

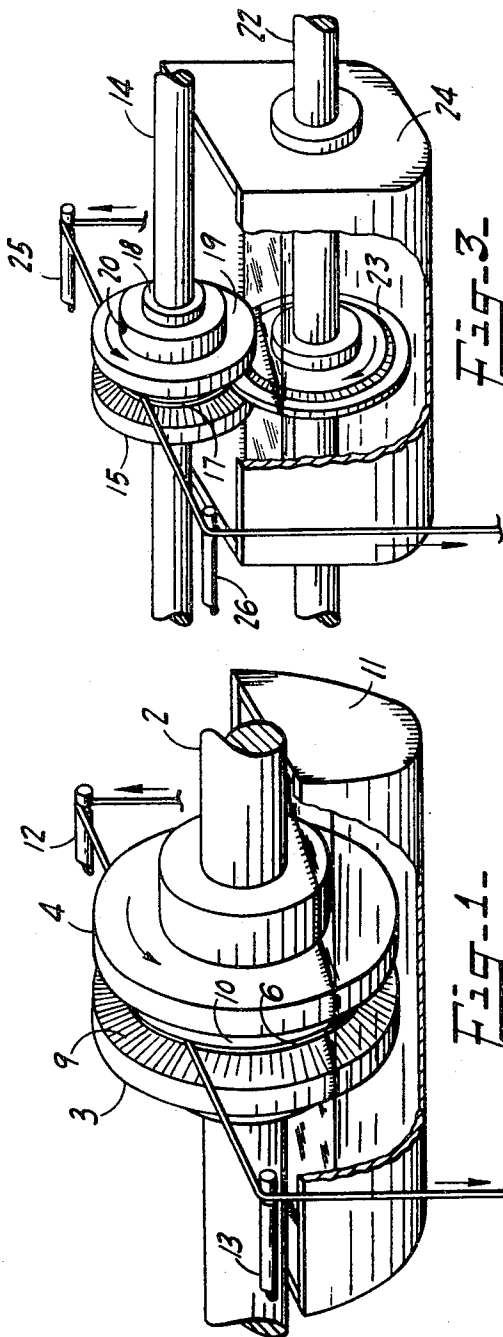
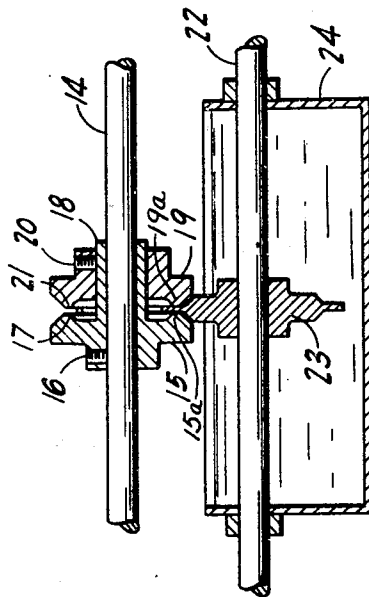
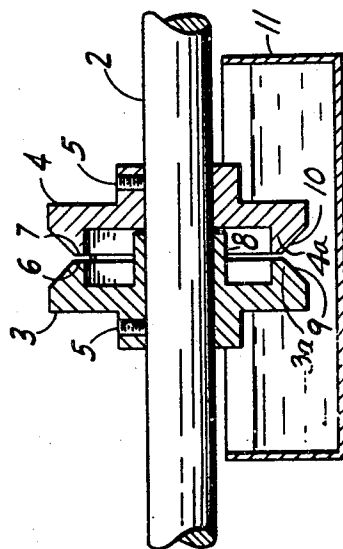
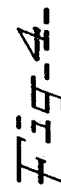
June 1, 1948.

E. K. BAUER

COATING DEVICE

Filed May 3, 1943

2,442,335



BY

INVENTOR.
ERNEST K. BAUER
Carl A. Chastellan
ATTORNEY.

UNITED STATES PATENT OFFICE

2,442,335

COATING DEVICE

Ernest K. Bauer, Meadville, Pa., assignor to
American Viscose Corporation, Wilmington,
Del., a corporation of Delaware

Application May 3, 1943, Serial No. 485,442

10 Claims. (Cl. 91—50)

1

2

This invention concerns a device for applying a coating or impregnant to structures of indefinite length having at least one of its transverse dimensions of small size, such as continuous filaments, yarns, cords, cables, strips, ribbons and the like either of textile materials, or of non-textile materials, such as of wire, paper, rubber, synthetic rubbers, and the like. The device may be used for applying oils and other lubricants, sizes, conditioning and finishing materials in the form of liquids or dispersions, such as solutions or emulsions to textile materials, to apply insulating coatings to wires or metallic ribbons or tapes, or to apply decorative and/or protective coatings in general.

It is an object of the present invention to provide a coating device of simple design capable of applying the coating material at a uniform rate to the yarn or other structure traveling with respect thereto. A further object is to provide such a device which is self-cleaning during operation. Another object is to provide a coating device by which the amount of coating material applied and the uniformity of application are independent of variations in the pressure and path of the yarn or other structure against the coating element or elements thereof. Further objects and advantages of the invention will be apparent from the drawing and the description thereof.

In the drawing, illustrative of the invention

Figure 1 is a perspective view, partially cut away, showing one embodiment of the invention.

Figure 2 is an elevation of the device of Figure 1, in cross-section,

Figure 3 is a perspective view, partially cut away, showing another embodiment of the invention, and

Figure 4 is an elevation of the device of Figure 3 in cross-section.

In Figures 1 and 2, numeral 2 refers to a shaft; 3 and 4 refer to disks secured, as by set screws 5, to the shaft, and having rings 3a and 4a projecting therefrom and provided with annular surfaces 6 and 7 respectively which face each other and are preferably substantially parallel, as shown. As shown, disk 3 has a sleeve 8 integral therewith which serves to reduce misalignment and extends considerably beyond the plane of the surface 6 without preventing disk 4 from being adjusted so that surfaces 6 and 7 are substantially in contact. Sleeve 8 may be omitted or each of the disks 3 and 4 may be provided with such a sleeve in which case they extend only to the respective planes of the surfaces 6 and 7. The rings 3a and 4a projecting laterally of

the outer rims of disks 3 and 4 may be beveled as shown at 9 and 10 to the outer peripheries of the annular surfaces 6 and 7. If desired, however, such beveling may be omitted. The disks 3 and 4 may be replaced by spoked wheels or spiders supporting rims provided with the opposed surfaces 6 and 7. The disks 3 and 4 are arranged to dip partially into a bath of the coating liquid or dispersion within a receptacle 11.

In operation, one or both of the disks 3 and 4 are adjusted by means of the set screws 5 so that the spacing between the surfaces 6 and 7 corresponds generally to the diameter of the yarn or the like or to the thickness of the ribbon or the like so that the yarn, ribbon or the like may travel continuously between the annular surfaces 6 and 7 without appreciable wear and tear. The spacing may be larger or smaller than the thickness of the yarn, film and the like, depending on the conditions of operation and the amount of liquid desired to be applied. The article to be coated is then drawn at constant speed through suitable guides 12 and 13 fixed in advance of and beyond the disks to cause it to subtend a substantially constant arc as it passes therebetween, preferably out of reach of any film of the coating liquid or dispersion on any surface other than the annular surfaces 6 and 7. The shaft 2 may be stationary or it may be rotatable as an idler, especially where the coating medium is characterized by a high capillary rise. Preferably, however, the disks 3 and 4, through shaft 2, are driven at constant speed by suitable means, not shown, in the direction indicated by the arrow.

The coating liquid or dispersion is removed by capillary action from the bath as a film bridging the gap between annular surfaces 6 and 7. The amount of liquid or dispersion transferred to the article being coated may be varied by varying any one or more of the following: speed of travel of the article, speed of rotation of the disks, width of and spacing between the annular surfaces 6 and 7. Pressure of the article being coated against the disks may be negligible and the amount, effectiveness, and uniformity of coating is independent thereof. The article being coated also serves to clear the coating surfaces when the spacing therebetween is properly adjusted to provide a light pressure upon the article. It is to be noted that the amount of coating medium applied is independent of the arc subtended by the path the article takes when that path lies within the inner periphery of the annular surfaces 6 and 7, so that any variation in that arc occasioned

3

by the whipping of the article resulting from high speed travel thereof does not detrimentally affect the uniformity of application.

Figures 3 and 4 show a modification in which 14 is a shaft to which disk 15 is secured by a set screw 16. Disk 15 is provided with an annular coating surface 17 formed on a laterally projecting ring 15a which is undercut. Disk 15 is formed integrally with a sleeve 18 upon which disk 19 is secured by a set screw 20. Disk 19 has an annular coating surface 21 facing surface 17 on disk 15 and formed on a laterally projecting ring 19a similarly undercut. A shaft 22 parallel to shaft 14 carries fixedly secured thereto a transfer member 23 which dips partially in a bath of the coating liquid in the container 24. The member 23 may take the form simply of a thin disk slidable between the annular surfaces 17 and 21 with slight clearance so that it transfers the coating liquid to the gap between those surfaces and serves to clean the gap simultaneously. As shown, member 23 is in the form of a symmetrically annularly shouldered disk, the shoulders being beveled to conform with the beveled rims of the disks 15 and 19. In operation, either or both of the shafts 14 and 22 may be driven in the direction indicated by the arrows, the article being coated being continuously passed there-through between guides 25 and 26 at constant speed and preferably so that it subtends a constant arc of the annular surfaces 17 and 21. The same factors as those mentioned above in connection with Figures 1 and 2 serve to control the amount of coating applied to the article.

It is to be understood that changes and variations may be made without departing from the spirit and scope of the invention as defined by the appended claims.

I claim:

1. In apparatus for coating articles, a pair of rotatable members having opposed annular surfaces, one only on each member, spaced apart at all points to form an annular gap of substantially uniform width for receiving a coating medium, means for rotating the members as a unit, a rotatable element for extending partially into a supply of a coating medium and having a narrow rim fitting slidably within the gap extending partially into the annular gap between the two members, and means for guiding an article to be coated through another portion of the gap.

2. In apparatus for coating articles, a pair of members each having a single ring formed integrally therewith and projecting therefrom toward that of the other member, said rings having opposed substantially parallel annular surfaces spaced apart at all points to form an annular gap of substantially uniform capillary magnitude for receiving a coating medium, said members being rotatable as a unit about the common axis of the annular surfaces, means for supplying a coating medium to the gap, and means for guiding an article to be coated through the gap along a path extending through the region surrounded by the gap.

3. In apparatus for coating articles, a pair of members each having a single ring projecting therefrom toward that of the other member, said rings having substantially parallel annular surfaces spaced apart at all points to form an annular gap of substantially uniform capillary magnitude for receiving a coating medium, said members being rotatable as a unit about the common axis of the annular surfaces, rotatable means co-

4

operating with a portion of the gap for supplying a coating medium to the gap, and means for guiding an article to be coated through another portion of the gap along a path extending through the region surrounded by the gap.

4. In apparatus for coating articles, a shaft, a pair of supporting members mounted thereon for rotation thereby, each of the members having a single ring projecting therefrom toward that of the other, said rings having substantially parallel opposed surfaces spaced apart at all points to form a gap of substantially uniform capillary magnitude, means for rotating the shaft, means for supplying a coating medium to the gap, and means for guiding an article to be coated through the gap along a path through the region surrounded thereby.

5. In apparatus for coating articles, a pair of rotatable members having opposed substantially parallel annular surfaces, one only on each member, spaced apart at all points to form an annular gap of substantially uniform width of capillary magnitude for receiving a coating medium, means for rotating the members as a unit, a rotatable element for extending partially into a supply of a coating medium and partially into the annular gap between the two members, and means for guiding an article to be coated through another portion of the gap along a path extending through the region surrounded by the gap.

6. Apparatus for coating articles comprising two supporting means, a single ring on each of the supporting means and projecting laterally therefrom toward the other ring, a pair of opposed annular surfaces on the rings, said surfaces being spaced apart at all points to form an annular gap of substantially uniform width of capillary magnitude for receiving a coating medium, said rings being mounted for rotation as a unit upon a common axis through their centers, means for supplying the medium to the gap, and means for guiding an article to be coated through the gap.

7. Apparatus for coating articles comprising two supporting means, a single ring on each of the supporting means and projecting laterally therefrom toward the other ring, a pair of opposed annular surfaces on the rings, said surfaces being spaced apart at all points to form an annular gap of substantially uniform width of capillary magnitude for receiving a coating medium, said rings being mounted for rotation as a unit upon a common axis through their centers, said rings and surfaces being arranged to be partially submerged in a supply of a coating medium, and means for guiding an article to be coated through an unsubmerged portion of the gap.

8. Apparatus for coating articles comprising two supporting means, a single ring on each of the supporting means and projecting laterally therefrom toward the other ring, a pair of opposed annular surfaces having circular peripheries on the rings, said surfaces being spaced apart at all points to form an annular gap of substantially uniform width of capillary magnitude for receiving a coating medium, said rings being mounted for rotation as a unit upon a common axis through their centers, means for supplying the medium to the gap, and means for guiding an article to be coated through the gap along a path extending through the region surrounded by the gap.

9. Apparatus for coating articles comprising two supporting means, a single ring on each of the supporting means and projecting laterally

5

therefrom toward the other ring, a pair of opposed annular surfaces having circular peripheries on the rings, said surfaces being spaced apart at all points to form an annular gap of substantially uniform width of capillary magnitude for receiving a coating medium, said rings being mounted for rotation as a unit upon a common axis through their centers, said rings and surfaces being arranged to be partially submerged in a supply of a coating medium, and means for guiding an article to be coated through an unsubmerged portion of the gap along a path extending through the region surrounded by the gap.

10. Apparatus for coating articles comprising two supporting means, a single ring on each of the supporting means and projecting laterally therefrom toward the other ring, a pair of opposed annular surfaces having circular peripheries on the rings, said surfaces being spaced apart at all points to form an annular gap of substantially uniform width of capillary magnitude for

6

receiving a coating medium, said rings being mounted for rotation as a unit upon a common axis through their centers, means for supplying the medium to the gap, means for rotating the rings as a unit, and means for guiding an article to be coated through the gap along a path extending through the region surrounded by the gap.

ERNEST K. BAUER.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

15	Number	Name	Date
	1,662,086	Stuhr	Mar. 13, 1928
	1,883,494	Berger	Oct. 18, 1932
	2,034,546	Weeks et al.	Mar. 17, 1936
20	2,331,207	Lodge	Oct. 5, 1943
	2,344,079	Burgenl et al.	Mar. 14, 1944