

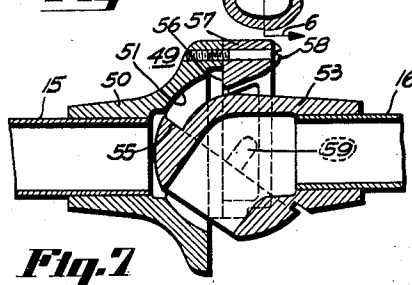
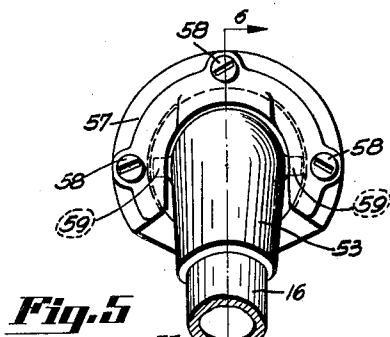
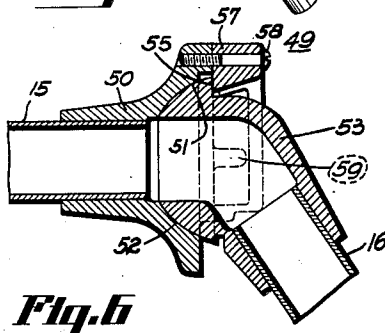
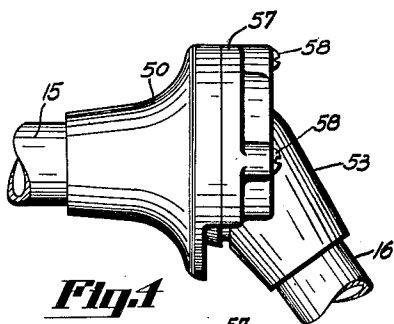
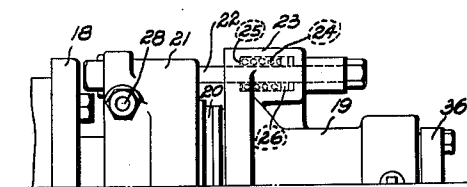
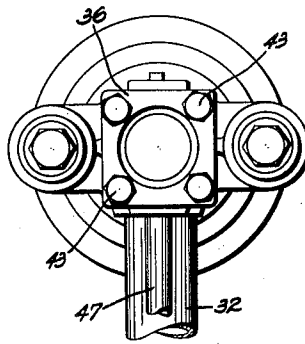
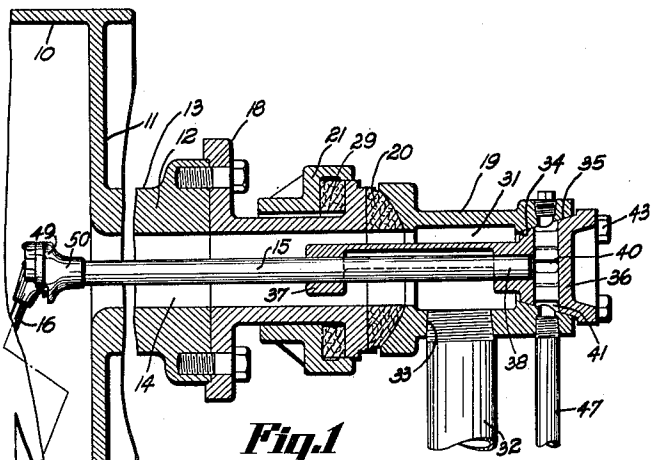
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PAPER MACHINERY

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PAPER MACHINERY

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5 Claims. (Cl. 285—93)

This invention relates to a condensate removal device for drier rolls of paper machines, and the like.

One object of the invention is the provision of a condensate removal device for drier rolls so arranged that a condensate withdrawal pipe may be readily applied to and removed from a supporting fitting provided at the end of the roll journal without disturbing the position of the fitting or without stopping the drier roll.

Another object of the invention is the provision of a condensate removal device for drier rolls and the like, providing a condensate withdrawal pipe held by an elongated support of such construction as to hold the pipe at widely separated points so the pipe will not sag or loosen.

Another object is to provide a condensate removal device of the character mentioned which is removably held against a surface on the steam supply fitting in which the pipe support is provided.

Another object of the invention is the provision of a condensate removal device comprising a condensate withdrawal pipe and a depending pipe extension connected together by a hinge connection so constructed as to provide for limited lateral swinging of the pipe extension but permitting the pipe extension to swing up into approximate alignment with the condensate withdrawal pipe when the latter is withdrawn.

Other objects and advantages of the invention will be apparent from the following description, the appended claims and the accompanying drawing, in which—

Fig. 1 is a central vertical section through a condensate withdrawal device embodying the present invention, as applied to a hollow drier roll.

Fig. 2 is a top plan view of a portion of the device;

Fig. 3 is an end view;

Fig. 4 is a side elevation of the socket hinge provided between the pipe portions;

Fig. 5 is an end view of the socket hinge;

Fig. 6 is a central sectional view of the hinge in its normal position; and

Fig. 7 is a central sectional view of the hinge when straightened out.

Referring more particularly to the drawing by reference numerals, 10 designates a hollow heated roll such as a steam heated drier roll of a paper making machine. In accordance with usual practice, opposite ends of such rolls are rotatably mounted in suitable bearings. As shown, the roll end 11 is provided with a hollow journal

shaft 12 having a bearing surface 13 and an interior passage 14. Steam is supplied to the roll through the hollow passage 14, and the water which condenses in the roll is withdrawn by the rigid condensate withdrawal pipe 15 which has an extension 16 that reaches down nearly to the bottom of the roll, the two pipe portions being interconnected by a suitable hinge connection as will be later described.

Bolted to the end of the journal shaft 13 is an extension member 18, and at the outer end of the extension member is a stationary steam supply fitting 19. Between the member 18 and the fitting 19 is a steam packing 20. The fitting 19 is held in axially located position by means of a ring 21 and aligning rods 22. The aligning rods pass through opposite sides of the ring 21 and through holes in the side lugs 23 of the fitting, a spring 24 in each lug bearing at one end against a shoulder 25 on the lug and at its other end against a collar 26 fixed on the rod 22, thus yieldingly maintaining a desired pressure on the steam packing 20. As will be apparent, the ring 21, which is split centrally and held assembled by bolts 28, is rotatably mounted on the extension member 18, suitable packing material 29 being provided between the ring 21 and the outer flanged end of the extension member.

Within the steam fitting 19 is a steam supply chamber 31 to which steam is supplied by a pipe 32 which is threaded in the steam supply opening 33. The fitting is also provided with a surface 34, herein shown as of conical form. Bearing tightly against surface 34 is an interfitting surface 35 of a pipe support generally designated by the numeral 36 to which the pipe 15 is fixed. The support 36, which is preferably made as a single integral casting, surrounds the end of the condensate withdrawal pipe 15, and is elongated in the direction of the pipe, having its inner end 37 at a considerable distance from the pipe end 38. It is provided with openings 40 which place the end of the pipe 15 in free communication with the condensate withdrawal chamber 41 in the end of the fitting and provided by an annular groove in the support 36.

The end portion of support 36 is detachably connected to the fitting by means of bolts or screws 43 and it will be apparent when the support 36 is in place and the bolts 43 tightened the pipe support will be held firmly in position, thus locating and positioning the condensate withdrawal pipe out of contact with the rotating parts. However, the construction is such that when the bolts 43 are loosened, the pipe support

along with the pipe and its extension may be readily withdrawn merely by moving those parts towards the right as shown in Fig. 2, and this is accomplished without disturbing the connection
 5 between the fitting and the end of the journal shaft, and can be carried out without stopping the roll rotation. The steam supply pipe 32 need not be disconnected in order to remove the pipe and its support, and the condensate withdrawal pipe
 10 47 which is threaded in the fitting also need not be disturbed. It will therefore be apparent that if it is desired to replace or repair a condensate withdrawing or syphon pipe, or to remove and replace a drier roll requiring first that the syphon
 15 pipe be removed, these operations may be carried out quite readily merely by removing the pipe supporting member 36 and the pipe without disturbing the steam supply or water withdrawing pipes and without removing the connection between the fitting and the roll journal. However,
 20 the arrangement is such that the syphon pipe is firmly supported throughout a considerable portion of its length and held centrally in the passage in the hollow journal shaft in such a manner that the pipe cannot sag or become loose. The
 25 support gives a great reduction in the stress on the pipe due to overhanging load. As will be apparent, the extension pipe 16 is quite conveniently withdrawn, straightening out in line with the pipe
 30 portion 15 as the latter is pulled out.

The pipe 15 is preferably a rigid metal tube, made by extruding or in any other desired manner so as to be able to withstand the bending forces without sagging. The extension pipe 16 is also
 35 rigid, substantially straight or only slightly curved, and of such length as to reach nearly to the bottom of the roll 10. The upper end of this extension is connected to the inner end of the pipe 15 by a hinge designated generally by the
 40 reference numeral 49. This hinge comprises a hinge member 50 which is fixed tightly to the inner end of pipe 15 in any suitable manner. Member 50 is provided with a seat surface 51 preferably of spherical form as shown in Fig. 6,
 45 which is adapted for cooperative socketed engagement with the part spherical surface 52 provided on the end of the connection member 53 which is suitably fixed to the upper end of pipe 16. The two spherical surfaces or seats are
 50 concentrically arranged so that the member 53 may be swung upwardly until its axis is substantially in alignment with the axis of member 51, this position of the parts being illustrated in Fig. 7. This brings the pipes 16 and 15 into substantial
 55 alignment so that the syphon pipe may be readily removed through the passage in the hollow journal of the roll, the upward swinging movement of the pipe 15 being effected as the pipe 15 is pulled out.

The outer surface of the ball portion of member 53 is provided with a shoulder or stop as indicated at 55. This stop normally abuts against a stop surface 56 provided on member 50. The stop surface 56 is preferably a part of a part-circular ring 57 which is secured by screws 58 to the
 65 body portion of member 50.

The part-circular ring 57, near its lower ends extends over two projections 59 provided on the member 53 at substantially the location of the
 70 horizontal axis of rotation. The projections prevent separation of the two socket members while affording free swinging movement of the pipe 16 either in a lateral direction or so that the pipe 16 can swing up into alignment with pipe 15.
 75 Limited lateral swinging through an angle of

about 11 degrees from the vertical in either direction, or some other suitable angle which is not large enough to permit the lower end of pipe 16 to contact with the rotating walls of the roll is provided for. Any movement beyond the pre-
 5 determined annular amount brings a side of the member 53 into contact with a lower end of the ring 57, preventing further movement. The pipe 16 normally projects downwardly at a suitable angle determined by the stop surfaces 55 and
 10 56 on the two socket hinge members, the weight of the pipe 16 causing the two socketed surfaces to be pressed one against the other so as to maintain the passages in the two members liquid-tight and air-tight.

It will now be apparent that the pipe 16 normally extends down into the liquid within the roll and may swing laterally to a limited extent during normal operation. When the pipe 15 is pulled out the pipe 16 is swung up into approximate alignment with the pipe 15, so that the syphon pipe may be readily removed or replaced without disturbing the various connections between the roll and the steam supply fitting and without requiring access to the inside of the roll for the disconnection of the pipe extension and also, if desired, without stopping the machine. The pipes may be simply inserted through the steam fitting, observing, if necessary, the relation of the end of the pipe 16 with relation to the inside of the roll through the observation or hand hole in the drier, and if not correct, simply taking it out again and fitting it correctly. Heretofore the difficulties in assembling the syphon pipe were so great that the syphon pipes were generally cut so short in order to keep the lower end out of contact with the roll that they would not extend far enough towards the bottom of the roll for most satisfactory operation. The pipe 16 may be made quite light in weight, much lighter in fact than usual constructions, and the socket hinge connection is also light in weight as well as simple and cheap in construction, so that the pipe 15 and the pipe support can readily assume the deflection load imposed upon them without
 45 excessive bending or deflection of the pipe 15.

While the form of apparatus herein described constitutes a preferred embodiment of the invention, it is to be understood that the invention is not limited to this precise form of apparatus, and that changes may be made therein without departing from the scope of the invention which is defined in the appended claims.

What is claimed is:

1. A condensate removal device for a hollow
 55 drier roll comprising a horizontally extending pipe portion, means for securing said pipe portion in a hollow drier roll journal, a pipe extension depending from the end of said pipe portion but adapted to be moved into substantial alignment
 60 with said pipe portion by withdrawal of said pipe portion from the drier roll journal, and a hinge connection between said pipes normally providing a substantially fluid-tight connection between the ends of said pipes and providing for lateral
 65 swinging of the pipe extension on said pipe portion, and means on said connection for limiting lateral swinging of the pipe extension.

2. A condensate removal device for a hollow drier roll comprising a horizontally extending
 70 pipe portion, a pipe extension depending from the end of said pipe portion, and a socket hinge connection between said pipes normally providing a substantially fluid-tight connection between the ends of said pipes and normally providing a
 75

fixed predetermined angle of dependence of the extension with respect to said horizontally extending pipe portion but affording motion of the pipe extension into approximate alignment with said pipe portion and also affording lateral swinging of the pipe extension, and means on said connection for limiting lateral swinging of the pipe extension.

3. A drier roll having a supporting journal provided with a horizontal passage of restricted diameter, and in combination therewith a condensate removal device adapted for entry through said pipe and for withdrawal therefrom and comprising a horizontally extending pipe portion, a pipe extension depending from the end of said pipe portion, and a socket hinge connection between said pipes, said connection comprising a member on the end of said pipe portion and a member on the end of the extension, said members having cooperating concentric spherical seats in socketed engagement with one another and having means determining a fixed normal angle of downward inclination of the pipe extension, and means for maintaining said spherical seats in concentric relationship while affording limited lateral swinging and relative angular movement of one member with respect to the other.

4. A condensate removal device for a hollow drier roll comprising a horizontally extending pipe portion, a rigid pipe extension depending from the end of said pipe portion, and a socketed hinge connection between said pipes, said connection comprising a member fixed on the end

of the pipe portion and a member fixed on the end of the extension, said members having cooperating spherical seats in socketed engagement with one another affording lateral swinging and relative angular movement of one member with respect to the other about a point substantially corresponding to the spherical center of said seats, said members having cooperating means providing a fixed angle of inclination of said pipe extension with respect to the horizontally extending pipe portion.

5. In a hollow rotatable roll having a hollow journal shaft providing communication to the interior of the roll and having a steam supply fitting located at the end of the journal shaft said fitting having a removable end wall providing a condensate pipe support, a condensate withdrawal pipe within said journal shaft fixed in said support and extending into said roll, a rigid extension pipe reaching angularly downwardly to a low point of the roll, a hinge connection between the upper end of said extension pipe and said condensate withdrawal pipe providing for lateral swinging of said extension pipe about the axis of said withdrawal pipe and also providing for movement of said extension pipe about a substantially horizontal axis into substantial alignment with said withdrawal pipe, whereby said pipe support, withdrawal pipe and extension pipe can be withdrawn by movement axially of the journal shaft without disturbing the position of the fitting with respect to the journal shaft.

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