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DRIER MECHANISM FOR PAPER MAKING MACHINES

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Fig. 1.

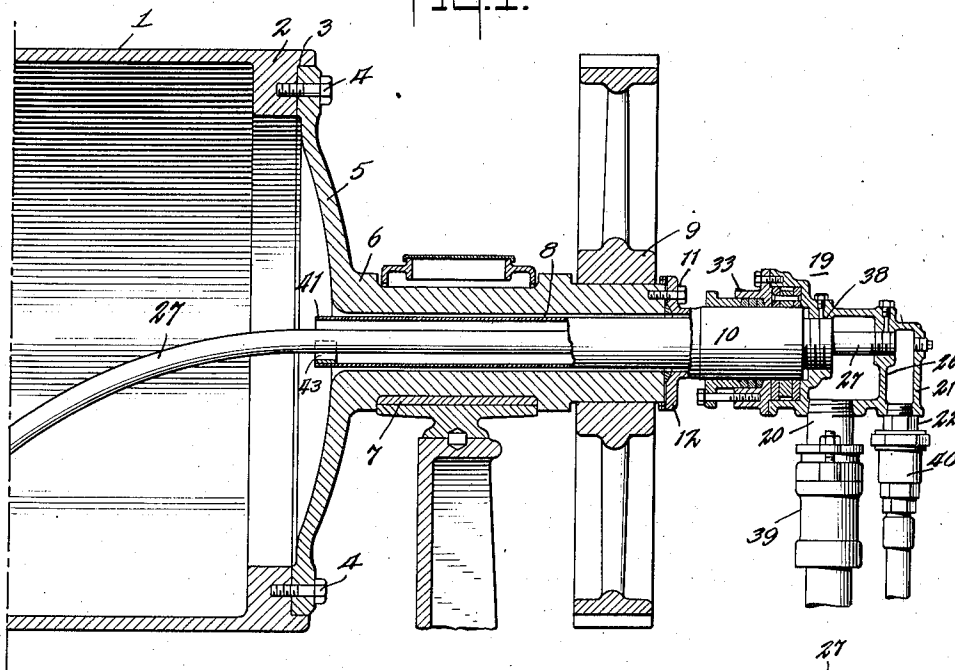


Fig. 3.

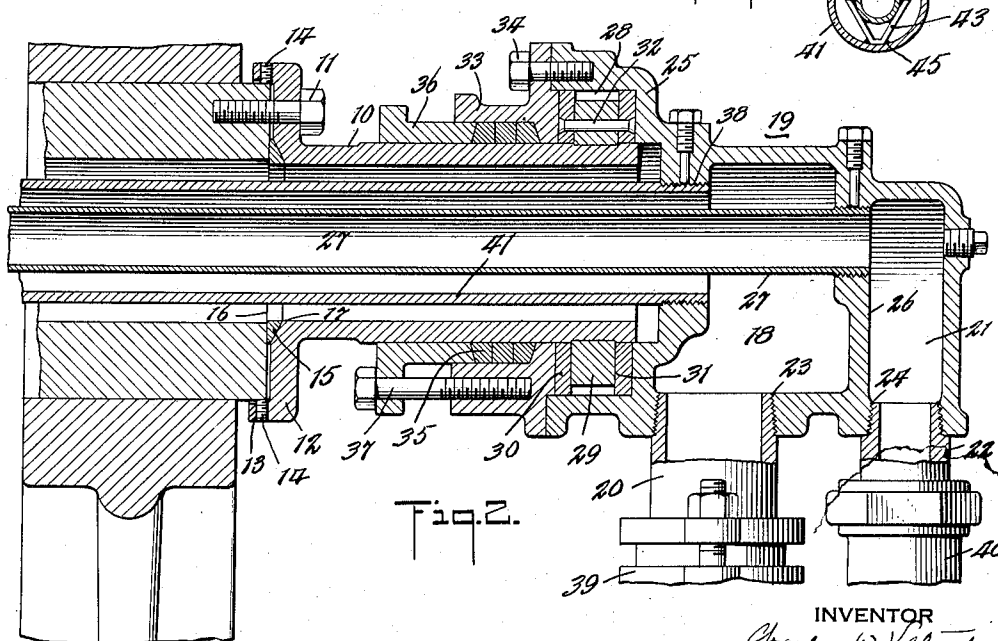
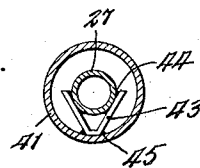


Fig. 2.

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DRIER MECHANISM FOR PAPER MAKING MACHINES

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7 Claims. (Cl. 285—10)

This invention relates to certain improvements in steam heated rotary drier cylinders, such as the drier rolls used in paper making machines, and particularly to improvements in the steam joints and the mechanism for supporting and adjusting the siphon pipe used with such driers.

As to certain of its features, the invention is useful with various hollow rolls which are to be steam heated, or from which the water of condensation must be extracted, but the invention will be described as employed with the drier rolls or cylinders of paper making machines for which it has been particularly designed. This drier mechanism for paper making machines comprises large hollow cylinders over which the web passes from the making end of the machine, and these cylinders are usually heated by steam, and where steam is used means must be provided for supplying the steam and withdrawing the water of condensation from the cylinders. Connected with these cylinders is a steam joint and a siphon tube or pipe which extends into the cylinder. These pipes are of considerable length and preferably are supported so that their inner ends may be adjusted toward and from the cylinder wall, and a steam joint must be provided through which steam may be admitted to the cylinder.

The steam joint, the cylinder and the cylinder bearings, to effect the best results, are run substantially concentric, and it is the especial object of the present invention to provide a steam joint construction which is adjustable, so that it can be adjusted relatively to the axis of the cylinder so as to run concentric therewith, this being particularly advantageous in machines where one end of the cylinder journal does not run perfectly true.

A further object of the invention is to provide an improved steam joint and connections whereby steam may be admitted directly into the cylinder, so that it does not come in contact with the bearings and therefore does not heat the bearings, and in which it is admitted in the form of a jet so that a better distribution of the steam into the cylinder is effected.

A further object of the invention is to provide an improved means for supporting the siphon pipe used in withdrawing the water of condensation from the cylinder so that this pipe will not become displaced, due to its weight, and come in contact with the rotating parts of the mechanism.

A further object of the invention is to improve the details of construction of the steam joint itself so that an effective joint is provided and one

which may be adjusted while the mechanism is running.

With these and other objects not specifically referred to in view, the invention consists in certain novel parts, arrangements and combinations which will be described in detail in connection with the accompanying drawing and the novel features pointed out in the claims hereunto annexed.

In the drawing,—

Figure 1 is a sectional view, partly broken away, of one end of a drier cylinder showing the improved construction;

Figure 2 is a detail sectional view, on an enlarged scale, of part of the construction shown in Figure 1, and

Figure 3 is a detail end view showing the improved means for supporting the siphon pipe.

Referring now to the drawing, the construction selected to illustrate the invention comprises a cylinder having side walls 1, which are thickened at the ends to form a flange 2 undercut to form a shoulder 3. Secured to the flange 2, by bolts 4, is a head 5, which is elongated to form an extended journal 6, rotating in bearings indicated at 7, and centrally hollowed, as indicated at 8, this journal having secured thereto a driving gear 9 for driving it and the cylinder. In order to effect the desired adjustment of the steam joint, more fully hereinafter referred to, with the cylinder journal, there is provided a hollow sleeve 10, which is secured to the end of the journal 6 by means of bolts 11 which pass through a flange 12 formed on the end of the sleeve 10 and in which the bolts have a slight play. This sleeve 10 has an inwardly extending member or collar 13, through which passes a suitable number of adjusting screws 14, four such screws being provided and two of which are shown.

The sleeve 10 is hollowed out centrally to form a socket 15 which receives a member 16 having a spherical face 17, this construction forming in effect a ball and socket joint. This sleeve 10 supports a steam joint hereinafter referred to, and by this construction the steam joint as a whole may be made to run concentric with the journal and may be lined up to a position concentric with the axis of rotation of the cylinder. Steam is supplied to a chamber 18 of the main steam joint, indicated generally by the numeral 19, through a pipe 20, and the water of condensation is withdrawn from a chamber 21 through a pipe 22, these pipes being screw threaded, as indicated at 23, 24, into suitable flanges formed on the main steam joint 19.

The adjustment for lining up the steam joint and the end of the cylinder journal may readily be effected by unscrewing the pipes 20, 22, loosening the adjusting screws 14 and the tap bolts 11, so that these parts may be loosened by a light hammer blow and the entire steam joint may then be rotated and brought to a true running position, and when the parts are running true the adjusting screws 14 and the tap bolts 11 are tightened to retain the parts in this position.

The steam joint 19 includes a housing or casing, indicated at 25, which is elongated to provide the chambers 18, 21, before referred to, the casing being formed with an intermediate wall or partition 26 into which is threaded the end of a siphon pipe 27. This casing is recessed at 28 to receive a collar 29 shrunk on the sleeve 10. On each side of this collar is located a pair of bearing rings 30, 31, these bearing rings being held together by pins 32 passing through the collar 29.

These bearing rings are of special self lubricating material and of liberal proportions so as to take care of the pressures to which they are subjected without the need of additional lubrication, bronze having been found very effective for this purpose.

On the inner or cylinder end of the casing or housing 25 is a packing box comprising a flanged member 33 secured to the housing 25 by bolts 34, packing medium 35 being located in this flange and held in position by a packing gland 36, adjustable while the machine is running to adjust the packing by means of screw bolts 37.

With this construction it will be observed that, when the machine is operating, the only revolving parts are the sleeve 10, the bronze rings 30, 31, which revolve together with the collar 29, as they are held together by the pins 32. The main steam joint 19, the packing box 33, and the packing gland 36, as well as the siphon pipe 27 and a steam tube 38, hereinafter referred to, are stationary. With this construction, the weight of the steam joint is carried by the sleeve and the two bearing rings 30, 31, which also take up any thrust of steam pressure or angular pressure due to the weight or strains from the pipe connections. If desired, the pipe connections 21, 22 may be provided with flexible joints, indicated at 39, 40.

In accordance with the invention, an improved arrangement for the steam inlet pipe and for supporting the siphon pipe is provided.

The steam pipe is so arranged that the steam may be supplied to the cylinder with the effect of a jet action, so as to secure a good distribution of steam throughout the cylinder, and furthermore this steam inlet pipe is so arranged as to prevent the steam from coming in contact with the journal 6 through which it passes. In order to effect these results, the pipe, as shown, is arranged so that its entry end is closely adjacent the interior of the drier cylinder, the pipe being preferably arranged so that its end 41 extends slightly into the cylinder head. It will be seen therefore that by elongating the pipe in this manner live steam is kept away from the walls of the journal 6, so that these walls do not heat up and there is a more even temperature between the journals at each end of the cylinder.

Furthermore, any steam coming in contact with the journal wall must work back through the restricted space between the tube 38 and the inner wall of the journal. In thus working, the steam will condense so that water rather than steam works back into the body of the packing

box, having to work around the bearing rings 30, 31 before reaching the packing in the box. Thus it is very easy to maintain a seal at this point, thus reducing to a minimum the chance of steam blowing through the steam joint, and this condensed steam also serves as a water lubricant for the rings 30, 31.

As before stated, in the best constructions means are provided for supporting the siphon tube at a point intermediate its length, so that it will not tend to deflect to an undesired point in its relation to the inner wall of the cylinder. These means may be of various characters, but, as shown, the siphon tube is supported from the end of the steam pipe 38, where it enters the cylinder. These supporting means may, of course, be varied, but, as shown, there is provided a V-shaped member 43, see Figure 3, welded at 44 to the tube and at 45 to the inner surface of the pipe.

It will be seen from the construction described that a very effective and efficient steam joint has been provided for these driers, and one which permits the accurate lining up of the parts and which insures a satisfactory steam joint which can be adjusted while the machine is running.

While the mechanism has been shown and described in its preferred form, it will be understood that various changes and variations may be made in the particular construction and arrangement of the parts shown without departing from the invention as defined in the appended claims.

What is claimed is:

1. In a drier mechanism for paper making machines, the combination of a drying cylinder or roll, a journal therefor, a sleeve secured to the end of the journal and having a flange by which the sleeve is secured to the journal end, a steam joint assembly supported on the sleeve, and adjusting screws cooperating with the flange for adjusting the sleeve and assembly relatively to the journal to effect an alignment of these parts.

2. In a drier mechanism for paper making machines, the combination of a drying cylinder or roll, a journal therefor, a sleeve secured to the end of the journal and having a flange by which it is secured to the journal end, a steam joint assembly supported on the sleeve, a joint including cooperating curved surfaces between the sleeve and the end of the journal for aligning the sleeve and the assembly, means cooperating with the journal flange for adjusting the joint, and means for locking the parts in adjusted position.

3. A steam joint assembly for drier cylinders comprising a sleeve secured to the end of the cylinder journal and rotating therewith, a steam seal and thrust member comprising a pair of spaced members rotating with the sleeve, a stationary casing in which the sleeve and members rotate, means for supplying steam to the casing, a steam conduit within the sleeve but spaced from the sleeve and journal, and a siphon pipe within the steam conduit.

4. A steam joint assembly for drier cylinders comprising a sleeve secured to the end of the cylinder journal and rotating therewith, a steam seal and thrust member comprising a pair of spaced members rotating with the sleeve, a stationary casing in which the sleeve and members rotate, a steam seal associated with the casing, means for supplying steam to the casing, a steam conduit within the sleeve but spaced from the sleeve and journal, and a siphon pipe within the steam conduit.

5. A steam joint assembly for drier cylinders comprising a sleeve secured to the end of the cylinder journal and rotating therewith, a steam seal and thrust member comprising a collar and a pair of spaced disks rotating with the sleeve, a stationary casing in which the seal rotates, a packing gland associated with the casing, means for supplying steam to the casing, a steam conduit within the sleeve but spaced from the sleeve and journal, and a siphon pipe within the steam conduit.

6. A steam joint assembly for drier cylinders comprising a sleeve secured to the end of the cylinder journal and rotating therewith, a steam seal and thrust member comprising a collar and a pair of spaced bronze disks rotating with the sleeve, a stationary casing in which the sleeve and members rotate and with a wall of which one of the discs engages, a packing gland with which

the other of the discs engages, and a steam supply to the casing.

7. In a drier mechanism for paper making machines, the combination of a drier cylinder having an elongated journal forming a sleeve and rotating with the cylinder, a stationary casing mounted on the sleeve, a stationary conduit, a stationary siphon pipe supported at one end in the casing and extending through the conduit into the cylinder, these parts being concentric, a rotating thrust bearing and steam seal including a pair of spaced discs for taking the thrust due to steam pressure and any lateral pressure due to the weight of the parts, a packing seal independent of the discs associated with the sleeve, and means for supplying steam to the conduit and withdrawing water of condensation from the casing.

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