

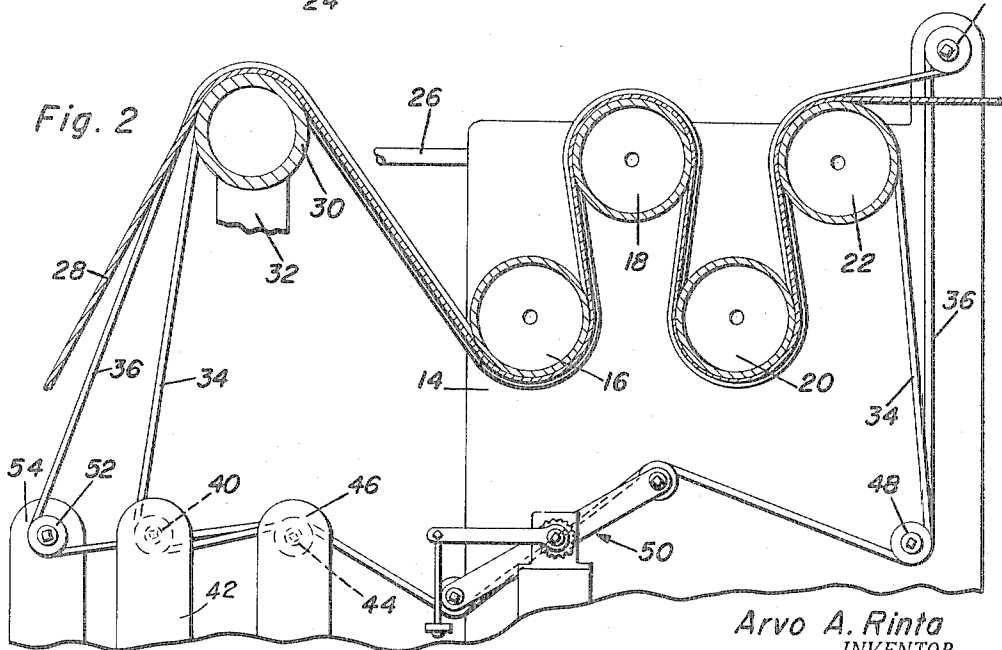
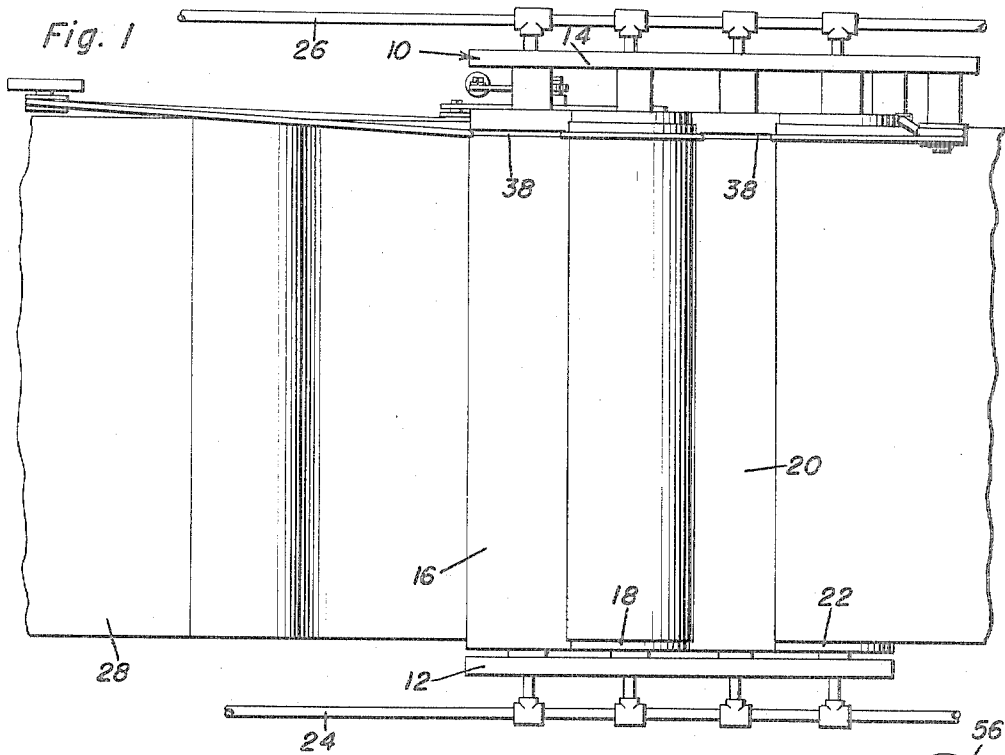
Oct. 4, 1955

A. A. RINTA  
ROPE TENSIONER

2,719,435

Filed June 30, 1952

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

Fig. 3

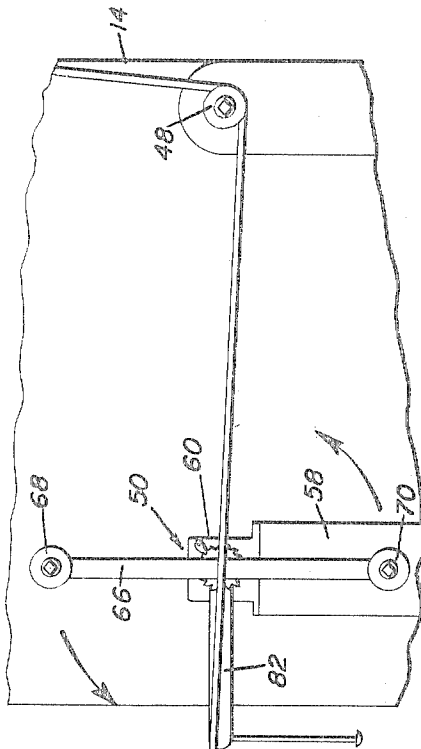


Fig. 4

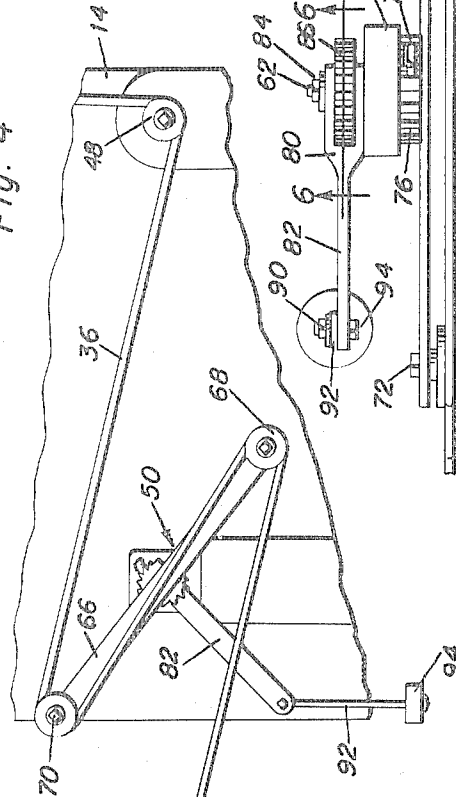


Fig. 5

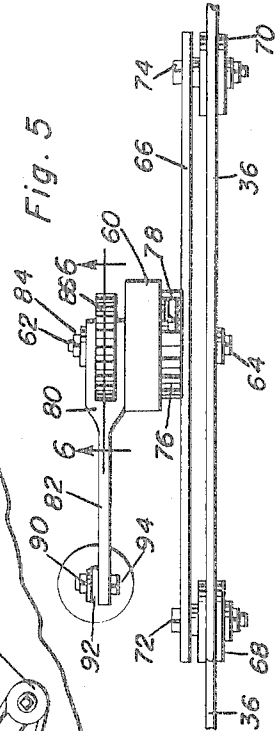
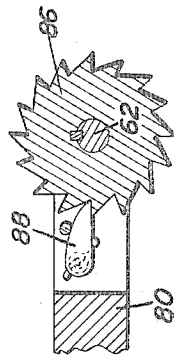


Fig. 6



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2,719,435

**ROPE TENSIONER**

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Application June 30, 1952, Serial No. 296,470

3 Claims. (Cl. 74—242.11)

This invention relates in general to tensioning means, and more specifically to an adjustable rope tensioner.

The primary object of this invention is to provide an improved rope tensioner which may be utilized in combination with a travelling rope for applying tension to the same, said tension being variable and easily controlled.

Another object of this invention is to provide an improved rope tensioner which includes a rotatable arm having connecting means for connecting the same to an intermediate portion of a rope, said rotatable arm being rotated by a weight attached to a crank arm and being adapted to partially double the rope upon itself whereby all slack is taken up and the desired amount of tension is placed on the rope.

Another object of this invention is to provide an improved rope tensioner which may be attached to an intermediate portion of a rope for tensioning the same, said rope tensioner being of a construction whereby it may be quickly engaged and disengaged from the rope.

Another object of this invention is to provide an improved rope tensioner which is of a relatively simple construction and may be conveniently mounted whereby the same is economically feasible.

A further object of this invention is to provide an improved rope tensioner for use with paper drying machines, said rope tensioner engaging a continuous rope of the paper drying machine and applying the desired tension to the same whereby the paper being made by the machine is led through drying rollers.

With these objects definitely in view, this invention resides in certain novel features of construction, combination and arrangement of elements and portions as will be hereinafter described in detail in the specification, particularly pointed out in the appended claims, and illustrated in the accompanying drawings which form a material part of this application and in which:

Figure 1 is a top plan view of the intermediate portion of a paper making machine and shows the construction of drying rolls for the same, the drying rolls being provided with continuous ropes for leading paper therethrough;

Figure 2 is a fragmentary longitudinal vertical sectional view taken through that portion of the paper making machine illustrated in Figure 1 and showing the general arrangement of the ropes for leading paper through the drying rolls, also illustrated is tensioning means for tensioning the ropes in order to clamp the paper under the desired pressure;

Figure 3 is a fragmentary side elevational view of the lower part of the paper drier of Figure 1 and shows the general relationship of one of the ropes and its tensioning means, the tensioning means being disconnected from the rope and the rope extending straight between two associated sheaves;

Figure 4 is a fragmentary side elevational view similar

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to Figure 3 and shows the rope tensioner in its rope tensioning position;

Figure 5 is an enlarged top plan view of the rope tensioner of Figures 3 and 4 and shows the general construction thereof; and

Figure 6 is an enlarged fragmentary longitudinal vertical sectional view taken substantially upon the plane indicated by the section line 6—6 of Figure 5 and shows the arrangement of a ratchet and pawl construction for permitting the adjustment of a crank arm with respect to a rotatable arm of the rope tensioner.

Similar characters of reference designate similar or identical elements and portions throughout the specification and throughout the different views of the drawings.

Referring now to the drawings in detail, it will be seen that there is illustrated in Figures 1 and 2 a drier portion 10 of a conventional paper making machine. The drier portion 10 includes a pair of spaced parallel side frames 12 and 14 between which extend rotatable drying rolls 16, 18, 20 and 22. Also carried by the side frames 12 and 14 are steam inlet and outlet pipes 24 and 26, respectively, which are connected to each of the drying rolls. It will be understood that the drying rolls 16, 18, 20 and 22 are hollow and normally filled with steam during the drying operation whereby paper, such as the continuous sheet of paper 28, passing thereover is dried as it moves along.

As is best illustrated in Figure 2, the paper 28 first passes over a roller 30 mounted on a support 32 and then down around and under the drying roll 16. The paper then advances outwardly over around and down on the drying roll 18 into engagement with the drying roll 20. The paper 28 passes from the drying roll 20 up around the drying roll 22 and off to the right, as is viewed in Figure 2 to adjacent paper making machinery.

It will be understood that newly made paper 28 passing around the drying rolls has a relatively low tensionable strength and may not be easily fed through the drying rolls when either a new sheet of paper 28 is being formed or that the one passing therethrough suddenly breaks. Therefore, one edge of the paper 28 is passed between a pair of ropes 34 and 36 which are under tension and clamp the paper 28 therebetween to lead the same through the drying rolls. It will be understood that although the paper 28 has been described as passing from the roller 30 to the drying roll 16, it will be understood that the paper 28 actually enters the drying machine from the right, as is illustrated in Figure 2. In order that the paper 28 urged through the drying rolls by the ropes 34 and 36 may have firm engagement with the drying rolls, the same are provided with continuous grooves 38 adjacent their edge over which the ropes 34 and 36 pass for receiving the same.

Inasmuch as the uppermost rope 36 must pass from a point outside of the edge of the paper 28 to an overlying relationship with the same and then back to a point outside of the edge of the paper, the portion of the rope 36 not in actual engagement with the paper 28 is disposed out of alignment with the rope 34. It will be seen that the rope 34, after it passes over the roller 30, moves downwardly and around a sheave 40 carried by a support 42. The rope 34 then passes over a sheave 44 which is supported by a support 46, the sheave 44 being in alignment with the sheave 40. The rope 34 then passes from the sheave 44 to and around a sheave 48 which is carried by the side frame 14 of the drying mechanism 10. Disposed between the sheaves 44 and 48 is a tensioning device or rope tensioner, which is referred to in general by the reference numeral 50. It will be seen that the rope 34 then passes from the sheave

48 up and around the drying rolls, and then back into engagement with roller 30.

The rope 36 passes over the drying rolls and around the roller 30 in the same manner as the rope 34 and in overlying relation to the same. After the rope 36 leaves the roller 30, it moves downwardly and outwardly where it is entrained over a sheave 52 carried by a support 54. The rope 36 leaves the sheave 52 and extends to the right, as is viewed in Figure 2, in spaced parallel relation to the rope 34 and is entrained over a second sheave 44 which is mounted on a second support 46. The rope 36 then passes around a second sheave 48 also carried by the side frame 14 and then up and around a sheave 56 carried at the upper end of the side frame 14. It will be noted that the sheave 56 overlies the edge of the paper 28 and the rope 36 moves inwardly in order to pass over the same. After the rope 36 leaves the sheave 56 it passes around the drying rolls. The rope 36 is connected to a rope tensioner, identical to the rope tensioner 50 and referred to by the same reference numeral, as it passes between the sheaves 44 and 48.

Referring now to Figures 3 through 6 inclusive, in particular, it will be seen that there is illustrated in detail the arrangement of the rope 36 at the bottom of the drying mechanism 10 and the specific construction of its rope tensioner 50. The rope tensioner 50 is mounted on a support 58 and includes a centrally located housing 60 which is secured to the support. Carried by the housing 60 is a transversely extending shaft 62 which is mounted in suitable bearings (not shown) whereby the same is freely rotatable. It will be noted that the shaft 62, as is best illustrated in Figure 3, is in alignment with the rope 36 prior to its engagement by the rope tensioner 50. Secured on one end of the shaft 62 by a nut 64 is a rotatable arm 66, the rotatable arm having mounted thereon adjacent the ends thereof a pair of sheaves 68 and 70. The sheaves 68 and 70 are rotatably mounted on shafts 72 and 74, respectively, carried by the rotatable arm 66 and have engaged therearound the rope 36.

In order that the rotatable arm 66 may be rotated in a rope tensioning direction only, a counter-clockwise direction as is illustrated in Figure 3, the rotatable arm 66 has secured to the side thereof adjacent the housing 60 a ratchet wheel 76 which is engaged by a spring urged pawl 78 carried by the housing 60. It will be seen that due to the action of the ratchet wheel 76 and the pawl 78, the rotatable arm 66 may be rotated in a counter-clockwise direction only unless the pawl 78 is released.

Mounted on the other end of the shaft 62 is a bifurcated end 80 of a crank arm 82 which is normally free to rotate on the shaft 62. The crank arm 82 is secured in place by a nut 84 threadedly engaged on the end of the shaft 62 and is normally prevented from rotating by a ratchet wheel 86 keyed to the shaft 62 and disposed between the legs of the bifurcated end 80. As is best illustrated in Figure 6, the ratchet wheel 86 is engaged by a spring urged pawl 88 carried by one of the legs of the bifurcated end 80 and limits the crank arms 82 to rotation in a clockwise direction, as is viewed in Figure 3. Pivotaly secured to the outer end of the crank arm 82 by a fastener 90 is a depending hanger 92 on which may be removably hung a conventional weight 94. If desired, a plurality of individual weights may be used.

Referring now to Figure 3 in particular, it will be seen that when the rope tensioner 50 is mounted out of engagement with the rope 36, the retainable arm 66 is in a substantially vertical position and the sheaves 68 and 70 carried thereby are out of engagement with the rope 36. When it is desired to engage the rope tensioner 50 with the rope 36 in order to tension the same, the rotatable arm 66 is rotated in a counter-clockwise direction and the sheaves 68 and 70 are engaged with the rope 36. Inasmuch as the rope 36 has been designed to have a large amount of slack therein, for a reason

which will be explained in more detail hereinafter, the rope 36 is substantially doubled upon itself with tensioners applied thereto, as is best illustrated in Figure 4. It will be understood that the tension in the rope 36 is due to the downward pull of the weight 94 on the crank arm 82 from which it is suspended and that the tension in the rope 36 may be varied by increasing or decreasing the size or number of the weights 94.

It will be seen that inasmuch as the ratchet wheel 76 in combination with the pawl 78 prevents counter-clockwise rotation of the rotatable arm 66, tension will not be removed from the rope 36 upon accidental removal of the weights 94. However, if it is desired to disengage the rotatable arm 66 from the rope 36, the pawl 78 may be lifted and the rotatable arm 66 freely rotated.

It will be seen that inasmuch as the ratchet wheel 86 in combination with the pawl 88 prevents counter-clockwise rotation of the crank arm 82 but permits clockwise rotation of the same, the crank arm 82 may be freely moved in a clockwise direction to adjust the same in order that the effective lever arm thereof may be varied. Inasmuch as the crank arm 82 has the greatest lever arm when it is in a horizontal position, it is desired that the same be in that position when the weight 94 is applied to tension the rope 36. Should it be desired to move the crank arm 82 in a clockwise direction, the same may be accomplished by raising the pawl 88 out of engagement with the ratchet wheel 86.

Although only the rope 36 has been specifically described relative to its associated rope tensioner 50, it is to be understood that a similar cooperation exists between the rope 34 and its associated rope tensioner 50.

It will be understood that the ropes 34 and 36 encircle the drying mechanism 10 at all times during the operation of the same, but are used only when first inserting the paper 28 through the same.

The operation of this device will be understood from the foregoing description of the details thereof, taken in connection with the above recited objects and drawings. Further description would appear to be unnecessary.

Minor modifications of the device, varying in minor details from the embodiment of the device illustrated and described here, may be resorted to without departure from the spirit and scope of this invention, as defined in the appended claims.

Having described the invention, what is claimed as new is:

1. A rope tensioner comprising a rotatable arm having rope engagement means at opposite ends thereof, a crank arm attached to said rotatable arm to vary the tension of an associated rope, first means carried by said crank arm for varying the pressure exerted on said crank arm, second means carried by said rotatable arm and said crank arm for varying the effective lever arm of said crank arm, said second means being in the form of a pawl and ratchet connection between said crank arm and said rotatable arm whereby the angle of said crank arm to the vertical may be selectively varied, said crank arm and said rotatable arm being rotatable about a common axis.

2. A rope tensioner comprising a rotatable arm having rope engagement means at opposite ends thereof, a crank arm attached to said rotatable arm to vary the tension of an associated rope, first means carried by said crank arm for varying the pressure exerted on said crank arm, second means carried by said rotatable arm and said crank arm for varying the effective lever arm of said crank arm, said first means being in the form of at least one weight removably suspended from a free end of said crank arm, said second means being in the form of a pawl and ratchet connection between said crank arm and said rotatable arm whereby the angle of said crank arm to the vertical may be selectively varied, said crank arm and said rotatable arm being rotatable about a common axis.

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3. A rope tensioner comprising a support, a shaft carried by said support, a rotatable arm carried by said shaft, rope engagement means at opposite ends of said rotatable arm, a crank arm pivotally carried by said shaft, said crank arm having a free end portion, a variable weight depending from said free end portion for varying the torque imposed by said crank arm, means adjustably connecting said crank arm to said rotatable arm to vary the effective lever arm of said crank arm, said means being in the form of a pawl and ratchet connection where-  
 10 by the angle of said crank arm to the vertical may be selectively varied irrespective of the angle of said rotatable arm.

58,015  
 364,489  
 495,445  
 589,003  
 687,295  
 742,259  
 1,013,288  
 1,014,980  
 1,089,381  
 1,505,940  
 2,326,714  
 2,475,426  
 2,549,501  
 2,578,123

6

## References Cited in the file of this patent

## UNITED STATES PATENTS

Bingham ----- Sept. 18, 1866  
 Dale ----- June 7, 1887  
 Woods et al. ----- Apr. 11, 1893  
 Luther ----- Aug. 31, 1897  
 Borton ----- Nov. 26, 1901  
 Tompkins ----- Oct. 27, 1903  
 Fuller ----- Jan. 2, 1912  
 Sykes ----- Jan. 16, 1912  
 Rhoades ----- Mar. 3, 1914  
 Berryman ----- Aug. 26, 1924  
 Wholton ----- Aug. 10, 1943  
 Ewaldson ----- July 5, 1949  
 McClelland ----- Apr. 17, 1951  
 Bendfelt ----- Dec. 11, 1951