May 27, 1969 J. A. SPENCER 3,445,905

DANDY ROLL

Filed Aug. 31, 1966

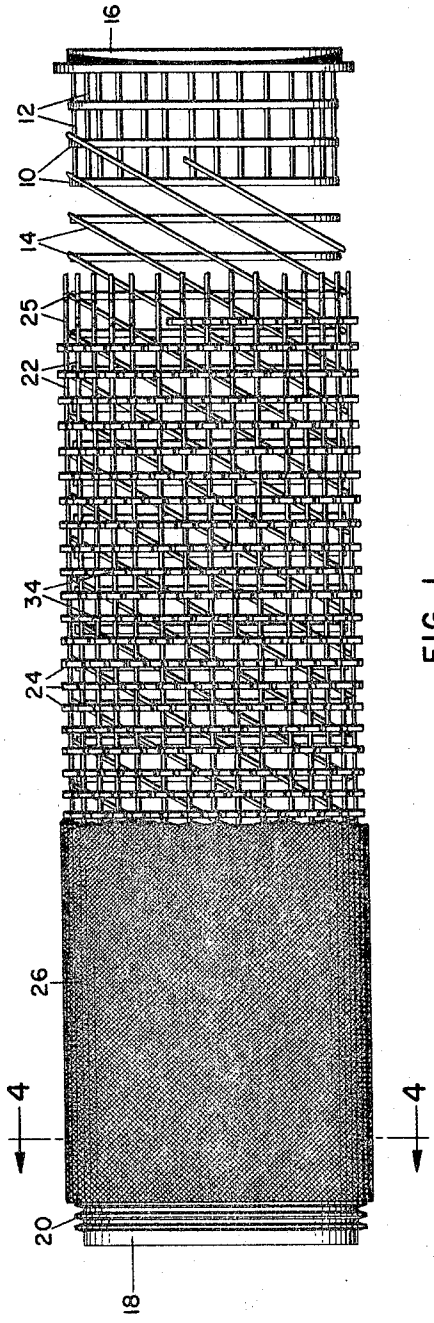


FIG. 1.

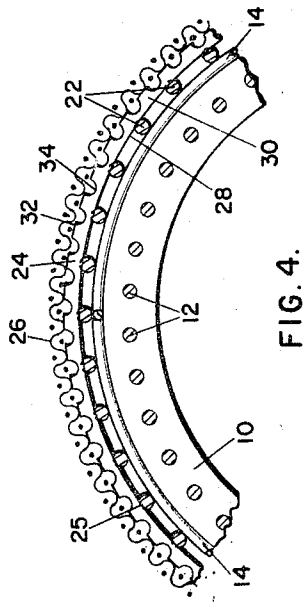


FIG. 4.

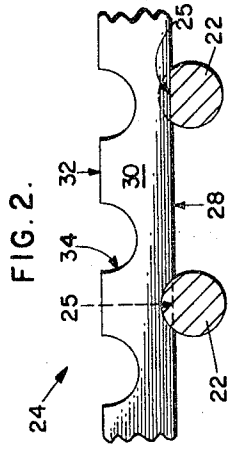


FIG. 2.

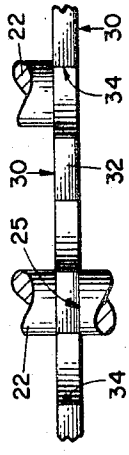


FIG. 3.

INVENTOR.
JOHN A. SPENCER
BY Kenwood Ross
ATTORNEY.

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DANDY ROLL

John A. Spencer, South Hadley Falls, Mass., assignor to H. M. Spencer, Inc., Holyoke, Mass., a corporation

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ABSTRACT OF THE DISCLOSURE

In a cylinder roll for papermaking machines, a cylindrical supporting structure for a wire mesh covering comprising, a plurality of longitudinally-spaced coaxial circular head members, a plurality of circumferentially-arranged supporting members extending between said head members and arranged parallel to the axis of said head members and connected thereto, a spirally-wound thin gauge winding wire of rectangular cross section having longitudinally-spaced outwardly projecting notches, and a wire mesh covering outwardly spaced from said supporting members and supported by said winding wire.

The present invention relates to improvements in wire faced rolls for papermaking machines, particularly dandy rolls.

Primary objects of the invention are to provide a roll structure which may be manufactured economically, and will be extremely rigid and light in weight, while at the same time providing maximum drainage and freedom from clogging and even water dispersion within and without the roll.

A dandy roll is usually constructed in the from of a hollow cylinder having an open cyclindrical frame provided at the ends with supporting heads or spiders having a shaft or axially-extending trunnions by which the dandy roll is rotatably mounted over the wire belt of the paper making machine. The surface of the dandy roll is covered with a fine mesh wire fabric similar to that used for the wire of the papermaking machine and the dany roll rests upon the formation on the wire to give the desired form and finish to the paper being formed. Since the paper at this point in the manufacture contains a substantial amount of water, there is a tendency for the interstices of the dandy roll to become clogged with material from the constituents of the partially-formed paper, which forms marks and blemishes on the paper, and it is customary to employ water sprays or the like on the inside of the dandy roll to keep the dandy roll frame and fabric from becoming so clogged.

The roll is mounted to rotate on the continuously moving sheet of paper being made. The rotation of the roll is caused by resting it on the paper stock at the place where the watermark is to be applied to the moving sheet. As the paper stock reaches the dandy roll location in a papermaking machine, the sheet is carrying considerable excess water, which is leaving the stock so rapidly as to mat the fibers thereat.

It is a salient object of this invention to provide a dandy roll construction in which the tendency to clogging is minimized and in which the water sprays may more efficiently operate to prevent accumulation of the paper material about the frame members and in the interstices of the wire fabric covering.

Heretofore, the usual practice in manufacturing a dandy roll has been first to construct a rigid frame composed of rods supported lengthwise in relation to spiders, these rods and spiders being soldered to all intersecting points so as to provide a rigid support assembly. Upon this support, a wire is wound helically to provide a foundation support for the fine wire mesh covering, which is placed about the roll and sewed or otherwise fastened at the seam. This construction has the disadvantage that the contacting relation between the wire mesh covering and the wound wire supporting structure prevents maximum drainage and causes fibers to become clogged therein.

It is proposed in the present invention to provide a roll in which the supporting frame includes a specially-prepared winding wire so constducted and arranged as to provide a rigid cylindrical structure having adequate area for supporting the wire mesh covering with a minimum of contact between such wire and covering, to the end that there is no appreciable obstruction to the mesh openings, and to provide drainage openings of relatively large extent spaced inwardly from the wire mesh covering.

It is proposed to give such structural shape to the winding wire that it is extremely rigid and at the same time provides guide surfaces for the unobstructed passage of the drainage of water therepast.

It is further proposed to provide a structure which will enable rolls of any desired lengths and diameters to be produced, and in which a perfect cylindrical surface concentric to the axis of the roll may be obtained with facility.

With the above and other objects in view, an embodiment of the invention is shown in the accompanying drawing, and this embodiment will be hereinafter more fully described with reference thereto, and the invention will be finally pointed out in the claims.

In the drawing:

FIG. 1 is a view, in front elevation, of a dandy roll, portions being broken away to show the supporting structure and the winding wire thereof;

FIG. 2 is a fragmentary view, in side elevation, on an enlarged scale, of the slotted winding wire and reinforcing members of the invention;

FIG. 3 is a fragmentary view, in top plan, on an enlarged scale, of the slotted winding wire and reinforcing members of the invention; and

FIG. 4 is a sectional view, on an enlarged scale, substantially on the line 4—4 of FIG. 1.

Referring to the drawing, the dandy roll, according to the exemplary illustrated embodiment of the invention, comprises first a subframe consisting of a plurality of longitudinally-spaced annular spiders **10** held in relation to each other by means of a plurality of suitably-spaced rods or truss wires **12** supported lengthwise with respect to the spiders by being soldered, brazed or otherwise secured at their interconnecting points.

Helically-wound reinforcing wires **14** extend from and are secured to an end header **16** at one end of the roll to an end header **18** at the opposite end of the roll. These wires are preperably of a circular cross section and extend in the direction of a helix having a very large pitch.

In some rolls, this subframe could be comprised of relatively heavy round wire configured to form a coarse tubular network with the contacting portions being soldered to form a rigid structure in lieu of the spider arrangement.

It will be mentioned here that the roll may be shafted as by a shaft extending entirely through the roll so that the spiders may be shaft supported or by means of short end shafts serving as trunnions secured to the end headers in which case the intermediate spiders would not be shaft supported but held in situ by their connection with the cylindrical supporting structure.

Contrariwise, the roll may be open-ended as shown, and provided with suitable drive means **20** for engagement with such as a pulley.

To continue with the description of the exemplified form, the cylindrical supporting structure additionally includes a plurality of parallel, spaced longitudinally-extending-from-roll-end-to-roll-end reinforcing members **22** which are secured to the outer peripheral surfaces of the helically-wound reinforcing members **14**.

It is preferable to have the reinforcing members **22** cross the successive turns of the helix formed by the reinforcing wires **14** midway between a pair of rods. The successive members may be spaced apart circumferentially a distance equal to 2 of the convolutions of the helix which gives a symmetrical structure.

The outer edges or faces of the reinforcing members **22** serve to support a winding wire **24** wound helically thereover to provide a foundation support for the fine wire mesh covering **26**.

The said outer edges or faces of the reinforcing members **22** are notched as at **25** to receive and hold the winding wire in place.

Such winding wire **24** is wound in spiral formation lengthwise of the roll and is formed from a strip of relatively thin sheet metal, preferably bronze or brass, but which may be of any suitable material.

The convolutions of the winding wire are substantially closer together than the spacing of the reinforcing wires **14**.

In assembly, the base of the winding wire **24** is placed in the notches **25** of the reinforcing members **22** in manner such that the openings of one winding are offset with respect to the openings of the next adjacent windings, as shown clearly in FIG. 1, to provide a uniformly distributed supporting surface for the wire mesh covering.

The contacting surfaces of the winding wire **24** and the reinforcing members **22** may be secured together by brazing or by coating them with solder and then sweating them altogether.

The winding wire is formed with a flat base **28** and vertical side walls **30** which are of a height substantially four times the width of the base so as to be substantially radial with respect to the roll axis. The side walls terminate in an upper bearing surface **32** upon which the wire fabric covering **26** is supported.

The winding wire is provided in notched form on its upper surface to provide a plurality of longitudinally spaced transversely disposed substantially semicircular notches **34**.

After assembly of the winding wire on the roll, and before mounting of the wire mesh covering, the roll is preferably placed in a lathe or grinding machine, and the outer surface is machined or ground to a true cylinder with respect to the axis. Thus any irregularities that may occur in any projections in the winding wire will not impair the production of a perfect cylindrical supporting surface.

The fine mesh wire covering is placed over the cylindrical supporting roll in contact with the outer supporting edges of the winding wire and is sewed, soldered, or otherwise suitably secured at the seam to complete the finished roll. In order to prevent any shifting or creeping of the wire mesh covering, its end edges are secured at the underside by spots of solder connecting it at suitably spaced points to certain of the end convolutions of the winding wire.

Inasmuch as the winding wire forming the supporting structure may be of a very thin gauge light metal, while still providing a rigid support for the wire covering, the edge surfaces of the wire in contact with the wire mesh can approximate the diameter of the wires from which the wire mesh is woven, so that there will be no appreciable obstruction to the mesh openings. At the same time, the relatively large openings which are spaced inwardly from the wire mesh covering, provide clear passage for the drainage of water therethrough without any chance of clogging, the side wall surfaces of the portions being self-cleaning as water passes thereover. In the event of damage to a roll, it is a simple matter to repair it by removing and replacing the damaged part, and thereupon refinishing the surface of the whole roll to provide a perfect cylindrical support.

Such arrangement offers maximum rigidity and stiffness and at the same time permits maximum drainage by offering minimum obstruction to the passage of water from the outside of the roll toward the center. This is accomplished by winding the strip on edge, thus presenting to the entrance of the water its smallest dimension.

The upright stay winding wire provides a surface which is free of any sharp corners in which paper fibers may become lodged, the notches acting as a deflecting funnel-like guide for draining the water which passes through the mesh covering of the roll.

It allows better drainage to the woven mesh top cover on the dandy roll, and helps to keep the dandy roll clean of paper stock and disperses water evenly inside and outside of the dandy roll. This improves the formation of the paper stock by breaking up the water that gets trapped inside the dandy roll.

The slotting of the winding wire reduces the current of water which follows the travelling winding wire. This eliminates streaking or rib mark and water spots in the sheet of paper which disturbs the paper formation at contact with the dandy roll.

Too, it eliminates the use of an open mesh undercover, which collects paper stock thus reducing drainage.

The stay wire may be of such cross section that it presents to the inflowing water its smallest dimension. That is, the cross-sectional form of the wire may be somewhat triangular, that is, the portion at the top or nearest the outside circumference of the dandy-roll may be somewhat smaller than the bottom of the wire. Such form would provide less obstruction to the inward flow of water near the outside of the dandy roll where it is most likely to get clogged up and the necessary size to furnish the requisite strength is spaced a little farther from the outside and would also provide greater rigidity and strength to the complete structure than the same weight of metal of rectangular cross-section.

It will be noted that the winding wire is relatively higher than it is thick, in this way supporting the wire fabric well above the rods so as not to be distorted thereby. The resulting open spaces between the convolutions of the wire are thus wider than would be the case with the ordinary round winding wire leaving the same center line spacing. At the same time, the broader base of the winding wire is more firmly locked to the bars than in the case of round winding wires so as to furnish a very substantial bearing support for the wire and its fabric.

As will be clear from FIG. 4, this construction provides a greater degree of openness and natural drainage than is the case when the frame is constructed of round wires in some cases. The bearing surface of the wire is of sufficient breadth to support the fabric without a tendency to crease or otherwise deform the latter and the sides of the winding wire result in larger openings and spaces through which the rinsing sprays may operate with maximum efficiency and prevent clogging. The bearing surfaces which approximate in width that of the interstices of the fabric present substantially less obstruction than the usual round wires.

With dandy rolls so constructed, manufacturing blemishes such as foam spots and bar markings are eliminated in the manufacture of paper, and the rolls may be run at higher speeds.

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

1. In a cylinder roll for papermaking machines, a cylindrical supporting structure for a wire mesh covering comprising, a plurality of longitudinally-spaced coaxial circular head members, a plurality of circumferentially-arranged supporting members extending between said

head members and arranged parallel to the axis of said head members and connected thereto, a spirally-wound thin-gauge winding wire of rectangular cross-section having longitudinally-spaced outwardly projecting notches, and a wire mesh covering outwardly spaced from said supporting members and supported by said winding wire.

2. In a cylinder roll according to claim 1 including a helically-wound wire sandwiched between the circular head members and the supporting members.

3. In a cylinder roll according to claim 1, said supporting members having a plurality of spaced notches in their outer peripheral surfaces, said winding wire being supported in said notches.

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BILLY J. WILHITE, *Primary Examiner.*