July 8, 1952 W. C. EWALDSON 2,602,381

LIQUID REMOVING PRESSURE ROLLER

Filed April 16, 1947 2 SHEETS—SHEET 1

FIG. 1

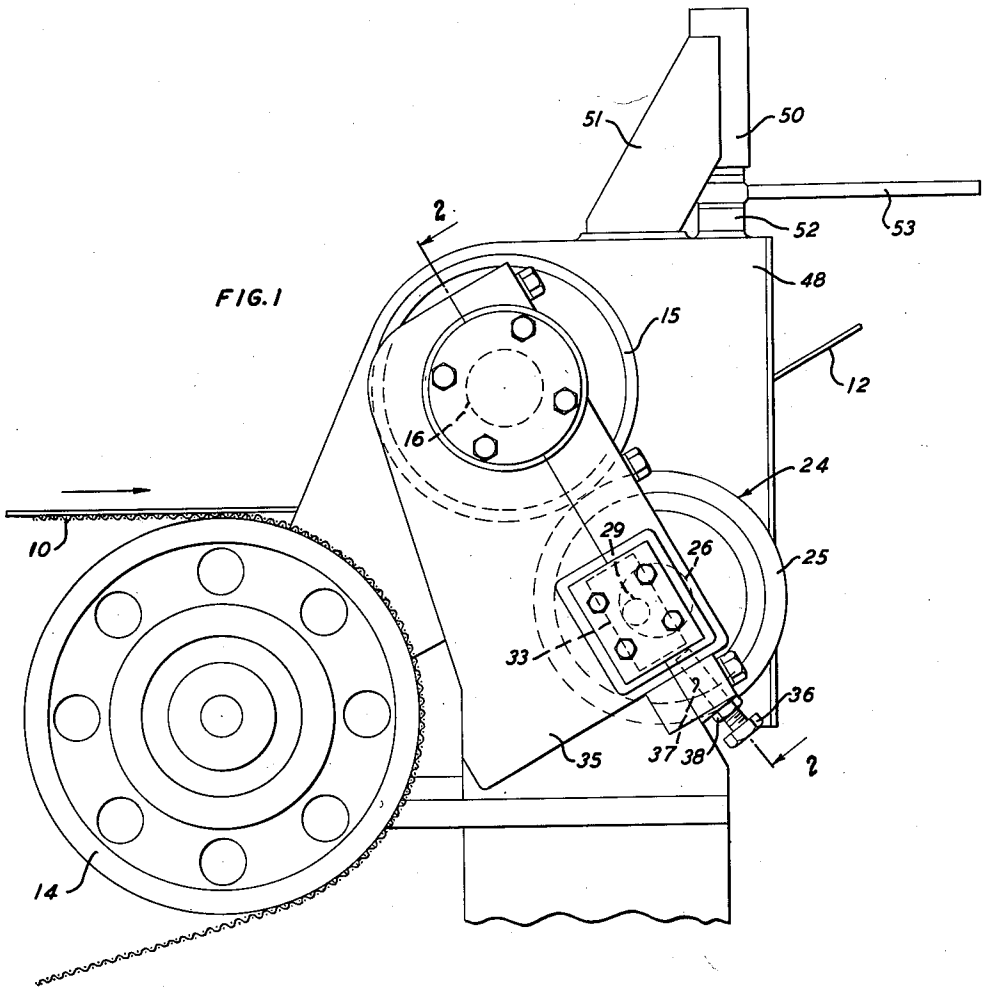

FIG. 4

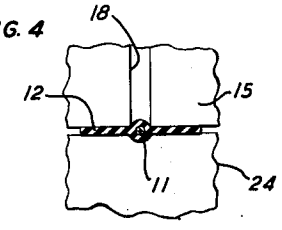

FIG. 5

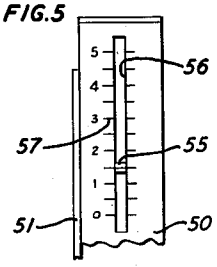

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FIG. 2

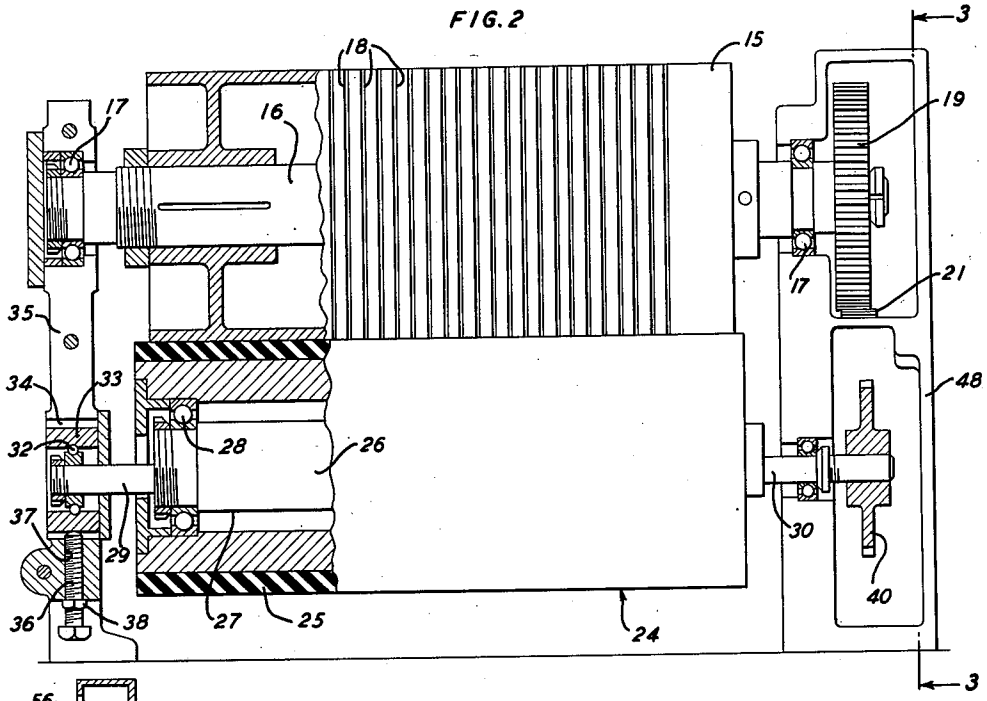
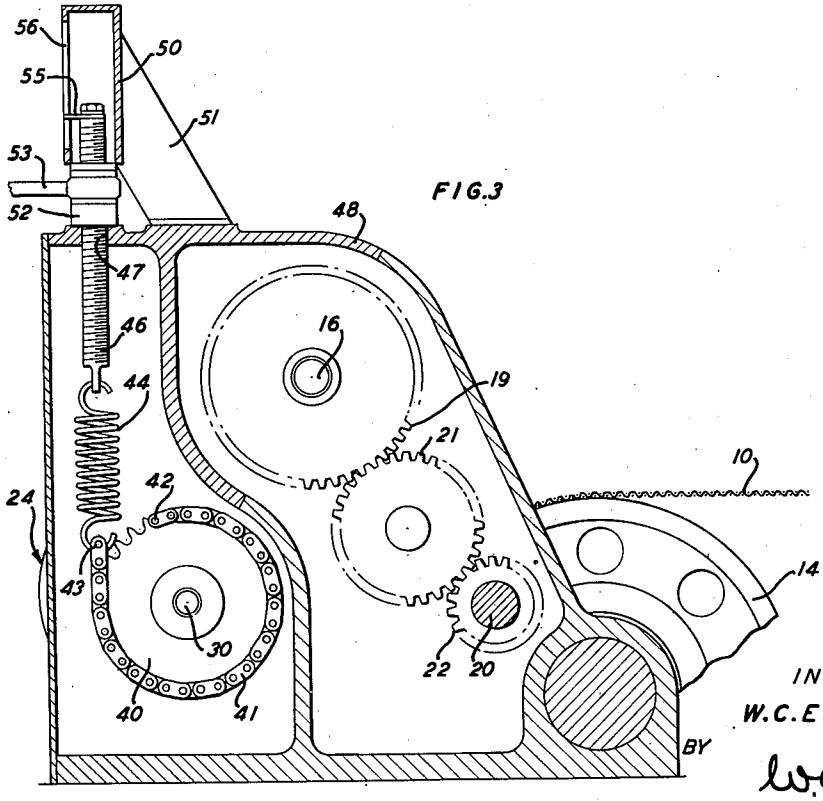


FIG. 3



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LIQUID REMOVING PRESSURE ROLLER

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3 Claims. (Cl. 92—49)

1

This invention relates to pressure rollers and more particularly to pressure rollers for squeezing fluid out of saturated material during longitudinal advancement of the material.

In pulp insulating machines for forming coverings of pulpous material on electrical conductors, the electrical conductors are advanced longitudinally with a Fourdrinier wire to which the pulpous material is applied. When the pulpous material is initially applied to the Fourdrinier wire about the conductors, its content is approximately ninety per cent water. A suction box positioned beneath the Fourdrinier wire removes a large percentage of the water to cause formation of ribbons of the residue of the material about the conductors. The ribbons of material are saturated with water as they leave the Fourdrinier wire and the area of the suction box. It is important that the major portion of the water remaining in the ribbons of material be removed before the conductors with their ribbons reach the spinners which wrap the ribbons about their conductors to form uniform sleeve-like coverings thereon.

An object of the invention is to provide pressure rollers for material saturated with a fluid for efficiently applying a variable pressure to the material advancing between the rollers to squeeze the major portion of the fluid from the material.

Broadly, the invention comprises pressure rollers one of which may be called a drive roller rotated about a fixed axis while the other, a driven roller, is supported for rotation on the central portion of a shaft, the end portions of which are in alignment with each other with their axes eccentric with the axis of the central portion whereby rotation of the shaft about the axes of the end portions thereof will force the driven roller into engagement with the drive roller to squeeze the major portion of the fluid from saturated material advanced longitudinally between the rollers.

More specifically, the invention comprises pressure rollers in a pulp insulating machine wherein the drive roller, rotated about a fixed axis has annular grooves in its periphery to partially receive the ribbons of pulpous material surrounding electrical conductors. A driven roller having a resilient outer surface is free to rotate on the central portion of a shaft, the aligned eccentric ends of which are supported in bearings, whereby partial rotation of the shaft about the axes of the end portions thereof will cause the driven rollers to move toward and into intimate engagement with the ribbon covered conductors advancing between the rollers. A sprocket is fixedly mounted on one end portion of the shaft to which a chain is connected, the free end of the chain being connected to a spring which may be expanded to create a variable force therein which is transmitted to the shaft through the chain and sprocket to force the driven roller under variable pressure against the material or the ribbon covered conductors. Indicating means is associated with the spring, particularly the mechanism for varying the force of the spring to indicate the force applied to the driven roller. This force is sufficient to squeeze the major portion of the water remaining in the ribbons of pulpous material on the conductors and to also assist in advancing the covered conductors longitudinally.

2

Other objects and advantages will be apparent from the following detailed description when considered in conjunction with the accompanying drawings, wherein

Fig. 1 is a fragmentary end elevational view of a portion of a pulp insulating machine embodying the invention;

Fig. 2 is a fragmentary sectional view taken substantially along the line 2—2 of Fig. 1;

Fig. 3 is a fragmentary sectional view taken substantially along the line 3—3 of Fig. 2;

Fig. 4 is an enlarged fragmentary detailed view of portions of the pressure rollers; and

Fig. 5 is a fragmentary front elevational view of the indicating means associated with the spring.

Referring now to the drawings, attention is first directed to Fig. 1 which illustrates the Fourdrinier wire 10 of a pulp insulating machine, the upper portion of the wire travelling in the direction of the arrow with longitudinally advancing electrical conductors 11 which have been covered with pulpous material 12, the material at the exit end of the upper portion of the Fourdrinier wire, before it passes around its supporting roller 14, being in the form of ribbons about the electrical conductors. The ribbons at this point remain saturated with water and the purpose of the press rolls is to remove the major portion of the fluid or water remaining in the material on each conductor.

The drive roller 15 is formed of a suitable hard material, preferably brass and is keyed to a shaft 16, the ends of which are supported in suitable bearings 17, only one of which is shown in the drawings. Equally spaced annular grooves 18 are formed in the periphery of the roller 15 to partially receive the ribbons 12 on electrical conductors, particularly those portions of the ribbons immediately surrounding the conductors.

The purpose of the grooves is to enable substantially uniform pressure to be applied to the ribbons to force the fluid or water therefrom without damaging the ribbons. If it were not for the grooves, and the ribboned conductors should be forced against a smooth surfaced roller with considerable pressure, the conductors may be caused to cut their way through the ribbons. A gear 19 is mounted upon one end of the shaft 16 and is operatively connected to a main drive shaft 20 of the pulp machine through an idler gear 21 and a pinion 22, the pinion being mounted upon the main drive shaft.

The driven roller indicated generally at 24 has a cylindrical outer covering 25 of flexible material, such as rubber, to conform to the ribbons about the conductors and to cooperate with the drive roll in squeezing the fluid from the ribbons when suitable pressure is applied, forcing the driven roller against the drive roller. The driven roller is mounted upon a central portion 26 of a shaft, indicated generally at 27, by the aid of bearings 28, only one of which is shown in the drawing. The shaft 27 is provided with end portions 29 and 30 which have aligned axes eccentric with the axis of the central portion 26 of the shaft. The end portion 29 is supported in a bearing 32 of an adjustable block 33 which is supported in a rectangular opening 34 of one of the supporting frames 35 of the machine. An adjusting screw 36 threadedly supported in an aperture 37 of the frame 35 serves to vary the position of the supporting block 33 to adjust the common axis of the end portions 29 and 30 of the shaft 27 parallel with the axis of the shaft 16. The adjusting screw 36 may be held in any desired position by the aid of a lock nut 38.

A sprocket 40 is fixedly mounted on the end portion 30 of the shaft 27 and has a chain 41 with one end 42 fixed to the sprocket while the other end 43 is connected to a spring 44. The spring 44 provides the force to move the driven roller 24 against the drive roller 15. The force required in the spring is accomplished by vertical movement of a threaded element 46, the lower end of which is connected to the upper end of the spring 44. The threaded element 46 extends upwardly through an opening 47 in the housing 48 of the machine and into a casing 50 supported by the housing through the aid of a bracket 51. A nut 52, resting in the housing, is threadedly mounted on the element 46 and may be rotated in either direction by a reversible ratchet wrench 53 mounted permanently on the nut 52. A pointer 55, mounted upon the upper end of the threaded element 46, extends through a vertical opening 56 in the casing 50 which is provided with indications 57 representing hundreds of pounds pressure or force created in the spring and transferred to the roller 24 through the connecting mechanism. These structures constitute a force applying mechanism connected to the shaft of the driven roller 24 and continuously operable to apply a constant known driving force to this shaft to move the driven roller toward the drive roller 15.

During the operation of the pulp machine, the electrical conductors 11 are advanced longitudinally through the machine and at the portion illustrated in Fig. 1 of the drawings. Ribbons of pulpous material have been formed about the conductors and while saturated with the water, they advance between the pressure rollers 15 and 24. The amount of force desired to be applied to the driven roller 24 depends upon the gage of each conductor, the sizes of the ribbons varying with the gages of the conductors and requiring variable forces to satisfactorily remove the desired quantities of water from the ribbons. The force required being known prior to the time the machine starts its operation, the operator may adjust the spring 44 by actuating the wrench 53 until the desired force is registered on the indications 57 by the pointer 55. The force created in the spring 44 will rock the sprocket 40 by the pull on the chain 41, rocking the shaft 27 about the axes of the end portions 29 and 30, causing the central portion 26 of the shaft 27 to move the driven roller 24 toward the drive roller 15 with the force initially created in the spring 44. The roller 15 being driven continuously, will drive the roller 24 and as the ribbons and their conductors travel between the rollers, the major portion of the fluid or water in the ribbons will be forced therefrom as they approach the rollers. The pressure on the ribbons between the rollers is also sufficient to enable the rollers to assist in advancing them with their conductors.

Although specific improvements of the invention have been shown and described, it will be understood that they are but illustrative and that various modifications may be made therein without departing from the scope and spirit of this invention as defined by the appended claims.

What is claimed is:

1. Pressure rollers for removing the major portion of a liquid from a fibrous material saturated therewith, the pressure rollers comprising a drive roller rotated about a fixed axis, a driven roller positioned adjacent the drive roller, a shaft for the driven roller having a central portion upon which the driven roller is rotatably mounted, with its axis coincident with the axis of the driven roller and end portions with aligned axes eccentric with the axis of the central portion, aligned bearings to support the said end portions of the shafts free to rotate, a force applying mechanism connected to the shaft and continuously operable to apply a constant known driving force to the shaft tending to rotate it about the axes of the end portions thereof to cause the eccentric central portion of the shaft to constantly force the driven roller toward the drive roller to squeeze the material between the rollers with sufficient force to remove the major portion of the liquid therefrom, and means for adjusting one of said aligned bearings to maintain an equal pressure along the entire length of the rollers.

2. Pressure rollers for removing the major portion of a liquid from a fibrous material saturated therewith, the pressure rollers comprising a drive roller rotated about a fixed axis, a driven roller constantly movable from and toward the drive roller and positioned adjacent the drive roller, a shaft for the driven roller having a central portion upon which the driven roller is rotatably mounted, with its axis coincident with the axis of the driven roller and end portions with aligned axes eccentric with the axis of the central portion, aligned bearings to support the said end portions of the shafts free to rotate, a spring, means connected to one end of the spring and actuable to create a variable force in the spring, a force applying mechanism powered by the force in the spring and connecting the other end of the spring to the shaft whereby the force in the spring will be translated to the shaft to rotate the shaft about the axes of the end portions thereof to cause the eccentric central portion of

the shaft to constantly force the driven roller toward the drive roller to squeeze the material between the rollers with equal force to drive the major portion of the liquid from the material, and means for adjusting one of said aligned bearings to maintain an equal pressure along the entire length of the rollers.

3. Pressure rollers for removing the major portion of a liquid from a fibrous material saturated therewith, the pressure rollers comprising a drive roller rotated about a fixed axis, a driven roller constantly movable toward and away from the drive roller, a shaft for the driven roller having a central portion, upon which the driven roller is rotatably mounted, with its axis coincident with the axis of the driven roller and end portions with aligned axes eccentric with the axis of the central portion, aligned bearings to support the said end portions of the shafts free to rotate, a spring, means connected to one end of the spring and actuable to create a variable force in the spring, a wheel fixedly mounted on one of the end portions of the shaft, and a flexible member having one end connected to the other end of the spring and extending partially around the wheel to which the other end of the flexible member is connected whereby the force in the spring will

cause the flexible member to create a constant and resilient rotary force in the wheel to force the central portion of the shaft with the driven roller toward the drive roller to squeeze the material between the rollers with equal force to remove the major portion of the liquid from the material.

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