

No. 708,808.

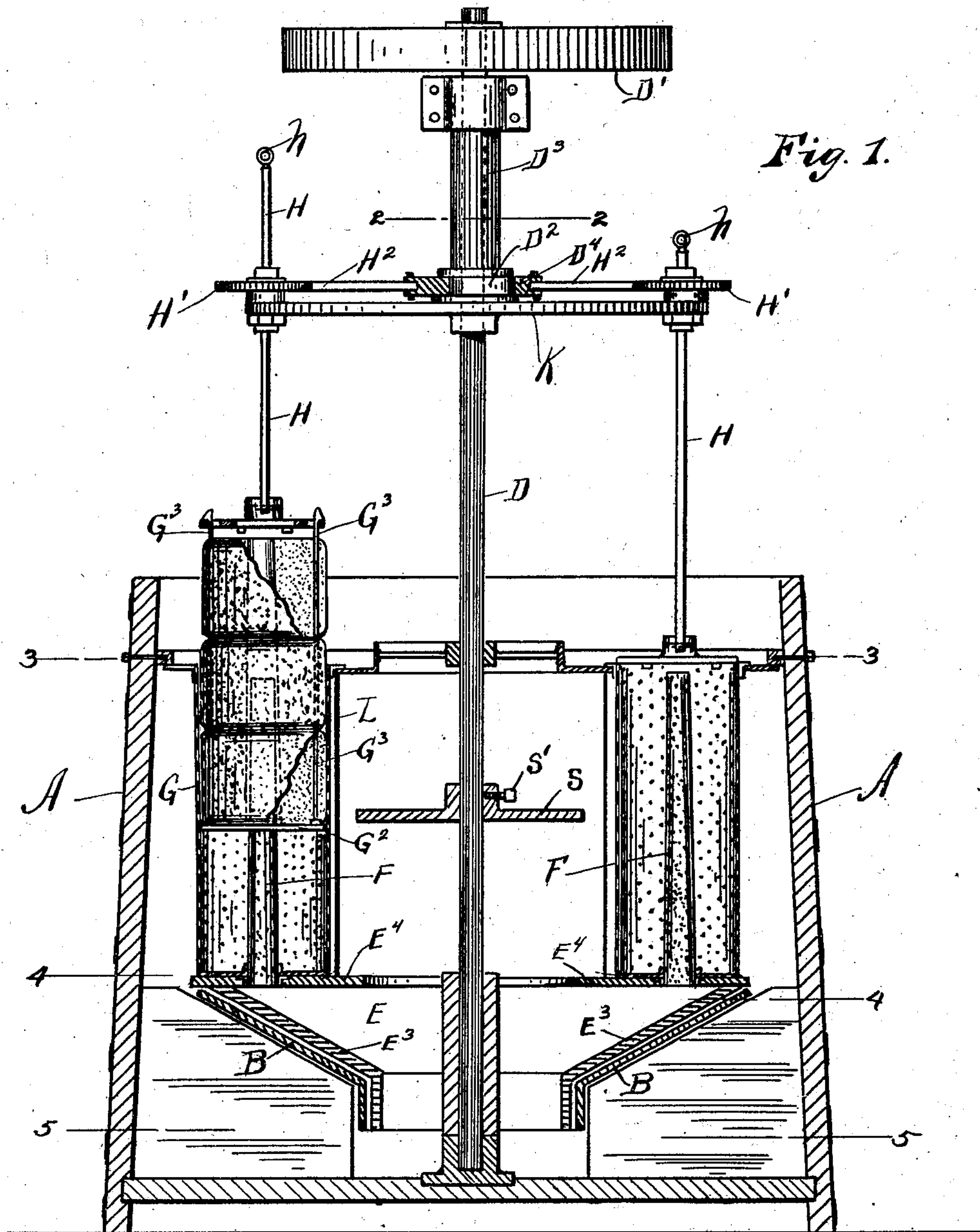
Patented Sept. 9, 1902.

C. M. HANSON.
APPARATUS FOR DYEING SLIVERS.

(Application filed Dec. 14, 1901.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses.

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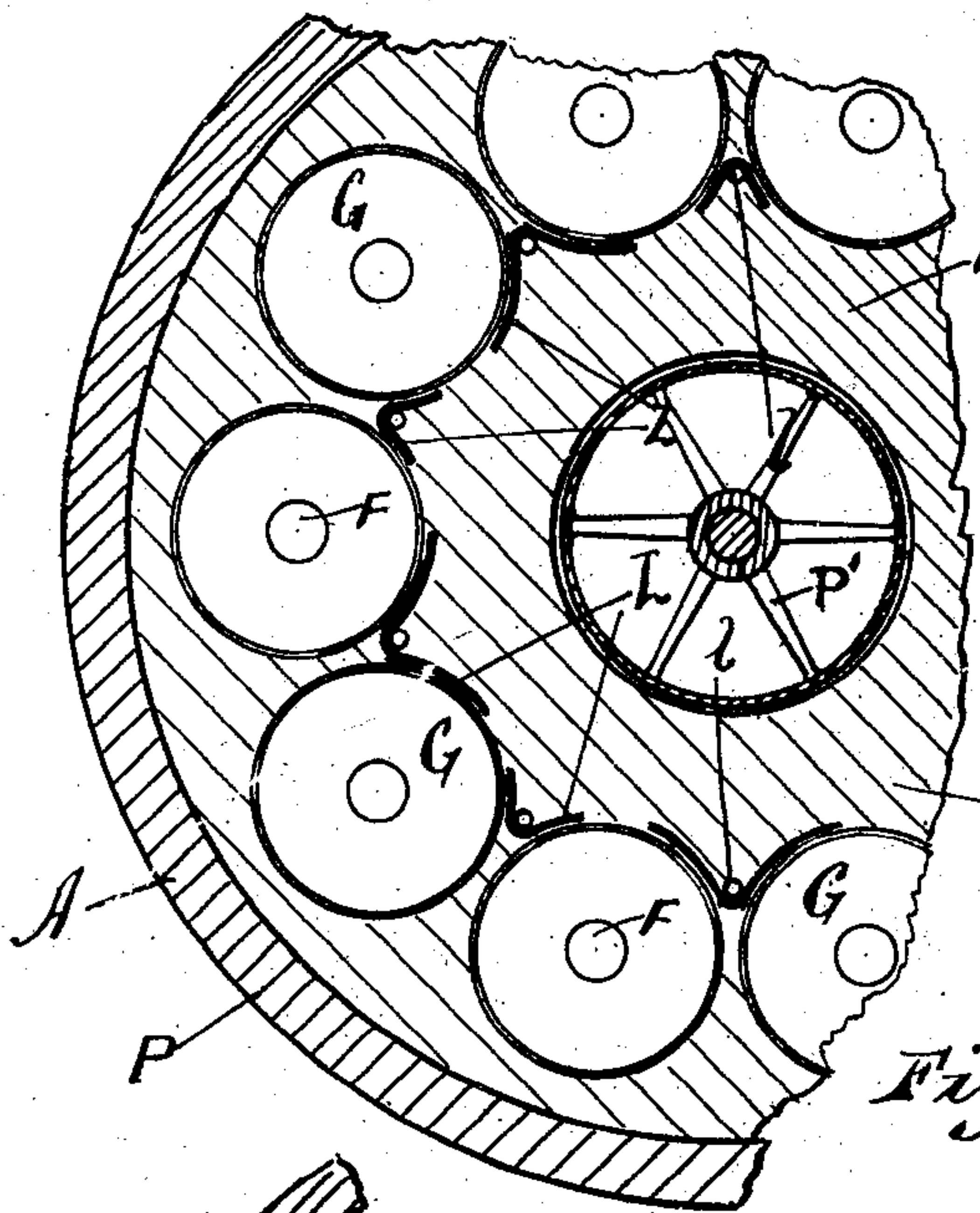


Fig. 3.

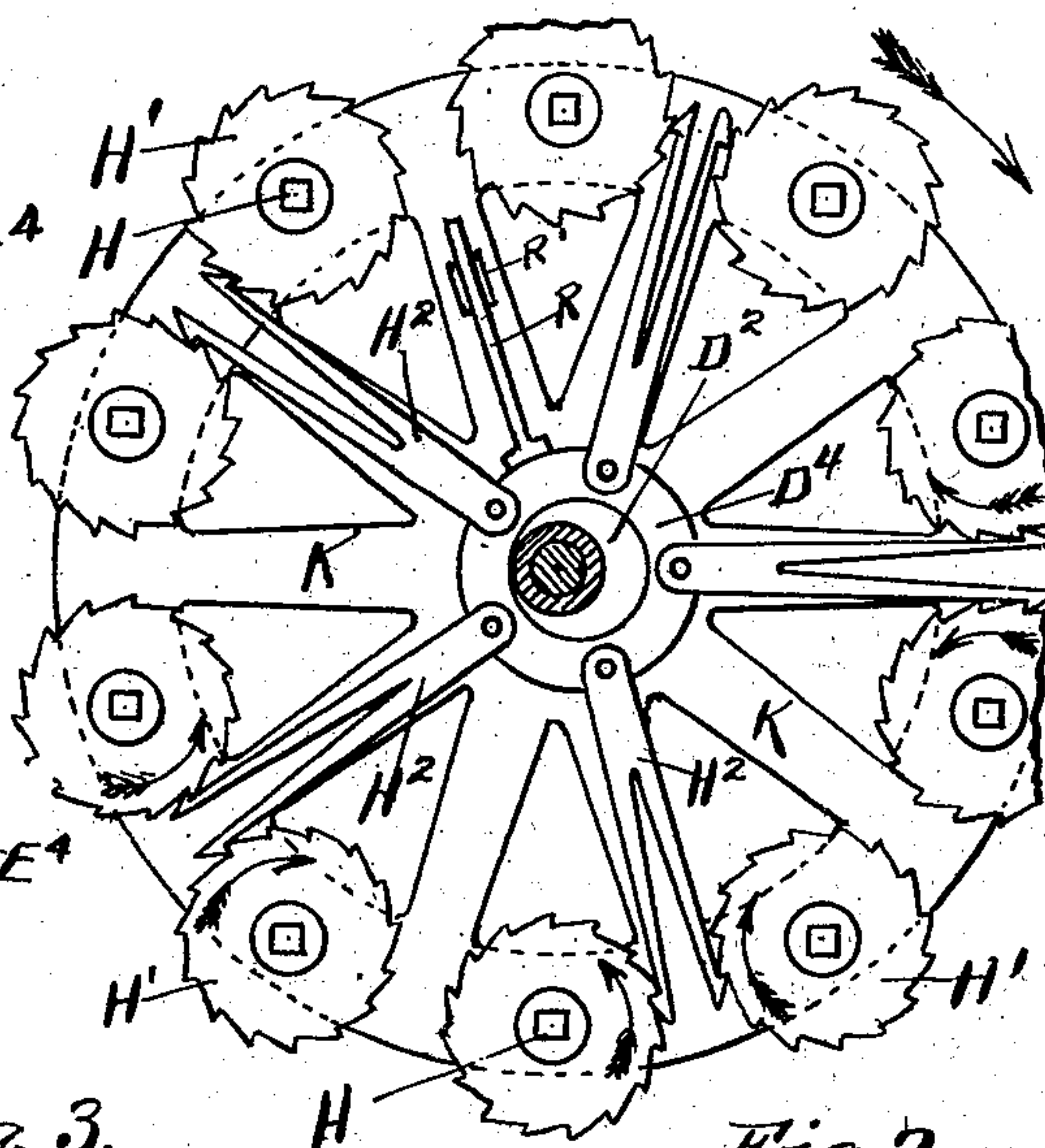


Fig. 2.

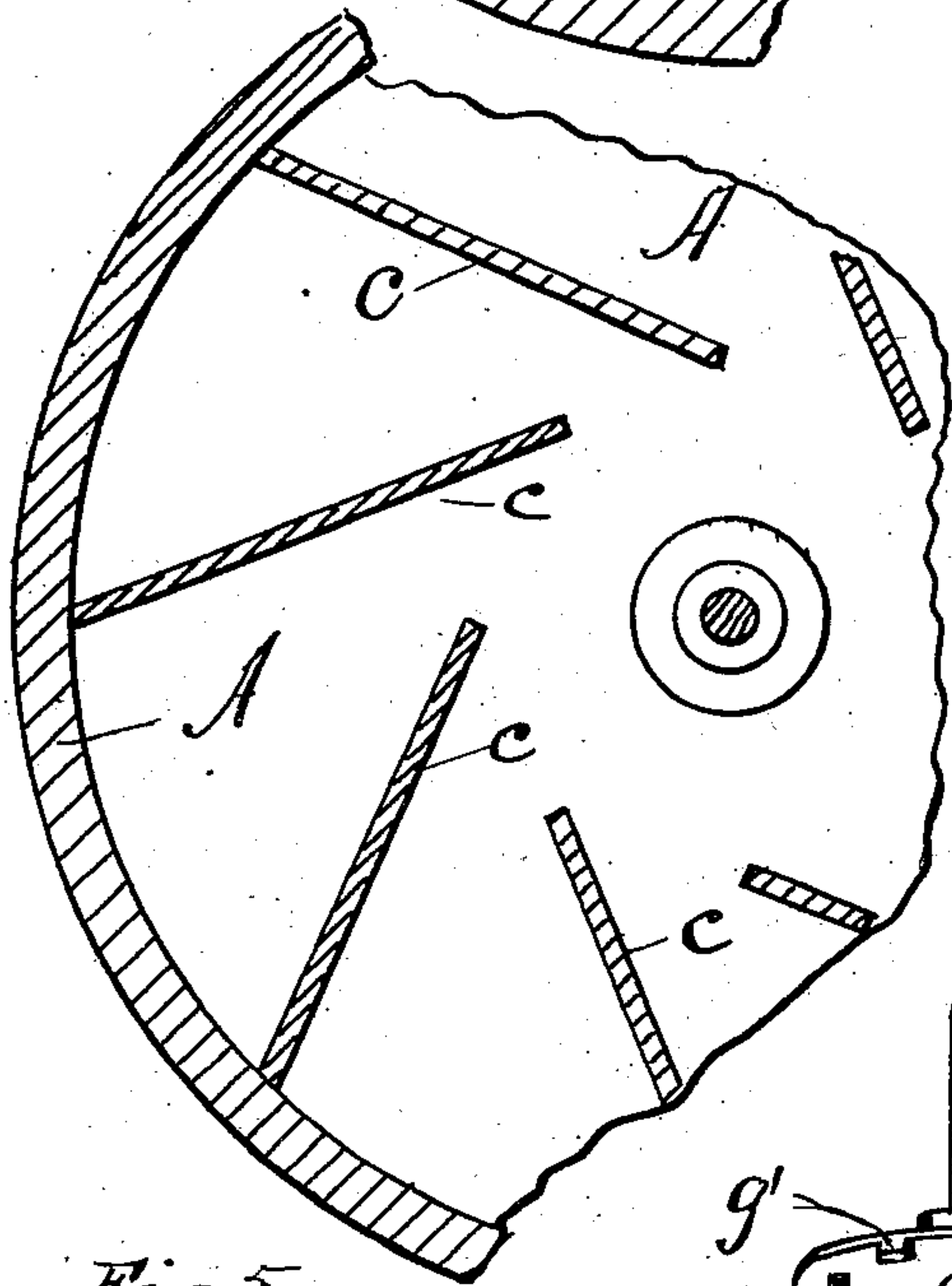


Fig. 5.

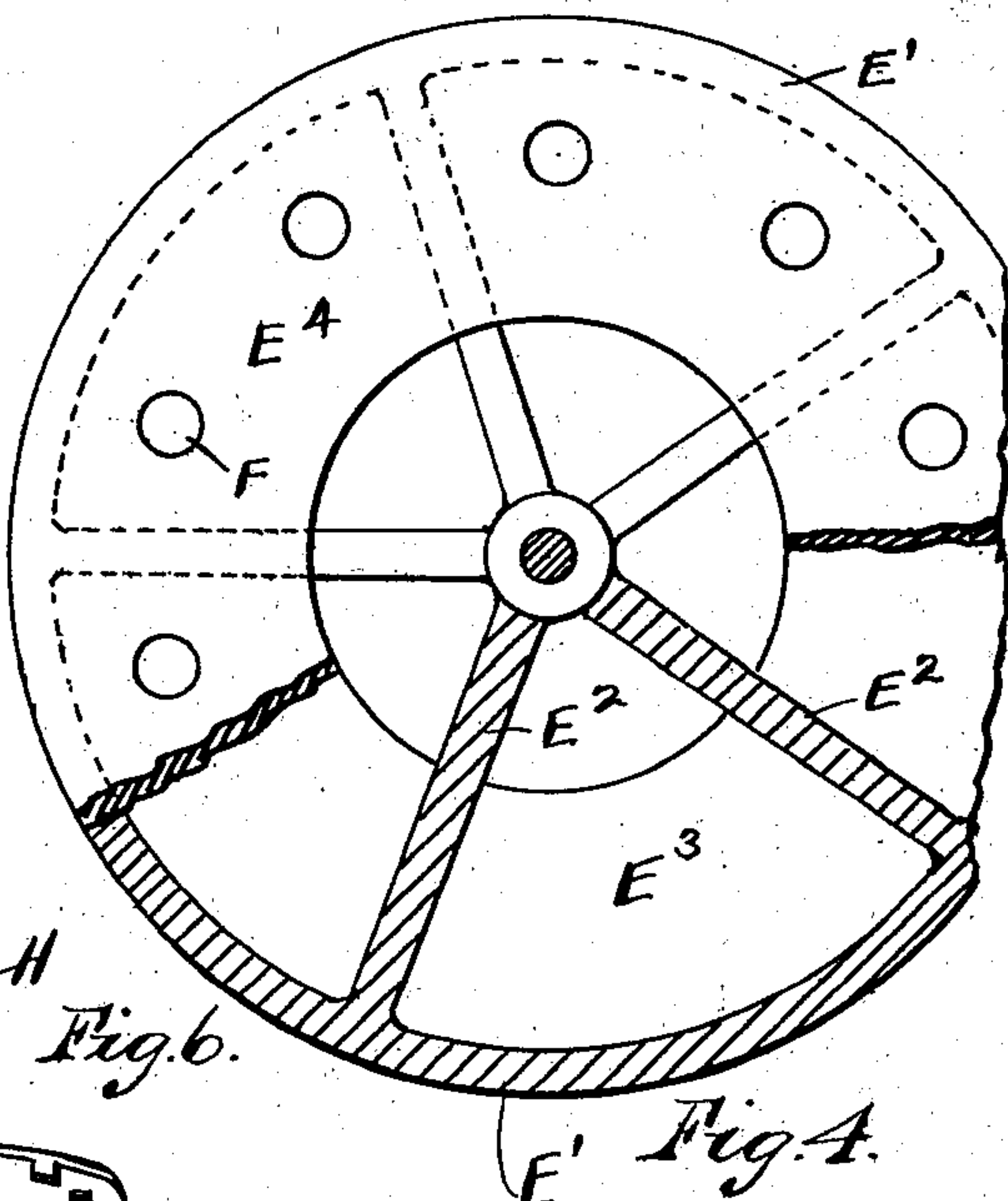


Fig. 4.

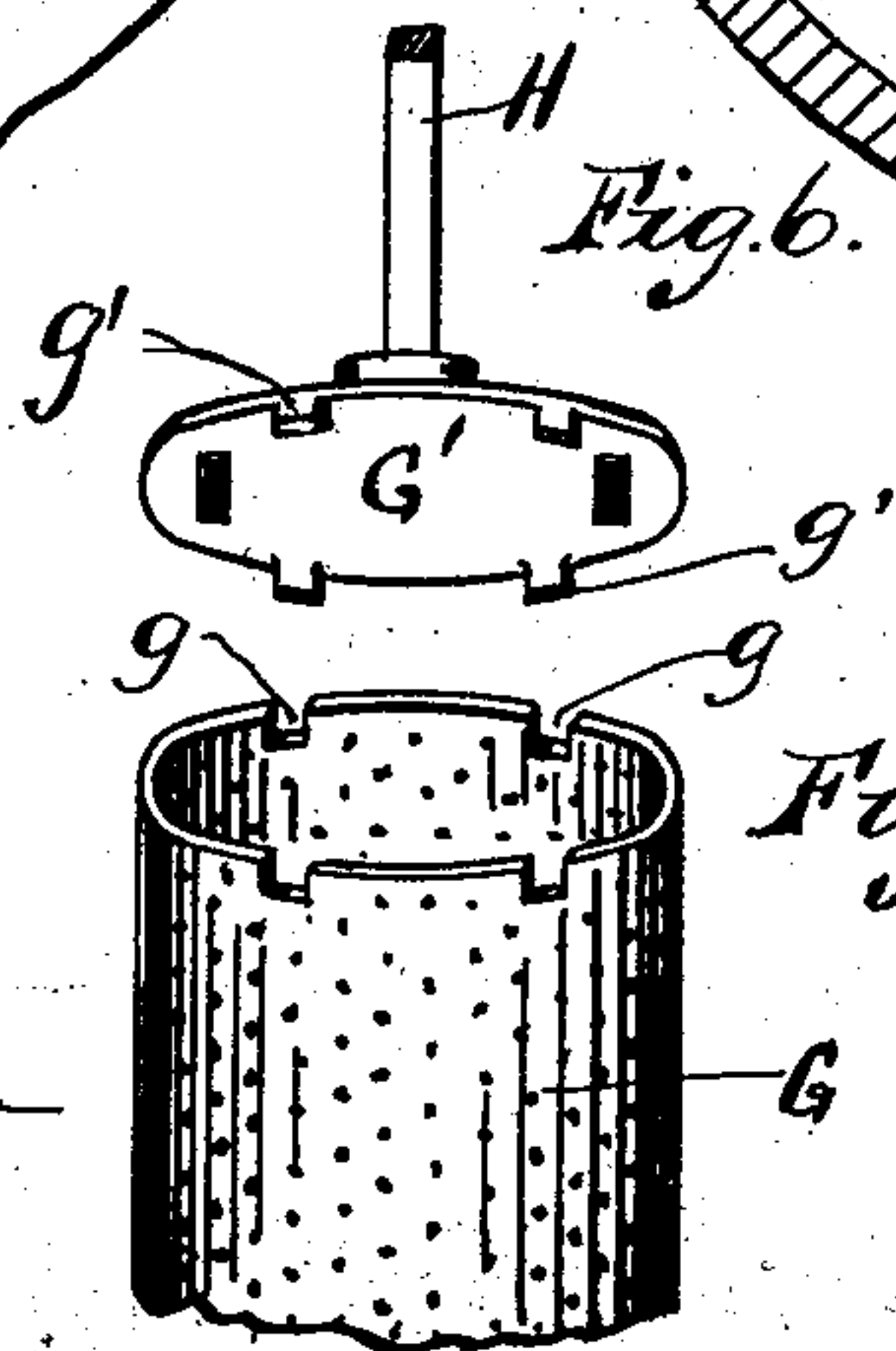


Fig. 7.

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UNITED STATES PATENT OFFICE.

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APPARATUS FOR DYEING SLIVERS.

SPECIFICATION forming part of Letters Patent No. 708,808, dated September 9, 1902.

Application filed December 14, 1901. Serial No. 85,917. (No model.)

To all whom it may concern:

Be it known that I, CHARLES M. HANSON, a citizen of the United States, residing in Peacedale, in the county of Washington and State of Rhode Island, have invented a new and useful Improvement in Apparatus for Dyeing Slivers Wound into Tops or Cheeses, of which the following, with the accompanying drawings, is a description.

My invention is designed more especially for the dyeing of wool, and I have heretofore taken the sliver as it is wound into the tops or cheeses about eighteen inches in diameter after having come from the first gill-box, although undoubtedly it is not absolutely essential to the proper working of my invention and apparatus that the sliver be taken at that exact point in its manufacture into yarn, but would also prove practical to a greater or less extent whenever the sliver is wound into such balls.

In the drawings, Figure 1 is an elevation of my apparatus almost wholly in section upon a diameter thereof. Fig. 2 is a plan, upon line 2 2 of Fig. 1, of the ratchet-wheels and ratchets for rotating the perforated cans. Fig. 3 is a plan of a portion of the apparatus upon line 3 3 of Fig. 1, showing the disposal of the perforated cans in a circle in a supporting circular framework. Fig. 4 is a plan on line 4 4 of Fig. 1, showing the construction of the rotating wheel. Fig. 5 is a sectional plan on line 5 5 of Fig. 1; and Figs. 6 and 7 show details of the tops of the perforated cans, as hereinafter described.

My apparatus consists of a circular tank A A, Figs. 1 and 5. Near its bottom it has a partial inclined floor B, Fig. 1, so constructed as to leave a central circular opening through it and so as not to extend to the outer walls of the tank. It is preferably supported upon strips C C, Fig. 5, which I have called "wings," extending diagonally from the outer walls of the tank to the open space in the center. An upright shaft D, Fig. 1, is mounted in the center of the tank and driven by a pulley D'. Attached to the shaft D to be rotated by it and located just above the floor B is a wheel (shown in Fig. 1 and separately in Fig. 4) consisting of a rim E', spokes E², tapering from the center outwardly, as shown in Figs. 1 and 4, and two coverings

E³ and E⁴, one attached to the tops of the spokes and the other attached to their under sides. These coverings E³ and E⁴ cover the same portion of the space near the bottom of the tank as the partial floor B, leaving the same central opening and the same open space between the wheel and the walls of the tank, and the lower covering E³ conforms to the inclination of the floor B. The entire wheel is made to rotate as near the floor B as is practical. The construction of the entire wheel E will be seen to consist of pockets opening into the central open space and closed at their outer edge by the rim E' of the wheel, (see Fig. 1,) and it will be shown hereinafter that the dye liquor will enter these pockets when the machine is operated. Round cans G G, about fifteen inches in diameter and, say, thirty-six inches in height, made, preferably, of sheet-copper and perforated as fully as possible with holes about one-eighth of an inch in diameter, are supported by the wheel E and disposed in a circle thereon close to one another, so as to constitute substantially the outer perforated circumference of an extractor. In the center of each can is an upright hollow tube F, perforated throughout its length, but closed at its top. These tubes preferably pass through the bottoms of the cans G G and holes in the covering of the wheel E, so that they communicate with the pockets of the wheel. The tubes F (or any equivalent construction) fit loosely into the holes in the covering of the wheel, so that the cans G G can be rotated upon them as axes. Fig. 3 of the drawings shows the arrangement of these cans side by side in a circle, supported at their tops by a circular cover or framework P, attached to the shaft D by arms P'. The construction thus far described shows that by the rotation of the wheel E by means of the pulley D' these cans are revolved around the central shaft D of the machine; but in addition to this circular motion I cause each can to rotate in the following manner: In the top edge of each can there are cut notches g, (see Fig. 7,) and the solid cover G', Fig. 6, is provided with lugs g' to enter these notches. Square upright shafts H H are attached to the covers G', (see Figs. 1 and 6,) so that when these shafts are rotated the covers, and consequently the cans G G, are rotated there-

by. At a sufficient height above the tops of the cans is another wheel K, of light construction, (shown separately in Fig. 2, and see also Fig. 1,) which is attached to the shaft D to rotate with it, and mounted in this latter wheel are ratchet-wheels H' H', (see Fig. 2,) so attached to the rim of the wheel K as to prevent them from being lifted off the rim, but to permit them to rotate freely upon their axes. The square shafts H H pass through the hubs of the ratchet-wheels H' H', the opening through the tubes being square to loosely fit the shafts. There is a cam D², Fig. 2, surrounding the shaft D, but rigidly attached to the foot of the bearing D³, Fig. 1, so as to be stationary, and a strap D⁴, Fig. 2, of ordinary construction, surrounds the cam. Attached to the cam-strap are elastic or spring rods H², with hooks in their ends to engage the notches of the ratchets on the wheels H' H'. These rods H² are conveniently made in pairs and split, as shown in the drawings, Fig. 2, to engage two adjoining ratchets. A rod R is rigidly attached to the strap D⁴ and extends outwardly over the wheel K, and an upright piece R' is attached by a pivot-joint to its outer end and by a similar joint to the wheel K, so as to permit the arm to have a longitudinal motion, but to compel it, and consequently the strap D⁴, to which it is attached, to rotate with the framework and other parts of the extractor. This rod R is not necessary when the apparatus is run at a comparatively low speed, as the strain on the rods H² will carry the strap D⁴ of the cam D² around with it, and the cam will give the longitudinal motion to the rods H² required to turn the ratchet-wheels H' H', and by means of the square shafts H H, the covers G' G' with their lugs fitting the recesses in the cans G G, the latter will be partially rotated upon their axes for every rotation of the shaft D and its connected parts.

Each of the cans G G has a false bottom G², (see Fig. 1,) with two elastic or spring rods G³ G³ attached to it, extending upward the length of the cans and passing through slots in the cover G' in such a way that the notched ends of the rods will spring over the cover to connect the false bottom with the cover, but permitting them to be readily separated by the elasticity of the rods. Each of the square shafts H H has an eye h in its upper end, into which a tackle can be fastened when unloading the machine, as hereinafter described.

As already described, the cans G G, with the mechanism for rotating them, are arranged in a circle upon the lower wheel E and are placed as close to one another as possible. Between the cans and each one overlapping two adjoining cans to a greater or less extent are plates L L, Figs. 1 and 3, which extend the entire height of the cans. They may readily be supported and retained in proper position by upright rods l l in their centers. These plates are preferably of two widths, every alternate one being sufficiently wide to overlap its cans to a point about on the di-

ameter of the apparatus, while the others are only sufficiently wide to cover the spaces between the cans and to overlap them only to the least possible extent. The object of this difference will be explained later on. A round disk or cover S is arranged upon the shaft D so that it can be slid up and down and fastened at any point by a set-screw S'. This cover is of a size sufficient to cover the central opening in the covering E⁴ when it is slid down upon it, as hereinafter explained.

In operating the apparatus the false bottoms G² G² are dropped into the cans without the covers. The tops or cheeses are forced into the cans around the tubes F F, it being preferable to have them fit into the cans tightly and the cans being preferably made several inches smaller in diameter than the tops for this reason. When the cans are filled, the covers G' G' are put on over the spring-rods G³ G³ and with the lugs of the cover fitting into the recesses of the cans, and the apparatus is ready for operation. When the wheel E is rotated at a moderate speed only, the centrifugal action is sufficient to cause the dye liquor to mount into the tubes F F from the pockets of the wheel, and as the speed increases the liquor is forced upwardly into them very strongly. This occurs even when the apparatus is filled with liquor only to a level considerably lower than the upper floor E⁴ of the wheel E. It thus becomes possible to operate the machine in either of two ways—namely, first, by filling it from one-half to three-quarters full (depending somewhat upon the tendency to foam of the dye liquor used) and permit it to be thrown outwardly from the center through the perforated cans as well as upwardly into the tubes F F and thence outwardly through their perforations, or, secondly, by placing only sufficient liquor in the apparatus to partially fill the wheel-pockets when the apparatus is at rest, and thereby use only the tubes F F to effect the dyeing. In the latter method the cover S is slid down upon the shaft D to cover the central opening in the upper floor E⁴ of the wheel and there fastened with its set-screw in order to prevent the liquor from splashing up, as any such splashing under the high speed used in thus operating the machine is apt to mat the tops more or less in the cans. In the first of these methods of operation the resistance of the liquor around the extractor is considerable, and a comparatively low speed can only be used, but is effective. In the second method the liquor comes from the perforated cans in a fine spray, and there is comparatively little resistance therefrom, so that it is possible to get the penetrating power given by a high speed of the extractor. Both methods have their advantages. It is difficult or impossible to obtain good results with very light colors without the use of the tubes F F, although it is not necessary to use them alone in order to do so; but because of the high speed possible and the smaller amount

of dye liquor used it is frequently advantageous to use the tubes only. Upon the other hand, it is not possible to use the tubes F F alone with colors which will oxidize readily in the air when finely divided into spray, as is the case, for example, with indigo. In either method of operating it the dye liquor passes down between the cans and the outer walls of the tank under the partial floor B and back to the center, the wings or plates C C completely preventing any tendency the liquor may have to continue its rotary motion under the floor, although their presence could be dispensed with without entirely preventing the action of the machine, or if these wings are retained the false floor B may be entirely omitted. As the liquor again reaches the center it will mount upward through the central opening in the wheel E into the pockets thereof and the tubes F F, and if the first of the above methods of operation is being employed a portion of the liquor will also pass upward into the center of the apparatus between the perforated cans, to be again thrown out through the latter. When the dyeing is complete, the liquor is drawn from the apparatus, and water or other chemicals may be introduced to wash or further effect the dyeing, and after the latter is also withdrawn the speed is preferably increased for a few minutes, if the first of the above methods has been used, in order to extract a portion of whatever liquid remains in the tops. The machine then being stopped, a small tackle is successively fastened in the several eyes h h and the false bottoms of the cans thus pulled out, thereby lifting the dyed tops from the cans. It will be seen that the plates L L prevent the liquor from passing out between the cans when the first of the above methods of operating the apparatus is used, thus compelling it to pass through the perforations in the cans and through the tops within. If these plates were all as small as the smaller set of them, it will be seen that the tops would receive the liquor passing through from the inside of the apparatus equally on both sides of the tubes F F; but the outer portion of the tops at any moment also receives dye liquor coming from these tubes F F, and that side of the tops which is turning toward the center of the apparatus by the turning of the can upon its axis has then received more liquor and is heavier than that side turning away from the center. I have found that when the dye liquor is thus permitted to pass from the center of the apparatus freely through both sides of the top there is a tendency in the tops to bind upon the tubes F F, which frequently makes it difficult and even impossible to remove the tops from the cans without cutting or otherwise destroying some of the sliver. Whatever may be the true cause for this, I have found that any such binding is largely prevented by extending the plates L L so as to cover that side of the cans turning toward the cen-

ter of the apparatus, and thereby compelling the liquor from the center to pass through the other side of the tops only, and it is for this reason that I have heretofore made every alternate plate sufficiently large to cover one-half of the surface of two adjoining cans exposed to the center of the machine, it being observed that any two adjoining cans as arranged in the drawings always turn in opposite directions.

I claim as my invention—

1. In an apparatus for dyeing tops or cheeses, the combination of a tank, a shaft within the tank and means for rotating it, a series of perforated cans to contain the tops to be dyed mounted upon the shaft to substantially constitute the periphery of an extractor, and means within the tank to stop the rotation of the dye liquor after being thrown out through the perforated cans and return it to the center of the apparatus.

2. In an apparatus for dyeing tops or cheeses, the combination of a tank, a wheel within and near the bottom of the tank which has an open center and which does not extend to the walls of the tank, means for rotating the wheel, a series of perforated cans to contain the tops mounted upon the wheel, and rigid strips or wings under the wheel, the whole arranged so that the dye liquor will be thrown out through the perforated cans by the rotation of the wheel and return under the wheel to the center of the apparatus.

3. In an apparatus for dyeing tops or cheeses, the combination of a tank with a partial floor near its bottom leaving an opening in the center of the floor and between it and the walls of the tank, strips under the partial floor extending from the walls of the tank to the open center, a wheel with an open center to rotate above the partial floor, means for rotating the wheel, and a series of perforated cans to contain the tops mounted upon the wheel, the whole arranged so that the dye liquor will be thrown out through the perforated cans by the rotation of the wheel and return under the floor to the center of the apparatus.

4. In an apparatus for dyeing tops or cheeses, the combination of a tank, a wheel within and near the bottom of the tank and means for rotating it, a series of perforated cans to contain the tops to be dyed mounted upon the wheel and constituting substantially the periphery of an extractor, means for rotating the cans upon their centers, plates between the cans to prevent the dye liquor from passing out between them, and means for returning the dye liquor to the center of the apparatus after being thrown out through the perforated cans.

5. In an apparatus for dyeing tops or cheeses, the combination of a tank, a wheel within and near the bottom of the tank which has an open center and which does not extend to the walls of the tank, means for rotating the wheel, rigid strips or wings under the

wheel, a series of perforated cans to contain the tops to be dyed mounted upon the wheel and constituting substantially the periphery of an extractor, means for rotating the cans about their axes, and plates between the cans to prevent the dye liquor from passing out between them.

6. In an apparatus for dyeing tops or cheeses, the combination of a tank, a wheel within and near the bottom of the tank with an opening in its center and between it and the walls of the tank, and constructed with a pocket or pockets extending outwardly from the open center, means for rotating the wheel, a series of perforated cans to contain the tops to be dyed mounted upon the wheel and constituting substantially the periphery of an extractor, means for rotating the cans about their axes, a hollow perforated tube in each can, with their interiors connected with the pockets of the wheel, plates between the cans to prevent the dye liquor from passing out between the cans; and means for returning the liquor to the center of the wheel.

7. In an apparatus for dyeing tops or cheeses, the combination of a tank, a wheel in the tank near its bottom with an opening in its center and between it and the walls of the tank, and constructed with a pocket or pockets extending outwardly from the open center, rigid strips under the wheel to prevent any circular motion of the liquor at that point, a series of perforated cans to contain the tops to be dyed mounted upon the wheel and constituting substantially the periphery of an extractor, means for rotating the cans about their axes, a hollow perforated tube in each can with their interiors connected with the pockets of the wheel, and plates between the cans to prevent the dye liquor from passing out between them.

8. In an apparatus for dyeing tops or cheeses, the combination of a tank, a wheel in the tank near its bottom with an opening in its center and between it and the walls of the tank and constructed with a pocket or pockets extending outwardly from the open center, rigid strips under the wheel to prevent any circular motion of the liquor at that point, means for rotating the wheel, a series of perforated cans to contain the tops to be dyed mounted upon the wheel and constituting substantially the periphery of an extractor, means for rotating the cans about their axes, a hollow perforated tube in each can with their interiors connected with the pockets of the wheel, and plates extending about half-way over the portion of the can next to the center of the apparatus and covering that

portion of the can turning toward the center, and plates between the cans to prevent the dye liquor from passing out between them.

9. In an apparatus for dyeing tops or cheeses, the combination of a tank, a wheel within and near the bottom of the tank constructed with an opening in its center toward the bottom of the apparatus and with a pocket or pockets extending outwardly from its open center, means for rotating the wheel, a series of hollow perforated tubes mounted upon the wheel with their interiors connected with the pockets of the wheel, and means to return the liquor under and to the center of the wheel after being thrown out from the perforated tubes, substantially as described.

10. In an apparatus for dyeing tops or cheeses, the combination of a tank, a wheel within and near the bottom of the tank constructed with an opening in its center toward the bottom of the apparatus and with a pocket or pockets extending outwardly from the open center, means for rotating the wheel, a series of hollow perforated tubes mounted upon the wheel with their interiors connected with the pockets of the wheel, a series of perforated cans surrounding the tubes, means for rotating the cans and tubes upon their axes, and means for returning the liquor under and to the center of the wheel after being thrown from the perforated tubes, substantially as described.

11. In an apparatus for dyeing tops or cheeses, the combination of a tank, a wheel within and near the bottom of the tank constructed with an opening in its center on the side toward the bottom of the tank and with upper and lower coverings, the latter being inclined upward from the open center toward the outer circumference, means for rotating the wheel, and a series of hollow perforated tubes mounted upon the wheel with their interiors connected with the space or spaces between the coverings of the wheel, substantially as described.

12. In an apparatus for dyeing tops or cheeses, the combination of a tank, a wheel within the tank, a series of perforated cans to contain the tops mounted upon the wheel, a false bottom for the several cans, means for lifting the bottoms from the cans, means for rotating the wheel, and means within the tank to stop the rotation of the dye liquor after being thrown out through the perforated cans and return it to the center of the apparatus.

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