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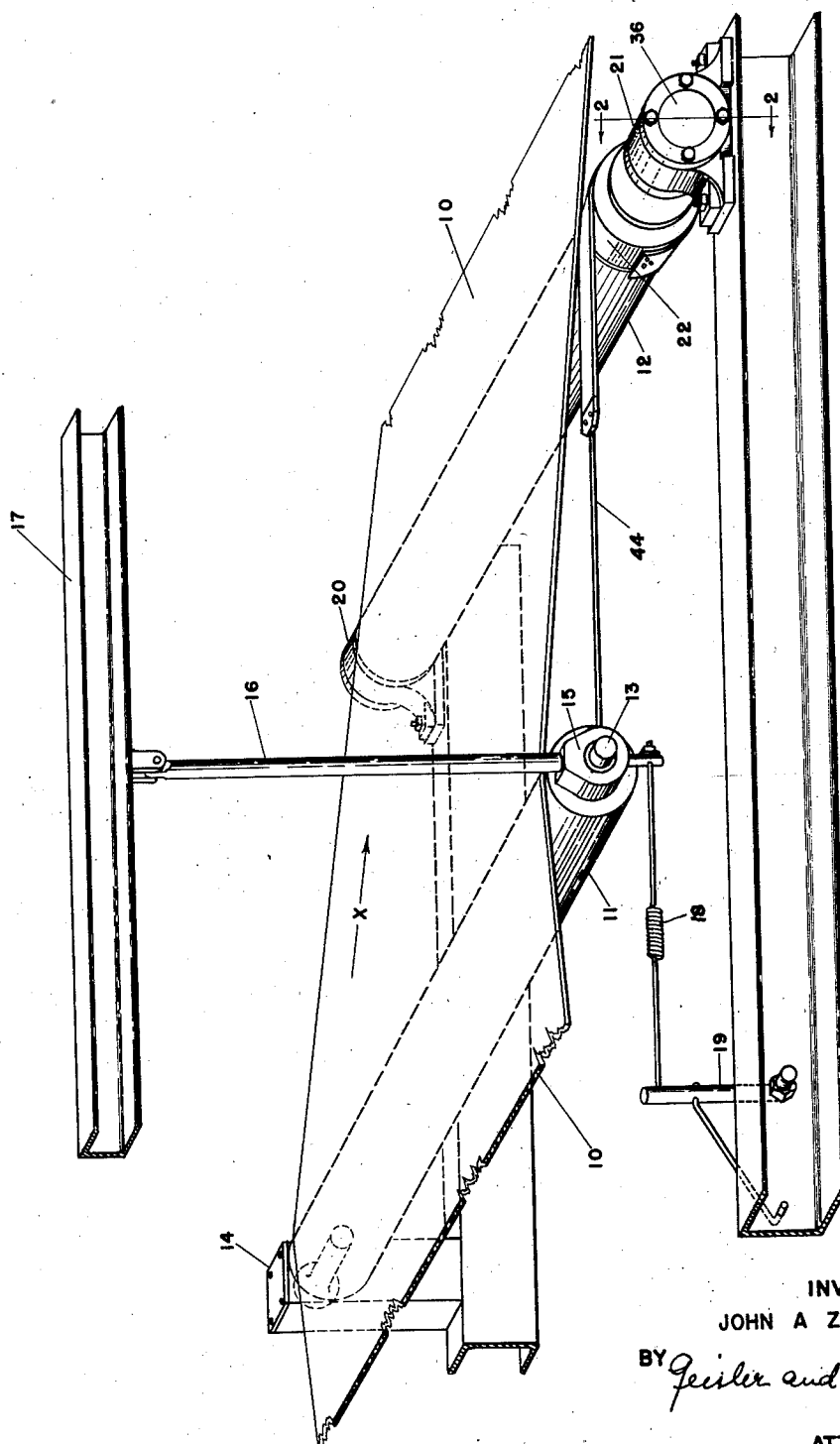
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2,431,856

COMBINED ROLLER AND SPOOL MOUNTING FOR PAPER MACHINES

Filed Jan. 3, 1945

2 Sheets-Sheet 1



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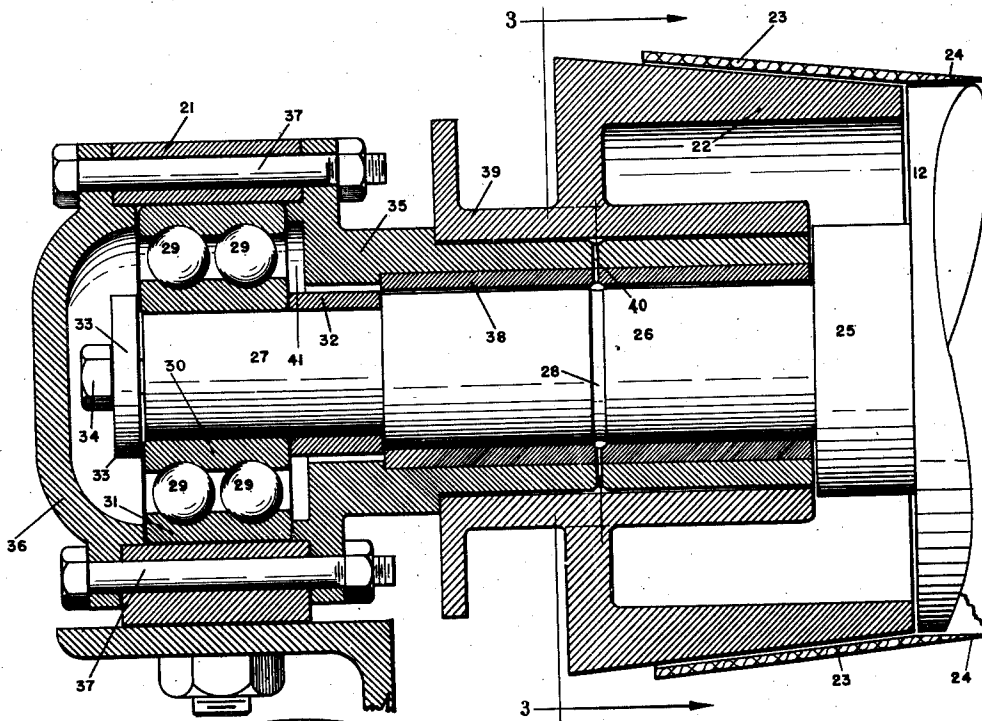


FIG-2

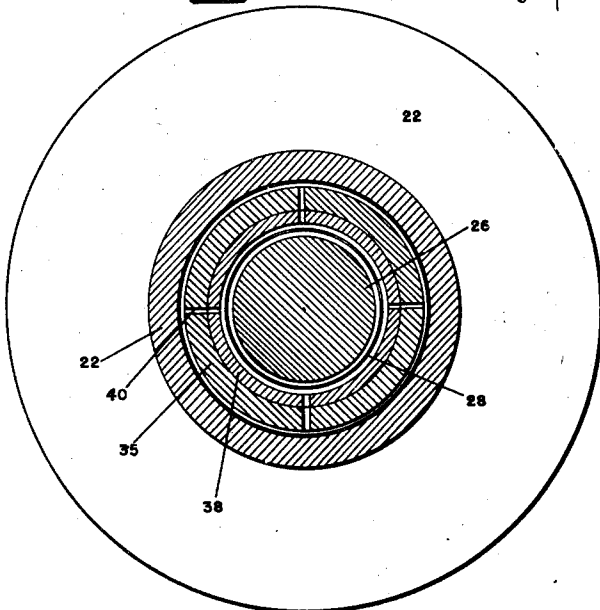


FIG-3

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COMBINED ROLLER AND SPOOL MOUNTING
FOR PAPER MACHINES

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4 Claims. (Cl. 308—20)

1

This invention relates to the endless belt-like carriers or "felts" on which the paper pulp mat or web is carried in a paper-making machine.

More specifically this invention relates to the guide rolls over which the felt passes, and which operate to keep the felt in proper position, and the means for adjusting the position of such guide rolls.

There is a frequent tendency for the felt to creep towards one end or the other of the rollers over which it passes and consequently, to overcome this tendency and keep the felt properly positioned, it is common practice to employ special felt guide rolls. These guide rolls as a rule are mounted on shafts which have the position of one end fixed and the other end movably mounted so that the guide roll can be moved out of perpendicularity with the direction of travel of the felt. As is well known, the tendency of the traveling felt is to follow a path perpendicular to the axis of rotation of any roll or roller over which the felt is passing. Consequently, a slight change in position of one end of the shaft of a felt guide roll will cause the felt to creep towards whatever end would bring the line of travel more nearly perpendicular to the guide roll axis.

Various means for causing an automatic change of position of one end of the guide roll shaft or axis are at present being used. As part of such means a control "spool" is often located adjacent one end of a fixed roller and connected to the support for the movable end of the guide roll. Certain difficulties are presented with such control means and the principal object of this invention is to overcome these difficulties and provide an improved control means and mounting for the same. In the accompanying drawings:

Fig. 1 is a fragmentary isometric perspective of a part of a paper-making machine, showing one of the felt guide rolls and my improved control means connected therewith;

Fig. 2 is an axial section through the main part of such control means, this section corresponding to line 2—2 of Fig. 1; and

Fig. 3 is a section taken transversely through the control spool on the plane indicated by the line 3—3 of Fig. 2.

In Fig. 1 the belt-like carrier or endless felt on which the paper mat is carried is shown at 10. The felt passes over the guide roll 11 and the fixed roller 12 located a short distance from the guide roll 11. The guide roll shaft 13 is pivotally journaled at one end in a suitable stationary bearing 14. At the opposite end the shaft 13 is journaled in a bearing 15 carried on the bottom end of a

2

pivotally supported arm 16. The arm 16 is pivotally suspended from a machine frame member 17 located above the corresponding end of the guide roll.

A spring 18, having one end attached to the bottom of the bearing 15 and the other end connected to any suitable member, such as the member 19 mounted on the machine frame, is so arranged as to pull the arm 16 and bearing 15 towards the left, as viewed in Fig. 1, and thus move the axis of the guide roll 11 out of perpendicularity with the line of travel of the felt 10. The direction of travel of the felt 10 is indicated by the arrow X in Fig. 1.

The axis of the felt-supporting roller 12 is fixed, the shaft of this roller being supported in suitable bearing blocks 20 and 21, secured to opposite sides of the machine frame.

A spool 22 is rotatably mounted at one end of the roller 12 and this spool is rotatable independent of the roller 12. A leather strap 23 is carried on the spool 22, one end of the strap being attached to the spool and the other end of the strap being attached to a rope or small cable 44, which in turn is connected to the movable bearing 15 of the guide roll shaft 13. The strap 23 extends counter-clockwise around the spool 22 and thus in the opposite direction from the clockwise direction in which the roller 12 is rotated by the passage of the felt 10 over the roller 12.

The surface of the spool 22 may be either truly cylindrical or slightly tapered in the form of a cone frustum, as shown in Fig. 2. I consider the latter shape preferable. The smaller diameter end of the spool, which is approximately of the same diameter as the roller 12, is placed adjacent the roller end and the larger diameter end of the spool is at the outside. The strap 23 preferably extends a slight distance over the roller 12 and its inner edge in such case is beveled on the underside, as shown at 24 (Fig. 2), to provide a slight clearance between the underside of the strap and the surface of the roller 12, and thus prevent undue wear on the inner edge of the strap and also to enable the felt to slide on to the strap without hesitancy or difficulty whenever the felt starts to move too far towards the spool end of roller 12. The result of such movement of the felt on to the strap will be described later.

The mounting for the spool 22 and for the roller shaft at that end of the roller 12, is the most important feature of my invention. The roller shaft 25 has an intermediate reduced diameter section 26 and a further reduced diameter outer section 27, with a resulting annular shoulder where one

3

section joins another. A small groove 28 extends around section 26, as shown in Fig. 2, the purpose of which will be explained later. The roller shaft is supported in suitable bearings, such as the ball bearings 29 mounted in the inner and outer races 30 and 31. The inner race 30 is held in place by the spacer ring 32 and by the disk 33, which is secured on the end of the roller shaft by the nut 34. The outer race 31 is securely mounted in the bearing block 21 and held in place between a tubular housing 35 on the inside and the end sealing cap 36 on the outside. The cap 36 and the tubular housing 35 are secured to the bearing block 21 by means of bolts 37. A bronze bushing 38 is attached to the inside surface of the tubular housing 35. The outside surface of the tubular housing 35 has a reduced diameter portion 39 on which the spool 22 is supported.

A plurality of holes or channels 40 extend radially through the bushing 38 and tubular housing 35 in registration with the annular groove 28 and the channels 40 preferably terminate approximately at the center of the bearing surface for the spool on the housing 35.

Lubricant supplied to the space inside the outer end cap 36 will not only keep the bearings 29 lubricated but considerable portion of such lubricant will also be delivered through the passageway 41 and thence pass between the bushing 38 and the shaft section 26. Furthermore, some of this lubricant collecting in the shallow groove 28 will be caused by the centrifugal force generated by the roller shaft to pass through the channels 40 and from thence between the bearing surfaces of the spool and the reduced diameter portion 39, which serves as the bearing surface for the spool on the housing 35.

During the travel of the felt 10 carrying the paper web or mat in the paper making machine, let it be assumed that the spring 18 has pulled the bearing 15 of the guide roll 11 slightly to the left, as viewed in Fig. 1, and thus moved the axis of the guide roll slightly out of perpendicularity with the line of travel of the felt. Since the tendency of the felt is to follow a path which is perpendicular to the axis of rotation of a roller with which it is in frictional contact, the felt 10 will gradually creep towards the movable end of the guide roll 11 and thus will gradually creep towards the spool adjoining the end of the roller 12. However, when the edge of the felt starts to move over the strap 23 the frictional engagement of the felt with the strap will cause the strap and spool 22 to be given a slight clockwise rotation, as viewed in Fig. 1, which will cause a pull to be exerted on the movable bearing 15 against the force of the spring 18. This will cause the end of guide roll 11 to be moved slightly to the right. When this change in the position of the axis of the guide roll occurs the tendency of the felt will then be to creep towards the opposite end of the guide roll and thus to move away from contact with the strap 23. But when the felt no longer engages the strap 23 the pull to the right on the movable bearing 15 is released and the spring 18 then again functions to move the bearing 15 slightly to the left, thus preventing the felt from creeping too far towards the opposite end of the guide roll. This method of preventing the felt from creeping too far to one end or to the other of the guide roll is well known.

Thus, the spool 22 will remain stationary on the tubular housing 35 most of the time while the roller 12 is rotating rapidly, but the spool 22 will occasionally be required to rotate a few degrees

4

clockwise and then counter-clockwise on the stationary housing.

Since considerable water drips from the paper mat as it is carried on the felt over the various rollers in the paper-making machine, I have found, with previous mountings for similar control spools, that some of this water dripping down over the ends of the rollers will get in between the bearing surface of the spool and the supporting bearing surface of the housing on which the spool is mounted, with the result that rust will gradually set in and often also added corrosion caused by chemicals in solution in the water. The fact that the spool rotates so seldom and then only rotates slightly on each occasion, makes it difficult to keep the bearing surfaces between spool and stationary housing completely lubricated, and makes it difficult particularly to prevent water from entering between these bearing surfaces. However, with the special mounting which I have developed I have been able to overcome this difficulty and the lubricant delivered to the bearings 29 will not only pass between the bushing 38 and the shaft section 26 during the rotation of the roller shaft, but some of this lubricant will be delivered to the space between the bearing surface of the spool 22 and the surface of the reduced diameter portion 39 of the housing 35. I have found, in fact, that the rotation of the roller shaft will cause sufficient lubricant under ordinary circumstances to be delivered to this space to keep the same so completely filled with lubricant that all water is prevented from entering into this space regardless of whether the spool rotates or not. Thus, danger of any rust or corrosion developing on the bearing surfaces of the spool or housing is entirely eliminated and the spool is kept properly lubricated at all times to enable it to rotate on the housing whenever this should be required in the operation of the felt guide means.

I claim:

1. A combined roller and spool mounting for paper machines, comprising a bearing support, bearings for one end of the roller shaft mounted within said support, a stationary housing associated with said bearing support, a felt guide control spool rotatably mounted on said housing, a plurality of holes extending through said housing and terminating at the bearing surface for said spool on said housing, means for delivering lubricant about said shaft in said housing, whereby part of said lubricant about said shaft in said housing will be caused by the rotation of said shaft to pass through said holes and be forced between the bearing surfaces of said spool and housing, thereby keeping said spool lubricated and preventing water or other undesirable substances from entering between the bearing surfaces of said spool and housing.

2. A combined roller and spool mounting for paper machines, including a bearing block, bearings for one end of the roller shaft mounted within said block, a stationary tubular housing attached to said bearing block, a felt guide control spool rotatably mounted on said housing, a plurality of channels extending radially through said housing and terminating at the bearing surface for said spool on said housing, a lubricant passageway leading inwardly from said bearings into said tubular housing, whereby lubricant from said bearings will spread over the roller shaft within said housing and part of such lubricant will be caused by the rotation of said shaft to pass through said radial channels and be forced between the bearing surfaces of said spool and hous-

5

ing, thereby keeping said spool lubricated and preventing water or other undesirable substances from entering between the bearing surfaces of said spool and housing.

3. In a paper making machine having a felt supporting roller, a bearing support, bearings for one end of the roller shaft mounted within said support, a stationary housing associated with said bearing support, a felt guide control spool rotatably mounted on said housing, a plurality of channels extending through said housing and terminating at the bearing surface for said spool on said housing, an annular groove extending around the roller shaft within said housing, said channels registering with said groove, means for delivering lubricant about said shaft in said housing, whereby part of said lubricant about said shaft in said housing will fill said groove and will be caused by the rotation of said shaft to pass through said channels and be forced between the bearing surfaces of said spool and housing, thereby keeping said spool lubricated and preventing water or other undesirable substances from entering between the bearing surfaces of said spool and housing.

4. In a paper making machine having a felt supporting roller, a bearing support, bearings for one end of the roller shaft mounted within said support, a stationary tubular housing attached to said bearing support, a felt guide control spool rotatably mounted on said housing, a tubular bushing within said stationary housing, a plurality of holes extending radially through said hous-

6

ing and bushing and terminating at the bearing surface for said spool on said housing, an annular groove extending around the roller shaft within said bushing and housing, said holes registering with said groove, a lubricant passageway leading inwardly from said bearings into said tubular housing, whereby lubricant from said bearings will spread over the roller shaft within said bushing and housing and will fill said groove and will be caused by the rotation of said shaft to pass through said radial holes and be forced between the bearing surfaces of said spool and housing, thereby keeping said spool lubricated and preventing water or other undesirable substances from entering between the bearing surfaces of said spool and housing.

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