

Oct. 23, 1934.

W. G. GASS

1,978,258

APPARATUS FOR ROTATING HANKS DURING DYEING, FINISHING, AND THE LIKE

Filed Aug. 22, 1931

2 Sheets—Sheet 1

Fig. 1.

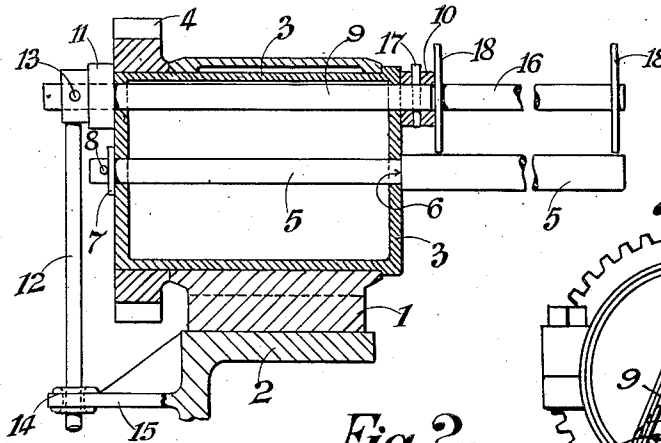


Fig. 2.

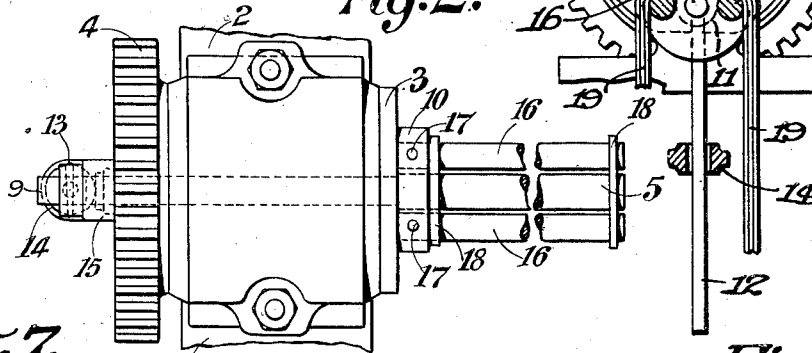


Fig. 3.

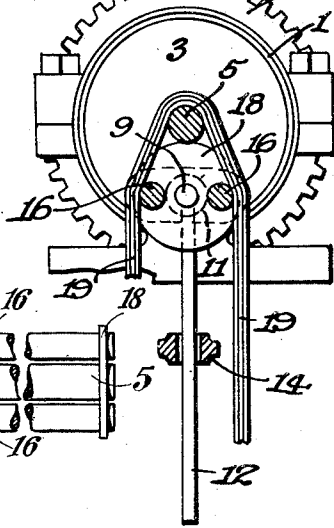


Fig. 7.

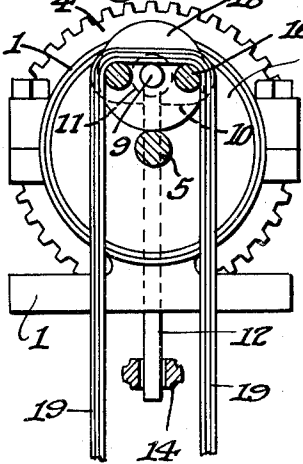
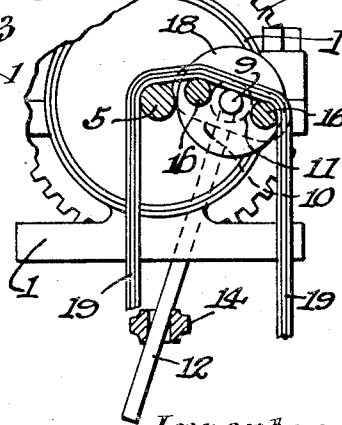


Fig. 8.



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2 Sheets-Sheet 2

Fig. 4.

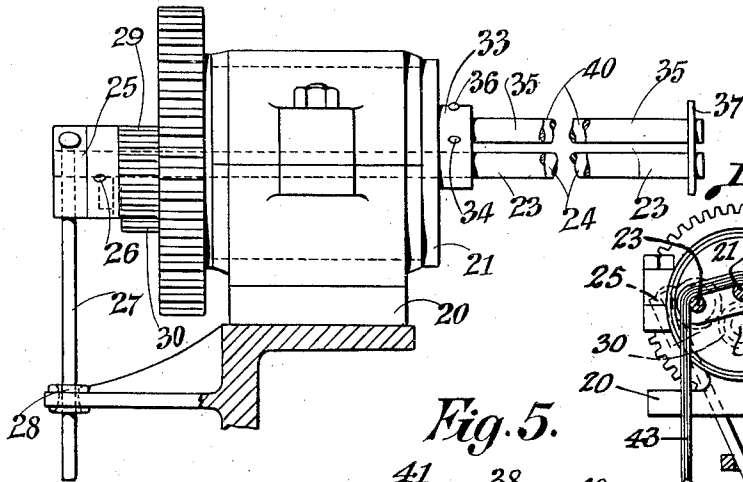


Fig. 10.

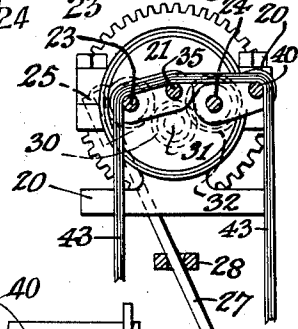


Fig. 5.

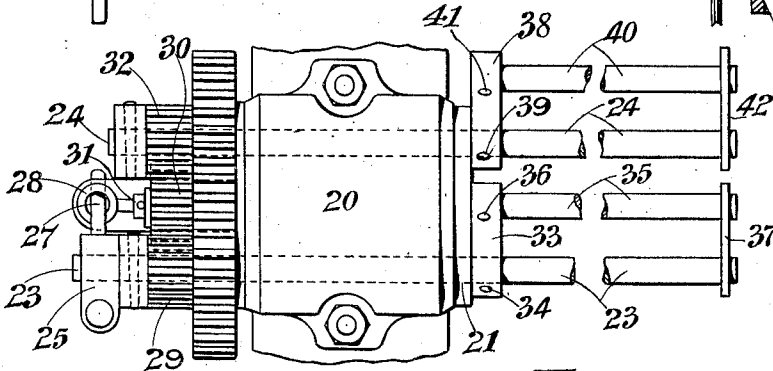


Fig. 10.

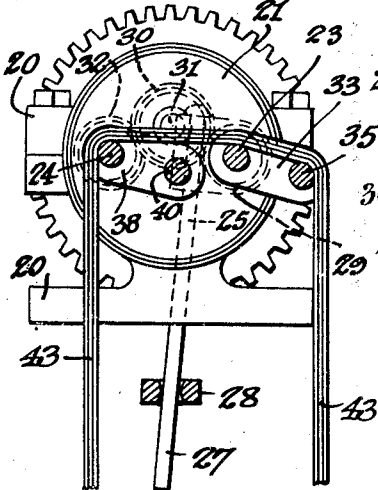


Fig. 6.

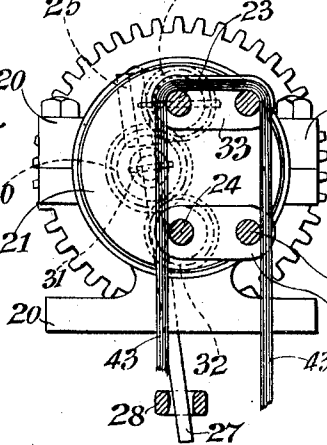
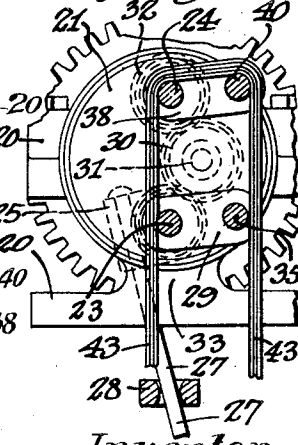


Fig. 11.



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UNITED STATES PATENT OFFICE

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APPARATUS FOR ROTATING HANKS DURING DYEING, FINISHING, AND THE LIKE

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In Great Britain October 31, 1930

11 Claims. (Cl. 8—19)

This invention relates to that kind of apparatus for rotating hanks during dyeing, finishing and the like wherein each hank is suspended by means which rotate it.

5 Previous to my invention the said means consisted of a bobbin or creel either rotated about its axis and thus merely rotated the hank, or it revolved about another axis without independent rotation about its own axis and thus not only rotated the hank but also swung the hank upwardly, downwardly and laterally. The said means are liable to catch and lap loose ends and thereby entangle the hank, and in the case of delicate material, such as artificial silk, the said means have a tendency to cause the inside threads of the hank to pack and stick together and thereby prevent the results of the dyeing, finishing or other process from being uniform, in addition to rendering the separation of the threads difficult when winding them from the hank.

The object of my invention is to overcome these defects.

According to my invention the said apparatus comprises a plurality of non-rotatory members which extend through the hank and are adapted to move round a centre in such a manner as to raise the hank, carry it a distance laterally of the said centre and lower the hank repeatedly, thus causing the hanks to rotate in stages and to be moved from side to side without producing any rubbing or loose end catching action on the hanks.

The said non-rotatory members may comprise a pair of rods adapted to operate on the hanks in the hereinbefore stated manner by the employment in conjunction therewith, of a rod situated at the said centre.

Alternatively the said non-rotatory members may comprise two pairs of rods adapted to cooperate with each other to operate in the hereinbefore stated manner.

The non-rotatory rods may move in circular or other orbits around the central rod.

I attain this object by the means illustrated in the accompanying two sheets of drawings, wherein—

Figure 1 is a side view in section of an apparatus for rotating hanks.

Figure 2 is a plan view thereof.

Figure 3 is a front view, partly in section, thereof, with parts in a different position.

Figure 4 is a side view of an apparatus for rotating hanks and illustrates another construction.

Figure 5 is a plan view of Figure 4.

Figure 6 is a front view, partly in section, with parts in a different position.

Figures 7, 8 and 9 are similar views to Figure 3, and show the same construction, but with the parts in different positions.

Figures 10, 11 and 12 are similar views to Figure 6 and show the same construction, but with the parts in different positions.

Referring to Figures 1 to 3 of the drawings, in the construction shown therein, a two-part head 1 is adapted to be arranged at one side of a tank and is mounted on a rail 2 adapted to be raised and lowered by any suitable means, for example mechanical or hydraulic means. A rotary drum 3 is mounted in the head 1 and has spur teeth 4 whereby it can be driven.

A rod 5 loosely engages central holes in the ends of the drum 3 and is held against axial movement by a shoulder 6, and a washer 7 and cross pin 8.

A rod 9 is loosely mounted in eccentrically arranged holes in the ends of the drum 3 and has a cross head 10 fixed to it. The rod 9 has a collar 11, and an arm 12 is fixed to the rod 9 by means of a cross-pin 13. The arm 12 loosely engages an eye 14 provided on a bracket 15 on the rail 2.

The cross head 10 has a pair of parallel rods 16 mounted on it and secured against rotation by means of cross pins 17. Circular flanges 18 are provided on the pair of rods 16.

In operation, when the drum 3 rotates, the rod 9 revolves round the rod 5 but is held against rotation by the arm 12 which slides in and is controlled by the eye 14. Therefore the rods 16 do not rotate but perform only a slight oscillatory movement about the centre of the rod 9. The rods 16 therefore move in substantially elliptical orbits around the rod 5. Consequently, when a hank 19, Figure 3, is placed on the rods 5 and 16 so that they all extend therethrough, the two rods 16 will raise and lower the hank and also move it from side to side. When the two rods 16 are sufficiently higher than the stationary rod, the hank 19 will hang suspended by the rods 16 only, see Figure 7, but when the two rods 16 are sufficiently lower than the rod 5 the suspension of the hank will be effected by the rod 5, see Figure 9. Figure 8 shows the position of the parts in travelling from the positions shown in Figure 7 to those shown in Figure 9, and Figure 3 shows the positions of the parts during movement from the positions shown in Figure 9 to those shown in Figure 7. The suspension by the two rods 16 may take place during about three quarters of each revolution of the

drum 3, and the suspension by the rod 5 during the remaining quarter thereof.

As the drum 3 rotates the two rods 16 pick up the hank from the stationary rod 5 whilst at one side thereof and carry the hank 19 laterally until they pass over and reach the other side of the rod 5 when they will deposit the hank 19 on the rod 5 to pass under the rod 5 back to the first named side where they will again pick up the hank 19 from the rod 5 and move it laterally thereof and again deposit on the rod 5.

It will be noted from the above-described operation that the rods 16 are arranged in spaced relation and that they are in a plane substantially at right angles to the length of the hank which they support. As these rods move around the center 5 by reason of the rotation of the member 3, the cooperation of the rods 16 and the eye 14 serves to prevent any substantial revolution of the rods about their own center of revolution indicated at 9. It, therefore, follows as a matter of course that in order to hold the rods 16 in this position, there must be a relative rotation of the rods with respect to the member. If this were not true and if the rods 16 were fixed with respect to the member 3, the rods would be substantially horizontal in their uppermost position, substantially vertical in the first quarter of movement, again horizontal in the half movement but reversed with respect to their positions at the start, and again vertical in the third quarter of movement but reversed with respect to their positions at the first quarter of movement. Therefore, there is a relative rotation of the rods 16 as a unit with respect to the member 3 in which they are mounted. The effect of this relative rotation is to maintain the rods 16 in practically the same position with respect to their own center of revolution though naturally in constantly changing positions with respect to the center of rotation of the drum 3. Incident, therefore, to the relative rotation of the rods 16 as a unit, these rods remain at all times in a plane substantially at right angles to the length of the hank suspended therefrom with the same point in each of the rods constantly uppermost with respect to the hank.

In Figures 1 and 2 the rods are shown in their uppermost positions and it will be seen from these figures that when the rods 16 are in the shown position, the hank will hang from the rods 16 and not from the rod 5. In Figure 3 it is assumed that the drum is rotating in clockwise direction and that the rods have performed about three quarters of a revolution from the positions shown in Figures 1 and 2. It will be appreciated that the hank has been completely suspended from the rod 5 and that the rods 16 are in the act of raising the hank from the rod 5 and moving the hank laterally to afterwards again deposit the hank 19 on the rod 5, but at a different point along the length of the hank. Owing to the lateral movement of the hank 10 whilst suspended from the two rods 16 only, the hank 19 at each revolution of the drum 3 rests on the rod 5 at a different point along its surface, the distance between these points being proportionate to the throw of the rods 16. Thus the hank 19 is gradually turned and the whole action thereon is similar to that used by a person when moving the hank round by hand. The action is free from the defects of a rotating or revolving creel and causes the skein to move without producing rubbing of the thread.

In the construction shown in Figures 4 to 6 a head 20 is provided similar to the head 1 of Figures 1 to 3 and a rotary drum 21 is mounted there-

in similar to the drum 3 of Figures 1 to 3. The ends of the drum 21 are provided with diametrically arranged holes through which extend rods 23 and 24. The rod 23 is provided with a block 25 which is fixed to the rod by means of a cross pin 26. The block 25 is provided with an arm 27 which is guided and slides in a stationary eye 28. The rod 23 is geared to the rod 24 by means of a pinion 29 mounted on the rod 23 and meshing with a pinion 30 loosely mounted on a stud 31 provided on one end of the drum 21, the pinion 30 meshing with a pinion 32 provided on the rod 24. Thus the rod 24 is caused to participate in any absence of movement or in any movement of the rod 23. The rod 23 has an arm 33 mounted on it and fixed to it by a cross pin 34 and the arm 33 has a rod 35 mounted on it and fixed thereto by means of a cross pin 36. The two rods 23 and 35 are connected together at their extremities by a flange 37. The rod 24 has an arm 38 provided on it and secured thereto by a cross pin 39. The arm 38 carries a rod 40 secured to it by a cross pin 41. The rods 24 and 40 are connected at their extremities by a flange 42.

The construction shown in Figures 4 to 6 operates in a very similar manner to that shown in Figures 1 to 3, the amount of feed at each revolution of the drum 20 being however greater than in the construction shown in Figures 1 to 3.

When the drum 21 is in the position shown in Figures 4, 5 and 12 the pair of rods 23, 35 and the pair of rods 24, 40 are in the position shown in these figures and the hank will therefore hang on the rods 23, 35 and 40.

As the drum 21 rotates, for example in clockwise direction, when the drum 21 has performed a quarter turn, the pair of rods 23, 35 and the pair of rods 24, 40 will have assumed the positions shown in Figure 6 and it will be appreciated that the hank 43, Figure 6, will have been raised and moved laterally and will then hang on the rods 23 and 35 which will have turned the hank a stage. Continued rotation of the drum 21 for another quarter turn will bring them into the positions shown in Figure 10 and will cause the hank to again be lowered and moved laterally, and the rod 24 will act on a different place along the hank. When rotation is continued for another quarter turn, the rods will have reached the positions shown in Figure 11 and have thereby turned the hank another stage, the whole action on the hank being very similar to that which takes place in the known hand operation wherein both hands of the operator are employed to manipulate the hank.

It will be observed that the rods 23, 24, 35 and 40 do not perform complete rotations about their axes but only perform a slight oscillatory movement about their axes during each revolution of the drum 21. This oscillatory movement is not detrimental and the extent thereof depends on the distance of the eye 28 from the rod 23, and can be reduced to a negligible amount by suitably increasing the said distance.

Instead of employing an eye such as 14 of Figure 1 or 28 of Figure 6, the end of the arm 12 or 27 may be connected to a radius rod mounted on a stationary part to assume a substantially horizontal position when the rod 12 or 27 is in the centre of its throw. In another modification, instead of an eye 14 or 28, the end of the rod 12 or 27 may be weighted to an extent sufficient to maintain the rods 16, or rods 23, 35, 22, 40 against rotation.

A rubber or metal tubular member may be pro-

vided on the rods 16 or each of the pairs of rods 23, 35 and 24, 40 to enclose them and extend from one rod to the other, whereby the surface acting on the hank is rendered more similar to the surface of a human hand. Alternatively instead of two rods, a single member of oblate form in cross section may be employed.

I claim—

1. An apparatus for rotating hanks during dyeing, finishing and the like, including a rotary part, a mounting eccentrically mounted rotatively on said rotary part, hank-carrying means fixed on the mounting, and means to restrain rotation of said mounting on its own axis during its movement with said rotary part.

2. An apparatus for rotating hanks during dyeing, finishing and the like, including a rotary drum, a member projecting axially from the drum and serving as a hank support, a shaft mounted for rotation in the drum beyond the center, hank-supporting rods carried by and fixed with respect to the shaft, means for rotating the drum to move the shaft throughout a path of revolution, an arm secured to and projecting from the shaft, and an eye in which the arm is positioned to prevent rotation of the shaft on its own axis during rotation of the drum.

3. An apparatus for rotating hanks during dyeing, finishing and the like, comprising hank carrying means, an additional element for extension through a hank, means for compelling revolution of the hank carrying means about the additional element, and means for compelling a rotation of the hank carrying means relative to the additional element during such revolution whereby to maintain the same point of said hank carrying means uppermost during movement of said means about said additional member.

4. An apparatus for rotating hanks during dyeing, finishing and the like, comprising a plurality of members extending through the hank, means supporting the members for revolution about an external center, and means for compelling movement of said elements during revolution to substantially maintain the same point of said members uppermost throughout a complete revolution.

5. An apparatus for rotating hanks during dyeing, finishing and the like, comprising a plurality of members for extension through the hank, means for compelling said members to travel through an endless path about a center, and means to compel a limited revolution of said members about an independent center during their travel in said endless path, the limited revolution of the members compelling the same points of said members to remain uppermost during their travel in said endless path.

6. An apparatus for rotating hanks during dyeing, finishing and the like, comprising a plurality of elements for extension through the hank, said elements being in a plane at substantially right angles to the length of a hank suspended therefrom, said elements being mounted for travel in an endless path with respect to a center, said elements having a center of revolution in said path, and means for operating the members to compel them to travel in said path, and means for maintaining the elements substantially fixed in their right angular relation to the

length of the hank with the same points of said elements uppermost during their travel throughout said path.

7. In an apparatus for rotating hanks during dyeing, finishing and the like, a pair of elements for extension through the hank, means for mounting the members to permit their unitary movement through an endless path about a center, the mounting of the members providing for their independent movement in a path of revolution having its center in said endless path, means for compelling movement of the elements through said endless path, and means for holding said members against substantial movement about their center of revolution during their movement through said path to thereby maintain the members with the same points uppermost throughout their full travel through said endless path.

8. An apparatus for rotating hanks during dyeing, finishing and the like, comprising a plurality of elements for extension through the hank, a third element for extension through the hank, means for compelling movement of said plurality of members as a unit through an endless path about said third member, and means for compelling movement of said plurality of members as a unit relative to the third member to maintain the same points of said plurality of members uppermost during their travel through said path about the third member.

9. An apparatus for rotating hanks during dyeing, finishing and the like, comprising a hank carrying a pair of rods moving as a unit in an endless path about a hank carrying third rod, said pair of rods being spaced apart and lying in a plane substantially at right angles to the length of a hank suspended therefrom, and control means for compelling movement of the pair of rods as a unit relative to said third rod to maintain such right angled relation of the rods to the length of the hank during such travel.

10. An apparatus for rotating hanks during dyeing, finishing and the like comprising a pair of hank supporting elements mounted for movement in two independent paths of revolution, a hank supporting member forming the center of one of said paths, and means for compelling movement of said pair of elements in both of said paths of revolution simultaneously, the movement of said pair of elements in one of said paths of revolution maintaining the same points of said elements uppermost during the movement of said elements in the other of said paths of revolution.

11. An apparatus for rotating hanks during dyeing, finishing and the like, including a rotary drum, an element projecting axially from the drum and serving as a hank support, a shaft mounted for rotation on the drum beyond the center thereof, hank supporting rods carried by and fixed with respect to the shaft, means for rotating the drum to move the shaft throughout a path of revolution, and means for maintaining the same points of the hank supporting rods uppermost during movement of the shaft through said path of revolution by restraining rotative movement of said shaft.

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