# United States Patent [19]

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[11] **3,770,579**

[45] **Nov. 6, 1973**


[54] **SYSTEM FOR BROKE REMOVAL**


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[22] Filed: **Oct. 4, 1971**

[21] Appl. No.: **186,252**

[52] **U.S. Cl.** ..... **162/264**, 162/191, 162/255, 226/190

[51] **Int. Cl.** ..... **D21f 7/04**

[58] **Field of Search** ..... 162/191, 264, 255; 226/11, 176, 190



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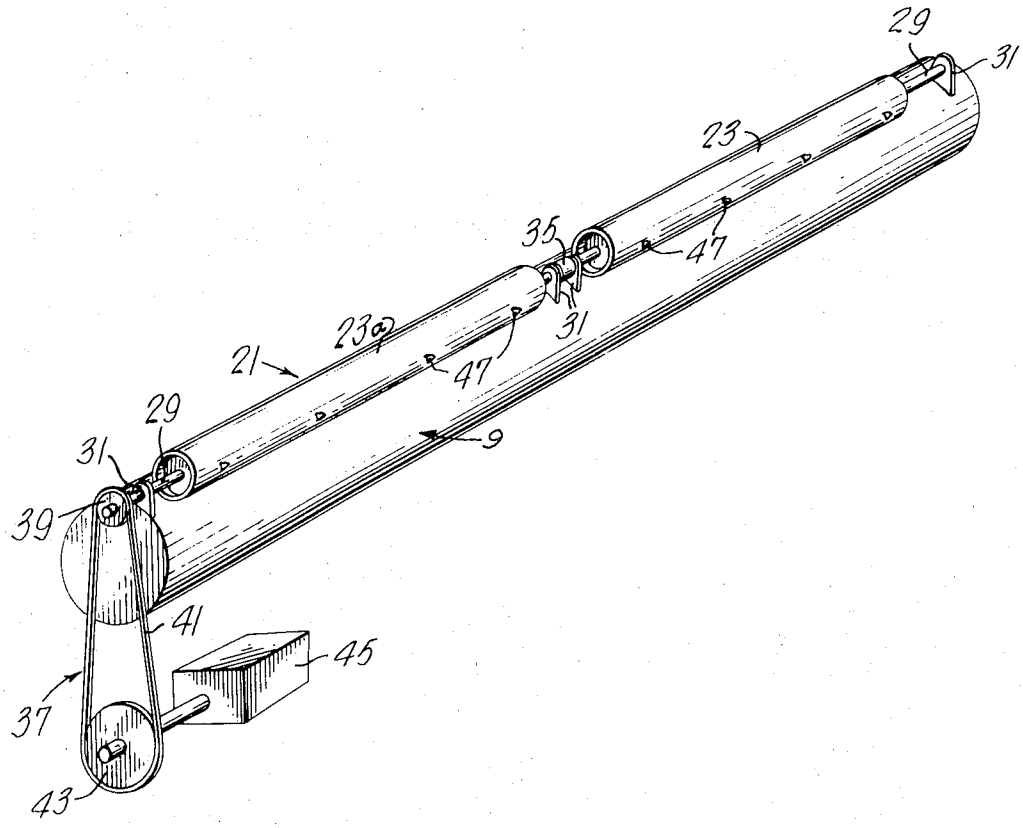
[57] **ABSTRACT**

A system for assisting in removing broke from a paper or board making machine includes an elongated cylindrical member mounted on an obstruction extending transversely beneath the paper or board making machine. The elongated member can be rotated to move the broke, hung up on the obstruction, off the obstruction in order to clear the machine.


**4 Claims, 7 Drawing Figures**



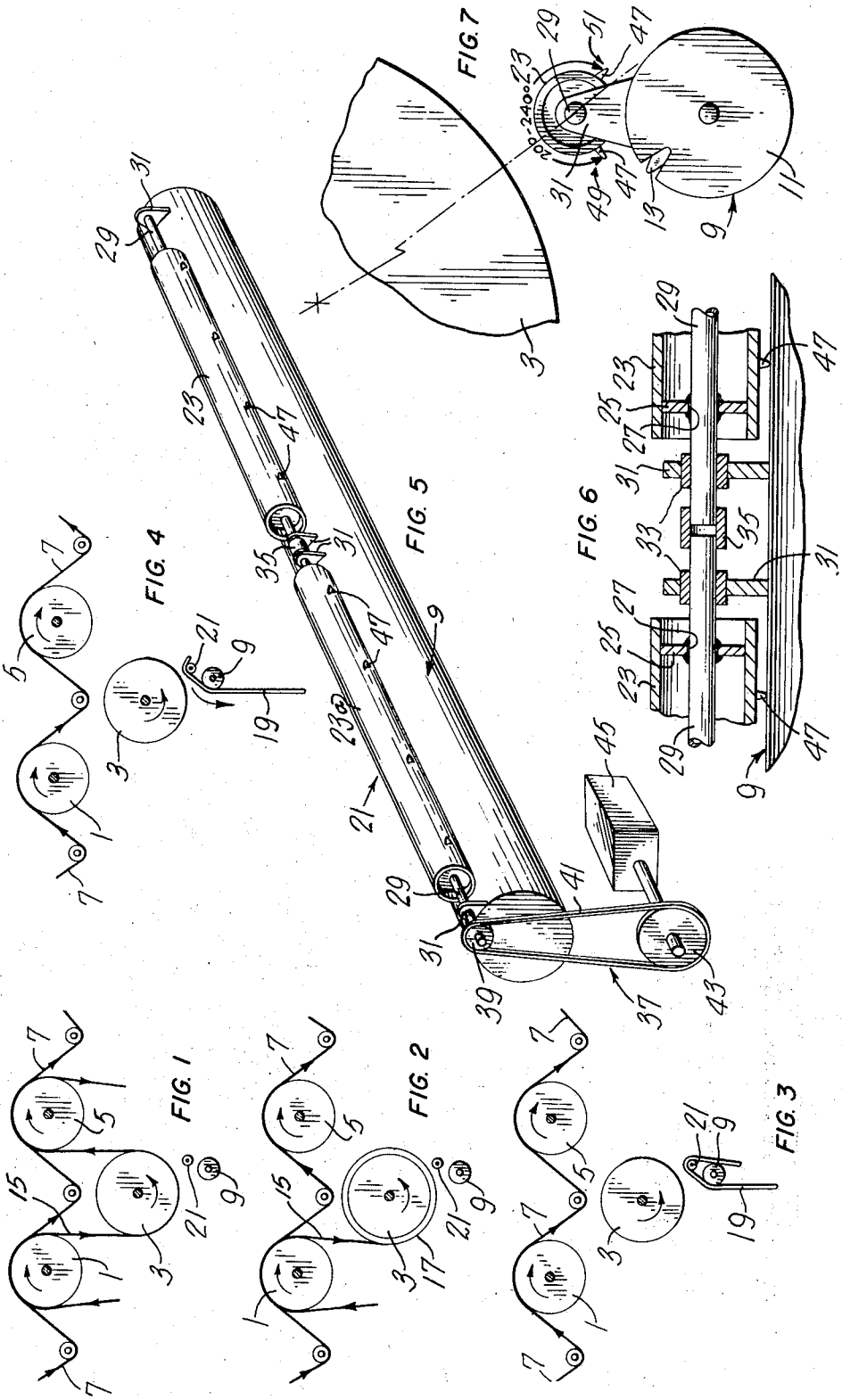


FIG. 1
FIG. 2
FIG. 3
FIG. 4
FIG. 5
FIG. 6
FIG. 7

# SYSTEM FOR BROKE REMOVAL

## BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to a method and a system for use in a paper or board making machine for assisting in removing board or paper broke from a paper machine.

2. Description of the Prior Art

As paper machines have increased in speed and width, the removal of broke after a break in the web in a paper or board machine has become to present a problem. It is necessary to get the machine operating as quickly as possible again after a break in the web has occurred. In order to do so, the broke must be moved away from the machine as quickly as possible.

The broke, formed from the web which winds about a roll in the machine where a break in the web occurs, is simply cut away to fall away from the roll as broke to the floor below the machine. Sometimes the broke forms about a roll which is located over a beam or support member for the machine or building which extends across the machine. When the broke is cut, it drapes over the beam or support member instead of falling directly to the floor. The broke then has to be manually pulled off the beam or support member.

With the newer machines, which are faster and wider, the manual removal of this broke off the beams or support members becomes time consuming because of the weight involved. In addition, with the use in many machines now of web conditioning nozzles in the dryer section of the machine, where many of the dryer rolls each have a web conditioning nozzle associated therewith beneath the roll for blowing a treating medium on the web, the occurrence of hang-up of the broke cut away from a dryer roll is much greater. Also, since in many cases the nozzles or beams are located 12 or 15 feet above the broke floor, the manual removal of the heavy, hung-up broke becomes extremely difficult and dangerous because ladders must be employed.

## SUMMARY OF THE INVENTION

The present invention provides a system which will remove the heavy broke hung up on obstructions located beneath the path of travel of the web through the machine.

The invention is more particularly directed to a system for removing broke from an obstruction member extending across a paper or board machine and located beneath the path of travel of a web through the machine and includes broke supporting means rotatably mounted on the obstruction and extending transversely across the width of the machine. Means are provided for rotating the broke supporting means. Means are also provided on the outer surface of the broke supporting means for moving broke draped thereover as it is rotated.

The broke supporting means can be mounted to encircle the obstruction. Preferably, however, the broke supporting means is mounted on top of the obstruction. In this case, the broke supporting means preferably comprises one or more elongated members, rotatably mounted on top of the obstruction. The elongated members can be rotated either through the use of a small motor and drive means or manually through a crank and gear reduction unit. The elongated member or members preferably comprise one or more tubular cylinder sections coupled to the rotating means. The means for moving the broke on the broke supporting means as it rotates preferably comprise rows of spikes on which the broke is impaled.



When the broke supporting means are provided on each transverse obstruction beneath the roll of the paper machine, the broke occurring as a result of break occurring at any position along the length of the machine, and particularly in the dryer section, can be easily handled, if hung up on the obstructions, permitting the machine to be quickly and easily cleared of broke and thus brought back into operation much quicker than can now be done when manually clearing the hung-up broke.

The invention is also directed toward a method for removing broke wrapped about a paper or board machine roll having an obstruction under the roll, which method comprises the steps of removing the broke from the roll, rotating a broke supporting means mounted on the obstruction to move the broke through moving means on the broke supporting means, off the obstruction, and continuing rotation of the broke supporting means after the obstruction has been moved off to move the moving means to a noninterfering rest position with respect to the roll.

## BRIEF DESCRIPTION OF THE DRAWINGS

The invention will now be described in detail having reference to the accompanying drawings, wherein:

FIG. 1 illustrates a portion of a paper making machine showing the broke removal system;

FIG. 2 illustrates the broke formed by a web wrapping around a dryer roller as shown in FIG. 1, when a break occurs;

FIG. 3 illustrates the position assumed by the broke when cut away from the dryer roll;

FIG. 4 illustrates how the hung-up broke is moved away from the obstruction;

FIG. 5 is a detailed perspective view of the preferred embodiment of the broke supporting means mounted on a transverse obstruction;

FIG. 6 is a detailed view of a portion of the broke supporting means shown in FIG. 5; and

FIG. 7 is an end view of the broke supporting means shown in FIG. 5, illustrating the location of the spikes used to move the broke off the obstruction.

## DESCRIPTION OF THE PREFERRED EMBODIMENTS

FIG. 1 illustrates a portion of the dryer section of a paper making machine showing the arrangement of three dryers 1, 3 and 5, a dryer felt 7 and also the location of a web conditioning member 9 extending beneath the lower dryer drum 3. The web conditioning member 9 can comprise a tube 11 having nozzles 13, as shown in FIG. 7, for directing a treating medium such as hot air on to the paper web 15 as it passes about the dryers.

When a break occurs in the web, the web usually wraps around one of the dryer drums adjacent the break, before the machine can be shut down, to form a multi-layered cylinder of broke 17 about the drum, as shown in FIG. 2. This broke cylinder 17 is removed from the dryer drum by cutting through it along a line extending parallel to the axis of the dryer drum at the top thereof to form a broke section 19. The section 19 falls away from the drum 3 under its own weight or is peeled off. However, the broke section 19 does not fall

to the broke or beater room floor (not shown) if an obstruction, such as the conditioning member 9, is located under the dryer drum. Instead, it drapes over the member 9, as shown in FIG. 3.

In order to remove the broke section 19 off the obstruction extending beneath the dryer drum, broke supporting means 21 extending transversely across the width of the machine are mounted on the obstruction 9. Preferably, as shown more clearly in FIG. 5, the broke supporting means 21 is mounted on top of the obstruction 9 and preferably comprises one or more cylindrical, tubular sections 23. The sections 23 can be tubes, 4 inches in diameter. The ends of the tubular sections 23 are closed by end walls 25, as shown in FIG. 6, having a central bore 27. The sections are fixedly mounted on an axial shaft 29 extending through the section 23 and the end walls 25. The ends of the shaft 29 of each section 23 are rotatably mounted in brackets 31, with heat resistant bearings 33 made of Teflon, for example, which brackets are attached to the obstruction 9. The brackets 31 may be in two or more pieces to provide adjustment to align the shafts of the tubular sections.

If more than one tubular section 23 is used, the shafts 29 of each of the sections are aligned and they are joined together by suitable coupling means 35.

Drive means 37 are provided at one end of the elongated means connected to the end of the shaft 29 of the first section 23a to rotate the tubular sections as a unit when required, as shown in FIG. 5. These drive means 37 can comprise a driven sprocket 39 attached to the shaft, a chain 41 extending from the driven sprocket 39 down to a drive sprocket 43, which is driven by an electric motor 45. The motor can be operated by suitable stop-start means. The motor speed and sprocket sizes are selected to rotate the tubular section or sections at a speed of between 10 r.p.m. and 30 r.p.m., and preferably at about 20 r.p.m., to assist in rolling off the broke section 19 when it is hung up.

Each tubular section 23 has suitable means on its outer surface for ensuring movement of the broke section 19 when rotated. These means can comprise at least one and preferably two rows of relatively short spikes 47 welded on the tubes 23, which impale the broke section to move it as the sections are rotated. Preferably, the spikes 47 extend radially from the wall of the tube section and are provided in two rows 49, 51 located no more than 160° and preferably 120° from each other about the periphery of the tube. The spikes 47 in each row 49, 51 can be spaced apart between 8 and 24 inches from one another with the spikes in the one row staggered with respect to the spikes in the other row.

In operation, after a break in the web occurs, the wrapped broke cylinder 17 is cut to fall away from the dryer roll as a broke section 19. If the section 19 is hung up on an obstruction, at the top of which there are the broke supporting means 21, the motor 45 is operated to rotate tubular sections 23. As sections 23 rotate, the spikes 47 impale the broke section and move it over the sections till it falls off the obstruction under its own weight. Once the broke section 19 falls off, the tubular sections 23 are rotated to a rest position to locate the two rows of spikes 45 so as to be substantially symmetrically positioned on either side of a vertical line passing through the axis of rotation of the shafts 29, and facing down away from the drum 3. This ensures that the spikes will not interfere with the web or loose broke should another break occur once the machine is started, particularly if the obstruction, and the broke supporting means thereon, is located close to the surface of the drum and also ensures that broke cut away from the roll which, because of a weight differential, would not hang up on the obstruction, will slide freely off it without snagging on the spikes.

While the obstruction 9 in the present case has been described as a web conditioning nozzle, the obstruction can also be formed by structural beams or support members extending transversely across the machine beneath the rolls. Preferably, broke supporting means are mounted on each of these members which are located beneath the path of travel of the web.

In addition, while the sections 23 have been shown to be rotatable by electric drive means, they can also be rotated manually through the use of an extended handle and suitable gear reduction means.

I claim:

1. A system for removing broke from an obstruction member extending across a paper or board machine and located beneath the path of travel of a web through the machine, said system including at least one elongated cylindrical member for moving the broke, and shaft means extending axially from said elongated cylindrical member to rotatably mount said elongated cylindrical means, the outer surface of said elongated cylindrical member comprising a row of spaced-apart spikes, means for rotatably mounting said elongated cylindrical member on the obstruction member so that the cylindrical member extends transversely substantially across the width of the machine, said means for rotatably mounting said elongated cylindrical member comprising brackets on the obstruction member for receiving the shaft means extending from the elongated cylindrical member, the shaft means extending from said elongated cylindrical member extending substantially parallel to the longitudinal axis of the obstruction, whereby the elongated cylindrical member is adapted to move broke draped thereover as the elongated cylindrical member is rotated.

2. A system as defined in claim 1, wherein said obstruction member comprises a web conditioning nozzle, and wherein said brackets are mounted on said web conditioning nozzle.

3. A system as defined in claim 1, wherein the outer surface comprises two rows of spikes.

4. A system as claimed in claim 1, wherein the means for rotating said cylindrical member comprises a motor, drive means connecting the motor to the shaft extending from the cylindrical member and means for operating the motor to selectively rotate the cylindrical member.

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