

J. H. GILES.  
DYEING MACHINE.  
APPLICATION FILED SEPT. 24, 1912.

Patented Apr. 1, 1913.  
2 SHEETS—SHEET 1.

1,057,634.

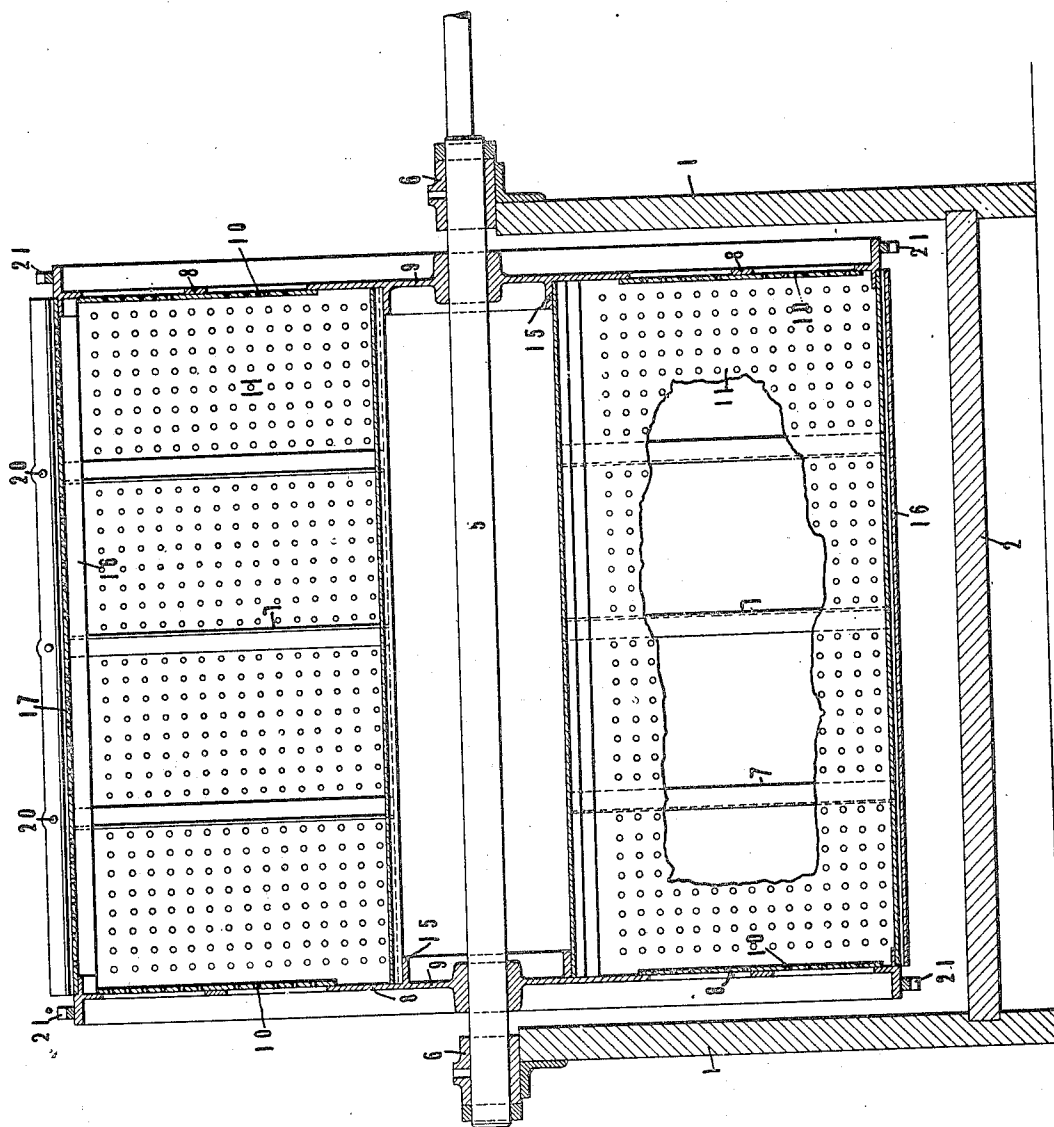


FIG. 1-

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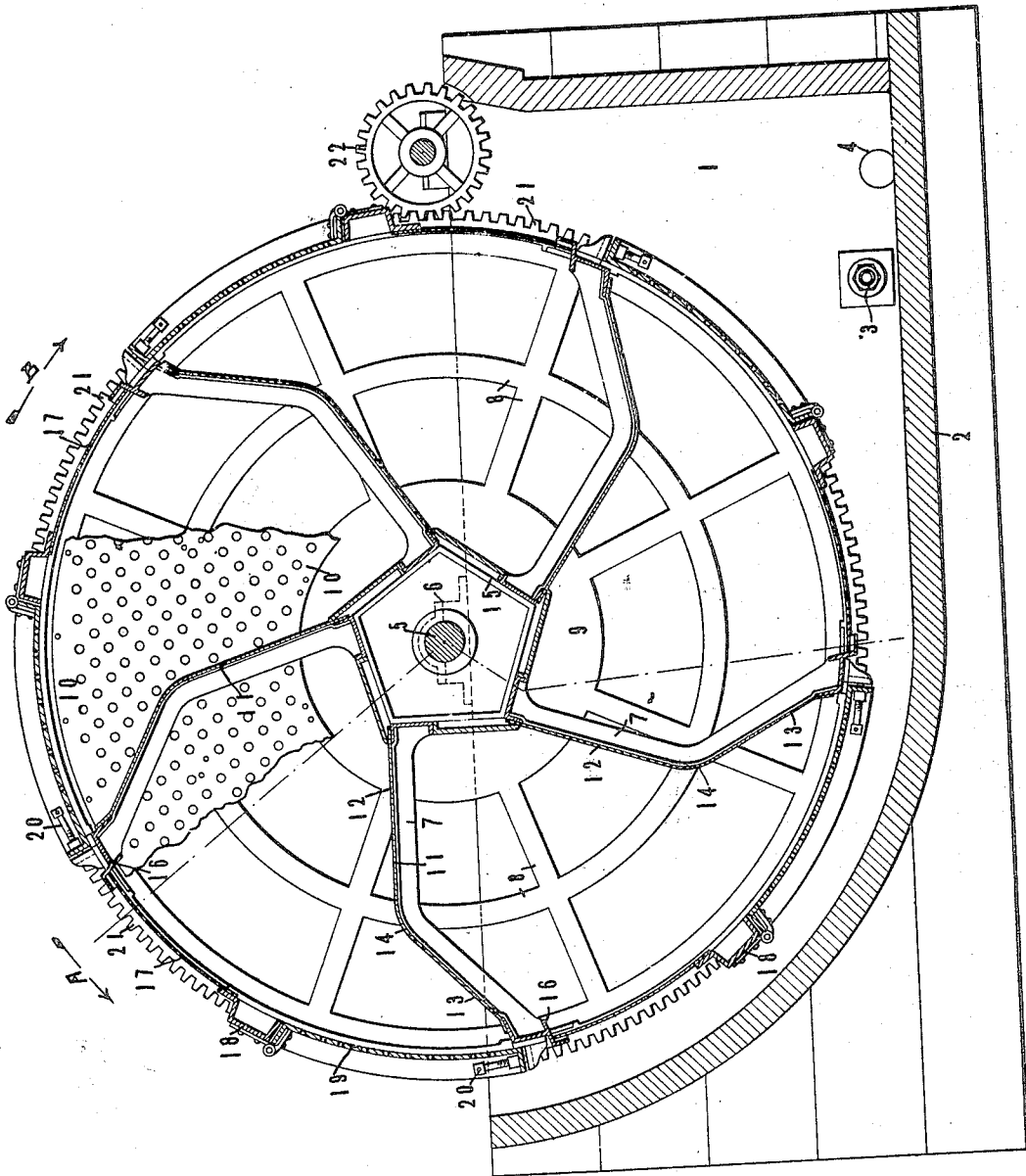


FIG. 2-

WITNESSES

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# UNITED STATES PATENT OFFICE.

JOHN H. GILES, OF AMSTERDAM, NEW YORK, ASSIGNOR TO KLAUDER-WELDON DYEING MACHINE COMPANY, OF AMSTERDAM, NEW YORK, A CORPORATION OF NEW YORK.

## DYEING-MACHINE.

1,057,634.

Specification of Letters Patent.

Patented Apr. 1, 1913.

Application filed September 24, 1912. Serial No. 722,021.

*To all whom it may concern:*

Be it known that I, JOHN H. GILES, a citizen of the United States, residing at Amsterdam, in the county of Montgomery and State of New York, have invented certain new and useful Improvements in Dyeing-Machines, of which the following is a full, clear, and exact description, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to dyeing machines, and with respect to its more specific features, to dyeing machines of the rotary type.

One object of the invention is the production of a practical device of the character described for uniformly dyeing goods without roughing up the goods.

Another object of the invention is the provision of a simple and efficient machine in which fine goods may be dyed without regard to whether the inside or outside of the goods faces outwardly in the dyeing operation.

Another object of the invention is the provision of a practical machine in which different kinds of goods may be dyed in a manner to conform to their special qualities.

Other objects will be in part obvious and in part pointed out hereinafter.

The invention accordingly consists in the features of construction, combinations of elements and arrangement of parts which will be exemplified in the construction hereinafter set forth, and the scope of the application of which will be indicated in the following claims.

In the accompanying drawings, wherein is shown the preferred embodiment of my invention, and wherein similar reference characters refer to similar parts throughout the several views,—Figure 1 represents a longitudinal section of part of the machine. Fig. 2 represents a cross section of the machine shown in Fig. 1.

The numeral 1 indicates a dye vat, which may be made of wood, or metal, the bottom

being preferably solid and having a curved portion 2. The liquid dye employed in the dyeing operation is placed in the vat and suitable means are employed for raising the dye to the proper temperature, as by a steam pipe 3 extending into the vat.

4 represents the valve by means of which the contents of the vat may be discharged.

The goods to be dyed are to be immersed in the bath of dye in the vat, the goods being placed in buckets mounted in such a manner as to travel in an endless path and carry the goods into and out of the dye in the vat. In the present embodiment the buckets are carried in a wheel comprising a shaft 5 suitably supported for rotation in bearing 6 mounted on the sides of the vat, the heads of the wheel being composed of skeleton-like metallic frames 8 connected to a disk 9, the frames being covered on their inner faces by perforated metallic sheets 10 extending from the periphery of the wheel to the disks 9. The buckets are symmetrically disposed around the axis of the wheel, five buckets being preferably employed, and the sides 11 of each bucket extend from the inner or central portion of the wheel to the periphery thereof and have an intermediate angular portion. Preferably each side is composed of a substantially flat inner portion 12, preferably approximating a radial disposition, and an outer portion 13 arranged angularly to the inner portion, and at a different angle to the axis of the wheel from the inner portion, and connected thereto by a curved portion 14, the curvature of which is preferably of a low degree.

The sides of the buckets are formed by partitions extending longitudinally between the heads 8, spaced at intervals of substantially 72°, around the periphery of the wheel, and preferably comprise copper plates, which are perforated in order to permit the dye liquor to pass therethrough. Each plate may be supported by angle bars 7 extending from a pentagonal drum 15 around the axis, said bars 7 being connected

at their inner ends to the drum and at their outer ends to an angle bar 16 extending longitudinally of the wheel. Extending from the peripheral portion of each partition or side of a bucket is a perforated copper plate 17 which in effect forms a portion of the periphery of the wheel and extends in the direction toward which the concavity of the partition faces, said plate 17 being connected at its outer end to a longitudinal channel bar 18 connected to the heads. Hinged on the channel bars 18 are doors 19, preferably perforate and which form a continuation of the periphery of the wheel and are adapted to be moved on their hinge to open and close the adjacent buckets, latches 20 being provided for suitably locking and unlocking the doors. The relative arrangement of the plates 17 and the doors 19 form a closure for the buckets, while the perforations in the plates 17 and the plates 10 permit the dye liquor to freely enter or leave the buckets as said buckets enter or leave the dye liquor in the vat.

The wheel is provided with suitable circumferential gear teeth 21 meshing with a small gear 22, which latter may be driven by any suitable motor so as to rotate the wheel in either direction. Also it will be observed that each bucket is self-contained; that is to say, the plates 17 and doors 19 form closures for the buckets so that the goods are not rubbed against the curved bottom of the dye vat.

In operation, the wheel revolves and the several buckets carry the material into and out of the dye liquor as the wheel rotates. As the goods pass through the dye liquor the liquor permeates the fibers of the goods and efficiently dyes the same to a uniform tint. It is designed that each bucket shall pass through the dye liquor several times, and it will be observed that should the wheel be rotated in the direction indicated by the arrow A, Fig. 2, the impelling side of each bucket lifts the goods from the dye liquor and carries them upwardly, the goods resting on the concave face of the partitions or sides of the buckets, the concavity of the angle facing the direction of movement in this instance. As the partitions approach their uppermost or upright position the inner portion 11 of each partition arrives at a vertical position after the arrival of the outer portion 13 at such a position, so that the peripheral portion of the batch of goods falls by gravity more freely than the goods at the inner portion of the buckets, the upper portion of the batch turning or tilting, as it were, upon the lower portion of the batch. But before a complete turning is effected the side 11 arrives at an inclined position so that the whole mass in effect tends to move around a

center nearer the central portion of the wheel. The curve at the angle of the bucket permits the wet mass of goods to lie in a relatively open or spread condition on the side, there being here no acute angles to sharply double or crease the goods, which latter in effect would double or fold them at this part of the bucket, and the dye would not penetrate the double thickness with the same facility as the undoubled portion, and non-uniform dyeing might result. At the same time the flat portions of the sides permit the goods to lie in completely spread condition adjacent the angular portion, so that the plain sides and the curved portion, the former being of measurably greater extent than the latter, combine to permit a bodily movement of the mass of the goods where rolling up might ordinarily tend to occur, and the flat sides readily permit an inward movement of the mass instead of offering a resistance to movement, in which latter case the action of gravity would be manifested by a rolling instead of a bodily sliding action. Both sides of the bucket are designed to be smooth, and offer as little resistance as practicable to the sliding of the goods thereon.

The drum being pentagonal and the partitions being substantially continuations of the faces of the drum, each face of the drum becomes in effect, a portion of a partition, so that the adjacent partitions intersect each other in a wide angle providing ample space for the material to be dyed, and each portion presenting a relatively long surface on which the material falls, this arrangement obviating the crowding and consequent creasing or folding of the goods.

In dyeing some characters of goods, it is preferable to rotate the wheel in the opposite direction to that before mentioned, that is to say, to the right as indicated by the arrow B in Fig. 2. In this case the apex of the angular portion presents a rounded convex surface to the goods and to the direction of movement of the wheel, the sides being flat at the inner and outer portions as before explained, but in this case the mass of goods coming from the vat tends to accumulate in the outer portion of each bucket. But the inclination of the outer side 13 is designed to be such that the mass of goods will move inwardly along said side and over the convex portion to the inner flat portion 11 before the peripheral pocket formed between the side 13 and the periphery of the wheel has arrived at such a position that gravity would cause the goods to bodily fall therefrom directly to the opposite partition. Thus the partition on this face, as well as on its opposite face, as before explained, permits the goods to slide

instead of rolling at critical positions of the buckets, entanglement thus being in a large measure avoided. The partition on this face is also smooth and free from projections which would become entangled with the goods and prevent their free motion inwardly or outwardly along the sides.

It is important that the proper angular relationship between the flat portions 11 and 13 be obtained on each face of each partition at the time when the bucket sides reach their upper position so that the goods will either turn by reason of the projecting portion 13, should the wheel be revolved to the left, or slide by reason of the inclination of the flat side 11 should the wheel be revolved to the right, and in order to obtain the most efficient angular disposition of these parts, five buckets, symmetrically disposed around the axis of the wheel, are provided. It is found that the bodily movement of the goods in this machine tends more efficiently to substantially preserve their condition as placed in the machine; and it is also found that goods dyed by the described machine are not roughed up, the absence of "roughing up" being especially noticeable when the buckets rotate to the right. On the contrary, the fibers of the goods remain flat and smoothly disposed and no subsequent singeing is required. The goods are treated gently and yet efficiently, the displacement of the goods between or during the several immersions being sufficient, however, to enable the dye to have access uniformly to all parts of the goods. In dyeing underwear the roughing up of the goods is regarded as an advantage, while in dyeing hosiery it is a disadvantage, and it is found that in dyeing goods such as cotton hosiery, wherein it is undesirable to have the goods roughed up, this machine is particularly efficient. Fine hosiery,—mercerized, lisle and silk,—may be dyed with this machine without putting the goods in bags, and even where the long lengths of ladies' hose are dyed, the machine does not roll and tangle them.

As many changes could be made in the above construction and many apparently widely different embodiments of this invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense. It is also to be understood that the language used in the following claims is intended to cover all of the generic and specific features of the invention herein described and all statements of the scope of the invention, which, as a matter of language, might be said to fall therebetween.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a dyeing machine, in combination, a rotary wheel, and buckets in the wheel formed by partitions spaced at intervals of substantially  $72^\circ$  and extending from the outer toward the inner portion of the wheel, the partitions comprising outer and inner substantially flat portions joined by a relatively stationary portion.

2. In a dyeing machine, in combination, a dye vat, a rotary wheel, and buckets in the wheel formed by perforated partitions spaced at intervals of  $72^\circ$  and extending from the outer toward the inner portion of the wheel, the partitions comprising substantially flat inner and outer portions joined by a curved portion, the outer portions being disposed to carry the material thereon into position to fall by gravity before the fall of the material on the inner portions, when the wheel is rotated.

3. In a dyeing machine, in combination, a wheel comprising a central pentagonal drum, buckets therein formed by partitions comprising inner portions extending from the drum in substantially the plane of the faces of said drum and outer portions intersecting the inner portions intermediate the outer and the inner portions of the wheel and at such an angle as to provide impelling faces concave from the outer portion of the wheel to the drum.

4. In a dyeing machine, in combination, a wheel comprising a central pentagonal drum, buckets therein formed by spaced perforated plates, each plate comprising an inner portion extending from the drum in substantially the plane of a face of said drum, an outer portion arranged at an angle to the inner portion, and an intermediate curved portion, said plates providing impelling faces concave toward the direction of rotation of said wheel, the adjacent partitions substantially intersecting each other.

5. In a dyeing machine, in combination, a wheel comprising a central axis, five buckets symmetrically disposed around said axis, each bucket formed by partitions having inner portions projecting from the axis, and outer portions projecting at such an angle to the inner portions as to carry the material lying thereagainst into position to fall by gravity before the fall of the material on the inner portion, when the wheel is rotated, the space between the buckets being unobstructed whereby the material may freely move from one partition onto the other at any point in the buckets.

6. In a dyeing machine, in combination, a wheel comprising a central pentagonal drum, five buckets symmetrically disposed

around said drum, each bucket formed by perforated plates comprising an inner portion projecting from the drum in substantially the plane of a face of said drum, an  
5 outer portion arranged at such an angle to the inner portion as to carry the material lying thereon into position to fall by gravity before the fall of the material on the inner portion when the wheel is rotated, and an  
10 intermediate curved portion continuous with the inner and outer portion, the space be-

tween the buckets being unobstructed whereby the material may freely move from the surface of one partition to the surface of the other at any point in the buckets. 15

In testimony whereof I affix my signature, in the presence of two witnesses.

JOHN H. GILES.

Witnesses:

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HOWARD L. WATERSTREET.