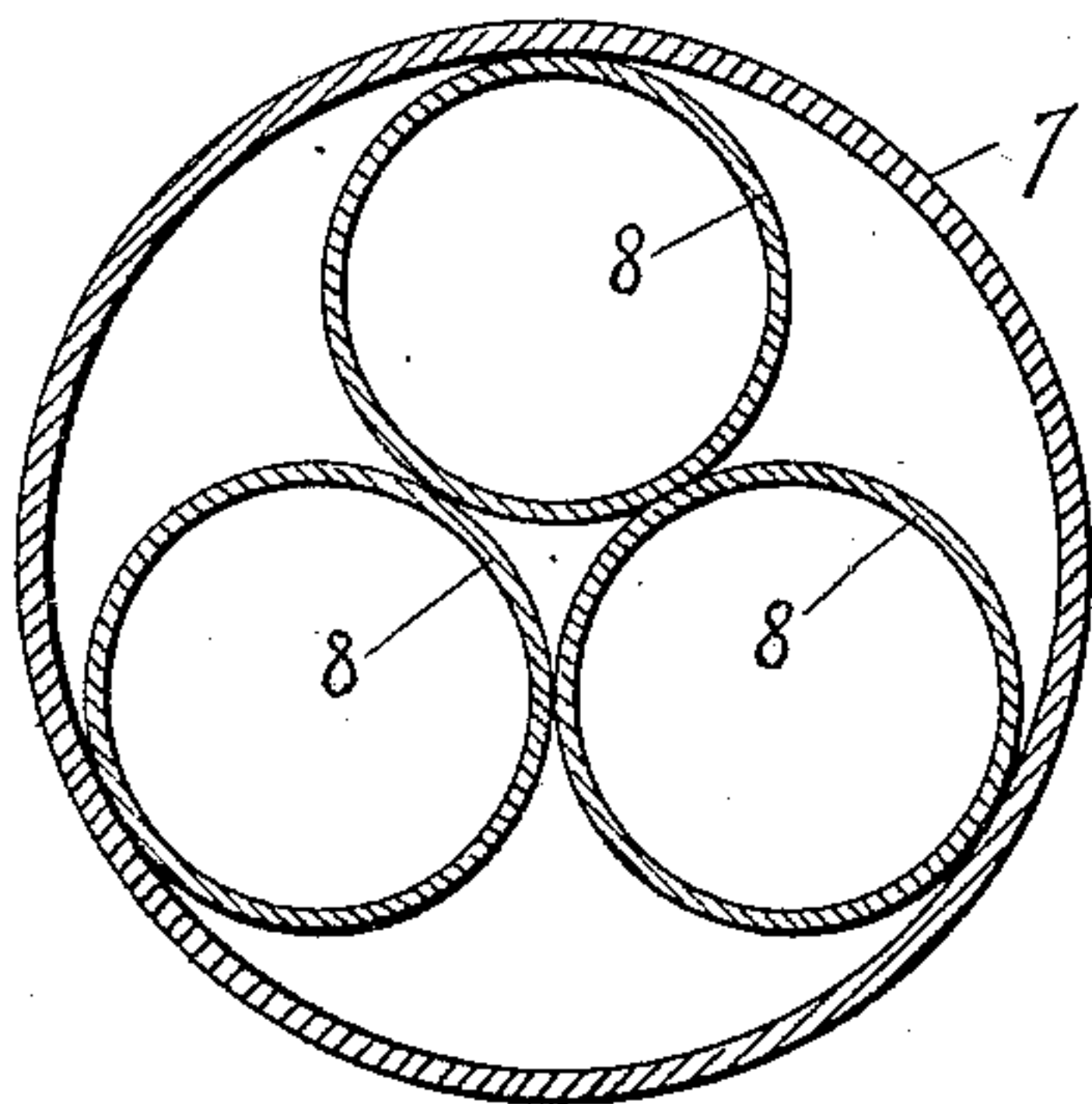
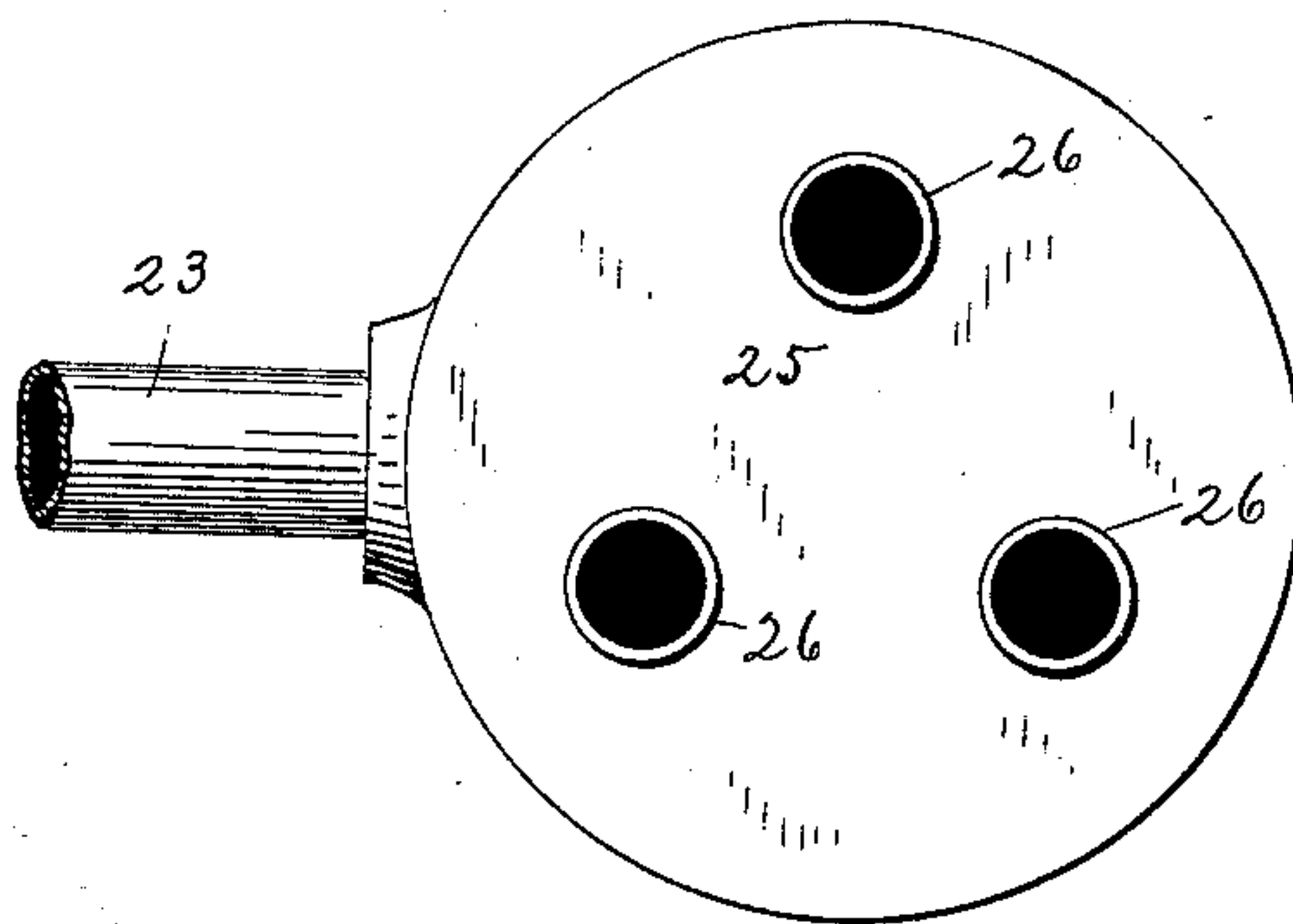


Fig. 5.



Witnesses
Chas. F. Schmeltz,
S. B. Dewey.

Inventor
Albert A. Sprague,

By his Attorney
John C. Dewey.

UNITED STATES PATENT OFFICE.

ALBERT A. SPRAGUE, OF UXBRIDGE, MASSACHUSETTS.

APPARATUS FOR DYEING.

SPECIFICATION forming part of Letters Patent No. 410,744, dated September 10, 1889.

Application filed June 20, 1889. Serial No. 314,947. (No model.)

To all whom it may concern:

Be it known that I, ALBERT A. SPRAGUE, a citizen of the United States, residing at Uxbridge, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Dyeing Apparatus; and I do hereby declare that the following is a full, clear, and exact description thereof, which, in connection with the drawings making a part of this specification, will enable others skilled in the art to which my invention belongs to make and use the same.

My invention relates to an apparatus for dyeing wool or other material of a fibrous nature; and it consists in certain novel features of construction of said apparatus, as will be hereinafter fully described, and the nature thereof indicated by the claims.

The object of my invention is to improve upon the construction of the apparatus for dyeing wool or other material now in general use and to produce a more thorough circulation of the dye-liquid and cause the wool or other material to be more thoroughly and evenly impregnated with the dye automatically than has been done heretofore.

Referring to the drawings, Figure 1 is a central vertical section of a dyeing apparatus of my improved construction. Fig. 2 is a plan view of the perforated distributing-pan removed. Fig. 3 is a plan view of the tub with the perforated distributing-pan removed and the false perforated bottom partially broken away. Fig. 4 represents, on an enlarged scale, a horizontal section through the central pipe, as indicated at *x*, Fig. 1; and Fig. 5 represents a plan view, on the same scale as Fig. 4, of the steam-pipe end or chamber extending under the central pipe. (See Fig. 1.)

In the accompanying drawings, 1 is a tub of circular form with solid sides and bottom and open at the top. In the lower part of the tub near the bottom is a false bottom 2, made of metal plates and having holes or perforations 3 therein. The false bottom 2 rests at its outer edge upon a projection or shoulder 4, extending out from the inner surface of the tub 1, (see Fig. 1,) and at its inner edge upon posts or stands 5 in any ordinary way. There

is a central opening in the false bottom 2, 50 which is encircled by a cone-shaped pipe 6, resting upon the bottom 2.

To the upper part of the cone-shaped pipe 6 is attached a vertical pipe 7, whose interior space is divided longitudinally into three or more parts by partitions or small pipes—in this instance by three small pipes 8. 55

Upon the upper end of the pipe 7 is placed the removable perforated distributing-pan 9—in this instance supported on said pipe by means of a projection or shoulder 10, extending around the pipe 7, the pan 9 having a central opening provided with a collar 11, which fits over the upper end of the pipe 7 and rests on the shoulder 10. The distributing-pan 9 is of less diameter than the diameter of the tub 1, and has an upwardly-projecting rim 12, extending around its outer edge, which is preferably provided with holes or perforations 13, as shown in Fig. 1, and said pan has numerous holes or perforations 14 in its bottom, and from some of said holes extend small pipes 15 of varying length down into and opening beneath the surface of the dye-liquid in the tub 1. 60 65 70 75

Above the center of the pan 9 is supported and secured to said pan—in this instance by means of vertical bolts 16—the inverted-cone-shaped deflector 17, which is situated over the open end of the pipe 7 for the purpose of spreading and deflecting onto the pan 9 the dye-liquid which passes up through said pipe 7. The deflector 17 has in this instance a ring 18 attached thereto, to furnish means for removing said deflector, and the distributing-pan 9 attached thereto from the tub 1. Rods 19 extend from the deflector 17 to the rim 12 of the pan 9 to brace and support the outer part of said pan. Additional rods 20 may be employed, extending under the pan, to support and strengthen the same. 80 85 90

A steam-pipe 21, for heating the dye-liquid, provided with a valve 22, extends down the side of the tub 1 and under the false perforated bottom 2, and has two perforated branch pipes extending out therefrom. (See dotted lines, Fig. 3.) Through perforations in said pipe 21 and the branch pipes extending out 95

therefrom the steam passes to heat the dye-liquid in the tub.

A second steam-pipe 23, provided with a valve 24, extends down the side of the tub 1, preferably next to the pipe 21, and under the false perforated bottom 2. At the inner end of the pipe 23 is attached an inclosed chamber 25, (see Fig. 5,) from the upper side of which extend small pipes 26, entering into each of the pipes 8, or divisions in the central pipe 7.

A pipe 27, provided with a funnel-shaped top 28, extends down at one side of the tub 1, with its inner end open and extending under the false bottom 2, so that the dye-liquid may be added to the liquid in the tub at the bottom thereof.

The perforated distributing-pan 9 may, if desired, have partitions or divisions extending from the center to the rim, as indicated by lines 29 in Fig. 2, to divide up the bottom surface of the pan into different parts for the purpose of securing a more even distribution of the liquid in the bottom of the pan.

From the above description, in connection with the drawings, the operation of my improved dyeing apparatus will be readily understood by those skilled in the art, and is as follows: The perforated distributing-pan 9 is first removed, and then the dye-liquid is put into the tub and the wool or other material to be dyed is put in. The pan 9 is then placed on the pipe 7 and fitted in place. Steam is let on through the pipe 23, which passes through the chamber 25 into the small pipes 26 and out into the pipes 8, extending up through the central pipe 7. The steam forces the liquid up through the pipes 8, and causes it to strike against the deflector 17 and overflow into the pan 9, from which it passes through the perforations 14 and the small pipes 15 in said pan onto and into the dye-liquid in the tub 1 and the wool or other stock in said liquid. As all the liquid which passes up through the central pipe 7 must come from beneath the false perforated bottom 2, it follows that as fast as the liquid is withdrawn the liquid above the false bottom 2 will pass down through the perforations in said false bottom to take the place of the liquid withdrawn. In this way a constant circulation of the dye-liquid is kept up through the small pipes 8 and the central pipe 7 onto the distributing-pan 9, from which, by means of the rim 12, it is evenly distributed and passes through the holes 14 onto the top surface of the liquid and the stock in the tub, and through the small pipes 15, extending down into the dye-liquid, it is carried into the body of the liquid and the stock.

In order to boil the dye-liquid, steam may be let on through the pipe 21, and when the liquid gets well to boiling the valve 24 in steam-pipe 23 may be closed, as the boiling of the liquid with pipe 21 will keep up suffi-

cient circulation, causing the liquid to pass up through the small pipes 8 in the central pipe 7, and also to pass up through the spaces around said pipes 8. (See Fig. 4 in the pipe 7.)

In case it is desired to add more dye-stuff without removing the stock in the tub 1 it can be done by pouring it into the pipe 27, which carries it to the bottom of the tub under the false perforated bottom 2.

The advantages of certain features of my dyeing apparatus will be appreciated by those skilled in the art. By dividing the central pipe 7 up into a number of different divisions longitudinally and introducing a separate pipe to carry the steam into each division I am enabled to divide up the body of the liquid in the central pipe 7, and cause the liquid to flow up through the divisions in the central pipe 7 more quickly, and out of the top thereof onto the distributing-pan 9, and cause a more thorough circulation of the liquid in a shorter time. By means of the perforated distributing-pan 9, having a rim around its edge, I cause the liquid to pass through the perforations or holes in the bottom of said pan, and I thus cause the dye-liquid to be more evenly distributed upon the surface of the liquid in the tub and upon the wool or other stock in said tub, and, further, by means of the small pipes 15 of varying length, extending down from the bottom of the distributing-pan 9 into the dye-liquid and into the wool or other stock floating around in the tub, I cause the dye-liquid to be carried directly onto and into the wool itself, thus more thoroughly and evenly impregnating the wool with the dye and producing much better results than where the dye-liquid simply drops upon the surface of the liquid in the tub or upon the wool or other stock in the same, as heretofore.

Having thus described my invention in dyeing apparatus, what I claim as new, and desire to secure by Letters Patent, is—

1. In a dyeing apparatus, the combination, with a tub having a false perforated bottom and steam-pipes entering the tub and extending under the false perforated bottom, of a central pipe extending up from the perforated bottom and divided longitudinally into two or more divisions and steam-pipes extending into said divisions, and a removable perforated distributing-pan of less diameter than the diameter of the tub, supported upon the upper part of the central pipe and provided with a deflector extending over the upper open end of the central pipe, and small pipes extending from holes in the bottom of the distributing-pan into the body of the liquid in the tub, for the purpose stated, substantially as set forth.

2. In a dyeing apparatus, the combination, with a tub having a false perforated bottom and a central pipe extending up therefrom, of a distributing-pan supported upon the

central pipe above the liquid in the tub and having an upwardly-projecting rim extending around its outer edge and holes in its bottom, and small pipes leading down from some
5 of said holes below the surface of the liquid into the body of the liquid, and a deflector supported above the open end of the central pipe, all substantially as shown and described.

ALBERT A. SPRAGUE.

Witnesses:

JOHN C. DEWEY,
SARAH B. DEWEY.