United States Patent

[11] **3,601,051**

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[54] **FLEXIBLE BLADE CONSTRUCTION FOR A ROLLER-CLEANING DEVICE**
2 Claims, 3 Drawing Figs.

[52] **U.S. Cl.** **101/425,** 101/169
[51] **Int. Cl.** **B41f 35/04**
[50] **Field of Search** 101/365, 350, 157, 169, 425; 115/256.51; 118/261

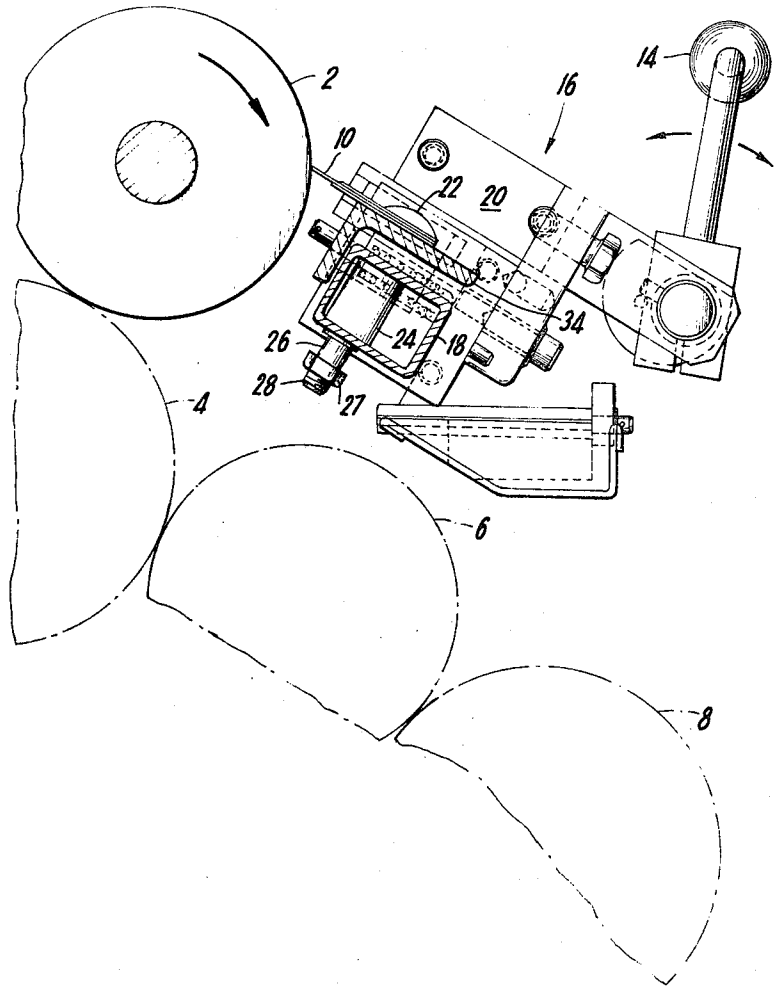
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ABSTRACT: The invention relates to a printing device having a roller-cleaning apparatus which includes a flexible blade which is maintained in line contact with a roller with substantially uniform pressure to remove caked-in dirt from the roller. The flexible blade is supported by a plurality of adjustable engaging means which can transversely bow the blade in any desired amount, depending on the size of the press involved, to insure that uniform pressure will be maintained between the roller and the blade throughout the entire line of contact.



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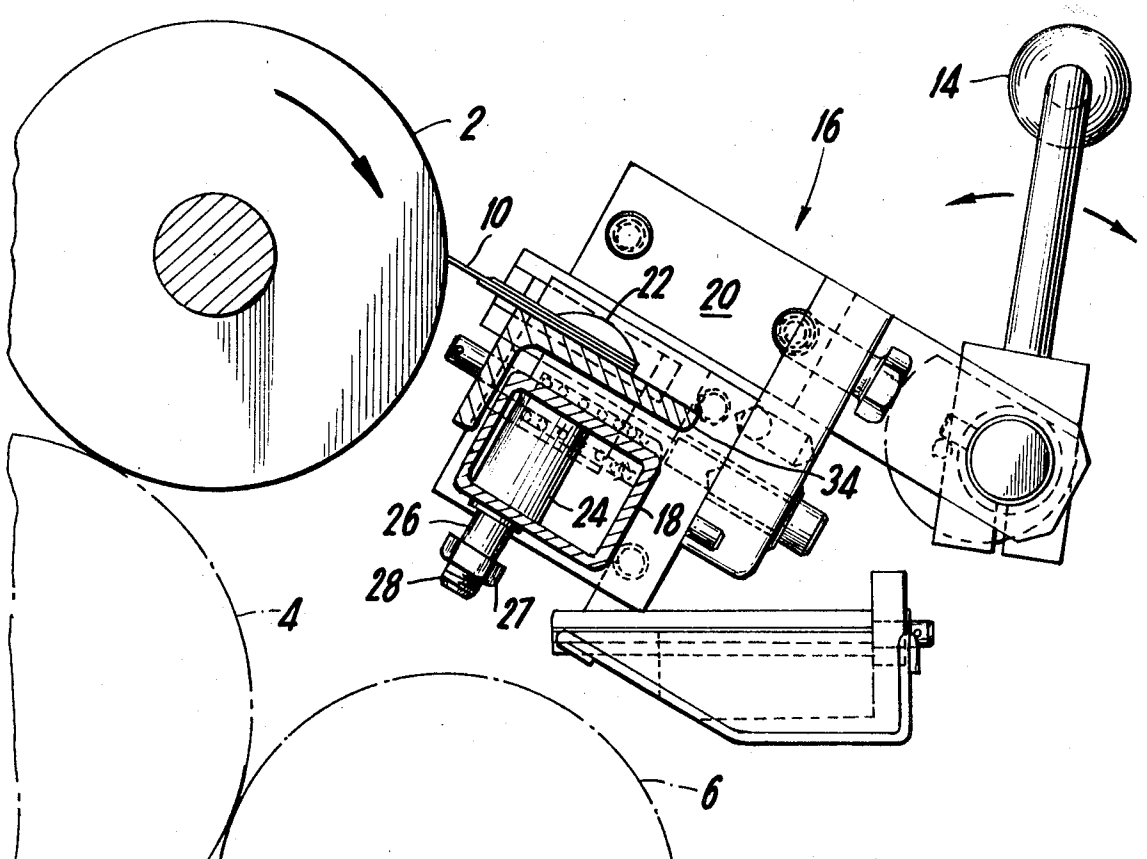


FIG. 2

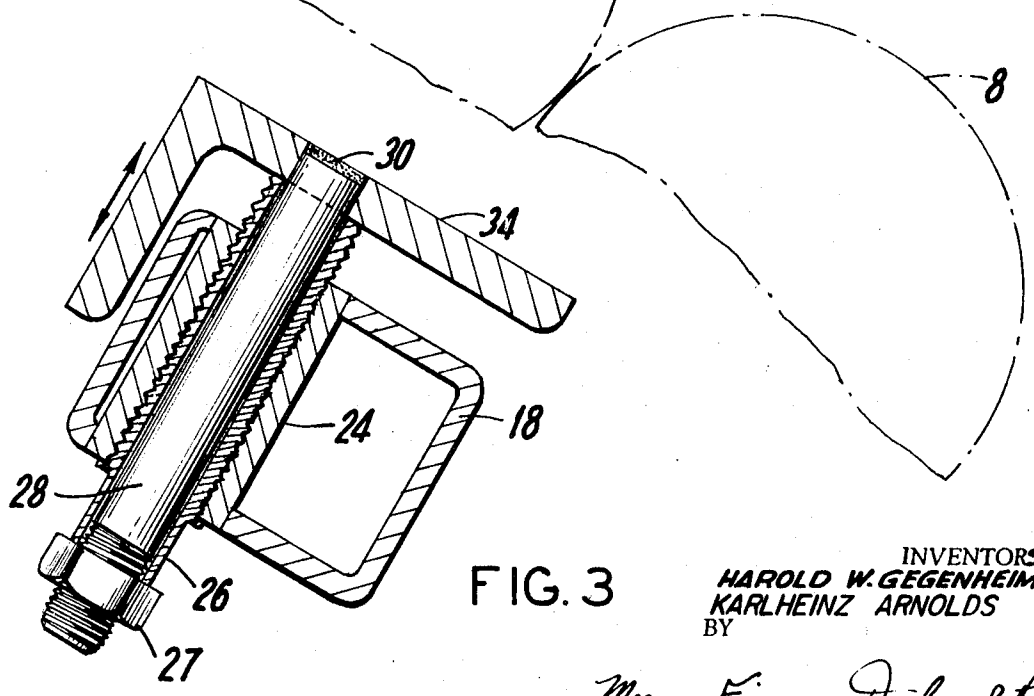


FIG. 3

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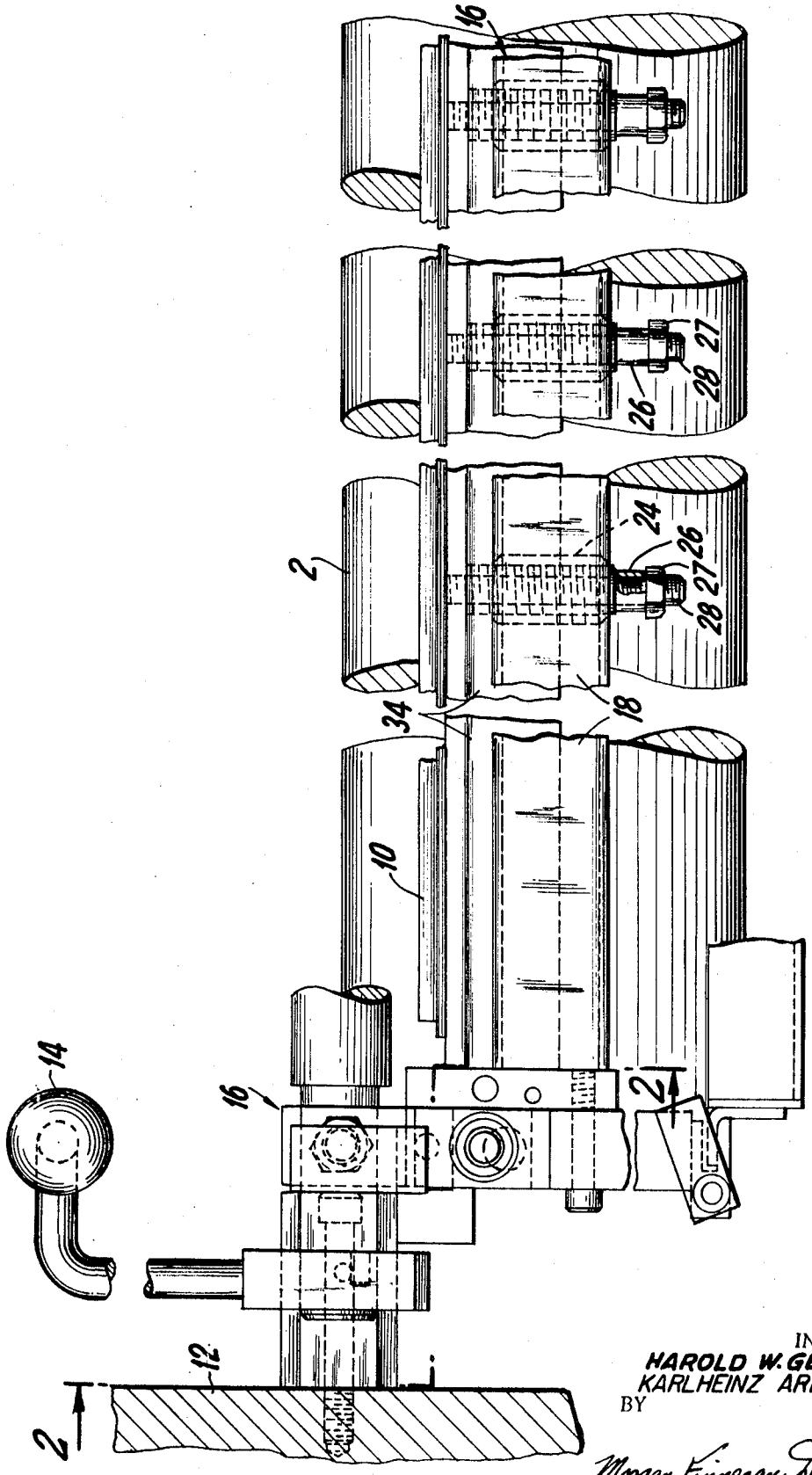


FIG. 1

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FLEXIBLE BLADE CONSTRUCTION FOR A ROLLER-CLEANING DEVICE

BACKGROUND OF INVENTION

This invention is an improvement over the invention described and claimed in U.S. Pat. No. 2,970,541 granted Feb. 7, 1961.

As described in that patent numerous problems arise in connection with the washing and cleaning of ink rollers such as used in printer-slotters and other similar equipment.

It is essential in such equipment that proper cleaning and care of ink rollers be maintained in order to achieve efficient and dependable results. It is therefore vitally important that the ink rollers be periodically cleaned not only for color changes but also to remove dried or caked ink from the ink roller and that this be done quickly and efficiently with substantial savings in both time and cost.

The specification of U. S. Pat. No. 2,970,541 describes a proposal which has in actual practice been successful with certain size presses. In accordance with the teaching of that patent a roller-cleaning apparatus is provided which includes a flexible cleaning blade which extends parallel to and can be maintained in contact with the vibrating ink roller. That patent, moreover, describes a flexible blade which has been transversely prebowed along the line of contact so that the center of the flexible blade is closer to the vibrating roller than the ends thereof. As described in that patent the prebending of the blade insures that the center portion of the blade engages the roller before the ends of the blade so that when the ink roller is rotating and vibrating substantially uniform pressure will be obtained between the roller and the blade throughout the entire length of contact.

However, despite the advantages of the invention in U.S. Pat. No. 2,970,541, years of experience with such devices have shown that it has certain shortcomings.

Thus, it has been found that the use of the prebowed flexible blade in presses of 60 inches or longer is not as effective as in cases where the presses are smaller in size. It has been found that with the larger press size and hence longer flexible blades, the blades do not maintain their uniform prebowed condition when in use and therefore do not maintain substantially uniform pressure when in contact with the vibrating ink roller. When this occurs the advantages of the bowed blade are lost.

Furthermore, it has been found that the necessary amount of bowing in the blade varies from press to press and differs substantially depending on the size of the press. Thus with the prebowed blade there is no "standard" bow which is usable with all different size presses.

With the foregoing in mind it is an object of this invention to provide a new and improved ink roller-cleaning apparatus.

Another object of this invention is to provide a new and improved roller-cleaning apparatus having a flexible bowed blade construction wherein the degree of bowing in the blade can be adjusted as desired.

A still further object of this invention is to provide a new and improved roller-cleaning apparatus having a flexible blade supported in a plurality of positions along its length by an adjustable mechanism which controls the degree of bow in the blade.

A still further object of this invention is to provide a new and improved ink roller-cleaning apparatus with a support means for an elongated flexible blade which is adapted to bow the blade transversely in the desired amount to maintain substantially uniform pressure between the blade and the vibrating ink roller.

Additional objects and advantages of the invention will be set forth in the description which follows and in part will be obvious from the description, the objects and advantages being realized and obtained by means of the instrumentalities, particularly pointed out in the appended claims.

Briefly described, the invention comprises the combination of roller-cleaning mechanism for cleaning ink rollers with a flexible cleaning blade adapted for line contact with an ink roller. The flexible blade extends along the length of the ink roller and is supported along its length at a plurality of locations. The support means are constructed so that variable pressure can be applied to the flexible blade in order that the blade will be transversely bowed or bent in the amount necessary for the particular press mechanism with which it is used.

The invention consists of the novel parts, steps, constructions and improvements shown and described.

The accompanying drawings which are incorporated in and constitute a part of this specification illustrate an embodiment of the invention and together with the description serve to explain the principles of the invention. Of the drawings:

FIG. 1 is a partially broken end elevation view of the apparatus embodying the invention.

FIG. 2 is a sectional view taken along line 2—2 of FIG. 1.

FIG. 3 is an enlarged view showing one of the adjustable blade supports for bowing the flexible blade.

For purposes of illustration the invention has been shown as applied to a printing press having a plurality of rollers for feeding ink. The cleaning apparatus of the present invention is arranged to cooperate with one roller generally termed the upper vibrator roller, but it will be understood that with this apparatus the entire series of rollers can be quickly and easily cleaned.

For purposes of convenience identical reference numerals have been used for the same elements in the drawings.

Referring now to the drawings there is shown therein in schematic form a plurality of rollers **2**, **4**, **6** and **8** adapted for transferring ink from an ink fountain, not shown, to a printing roller. As noted previously, these ink rollers must be maintained in a clean condition and caked and dried ink must be removed from such rollers from time to time.

For purposes of convenience the present invention will be described in reference to roller **2** which is referred to as a vibratory ink roller.

As shown best in FIGS. **1** and **2** there is, in accordance with this invention, a flexible blade **10** which extends the longitudinal length of the roller **2** and is adapted to be placed in line contact with the surface of the roller **2**.

The flexible blade in accordance with this invention may be made of any suitable material having sufficient strength and flexibility. Preferably the blade **10** is made of nylon or some other suitable nonmetallic material. The blade when in contact with the roller is preferably positioned as described in U.S. Pat. No. 2,970,541 so that the plane of the blade is substantially tangential to the cylindric plane described about the axis of the roller at a radius approximately half the radius of the roller.

The blade **10** is mounted on a blade-supporting structure which is connected between two stationary frame portions **12** only one of which is shown in FIG. **1**.

The blade-supporting structure **16** is movable so that the blade **10** can be positioned in and out of contact with the roller **2** as desired. For this purpose the handle **14** is provided. Since the means by which the blade is moved into and out of contact with the roller is not essential to the present invention, it will not be described further. Reference is made, however, to U.S. Pat. No. 2,970,541 for a specific structure for accomplishing this result.

In accordance with this invention means are provided for supporting the flexible blade so that it will be bowed in any desired amount along its longitudinal length so that substantially uniform pressure will be obtained between the blade and the roller throughout the entire line of contact while the roller is rotating in the usual manner.

As embodied, the support means **16** includes a tubular stiffening member **18** which extends substantially the longitudinal length of the roller.

Auxiliary frame **20**, FIG. **2**, is in any convenient manner connected to the tubular stiffening member **18**.

Connected to the tubular stiffening member **18** (FIG. **3**) is a lower blade support **34** to which is assembled an upper blade support **22**. The blades two supports **22** and **34** extends the length of the roller. As will be seen the upper blade support **22** serves, in effect, as a backing support for blade **10** against support **34**.

The stiffening tube **18** as best seen in FIG. **3** is substantially rectangular in form. Spaced along the longitudinal length of the stiffening tube are a plurality of internally threaded tubes **24** (see FIGS. **1** and **3**). Any suitable number of such threaded tubes can be provided and where the press is relatively large in size a greater number of such threaded tubes will be provided than where the press is smaller.

As shown in FIG. **3**, the threaded tubes **24** are adapted to cooperate with an externally threaded tube **26** which is externally threaded. Positioned in telescopic relation with each externally threaded tube **26** is a shaft **28** which is connected at one end **30** to a blade support angle **34**. The shaft **28** can be connected to blade support angle by threaded means or by welding or any other convenient means. The other end of each shaft is threaded for engagement with a locknut **27**.

The flexible blade **10** as best seen in FIG. **2** is sandwiched between the upper blade support **22** and the blade support angle **34**. The flexible cleaning blade **10** can be bowed by the difference in pressure applied to blade by the support **34**.

Thus by turning the nut **27** the blade support will move toward the stiffening tube. By applying more pressure to the blade at the center than at the end the center of the blade will be positioned higher than the ends thereof and vice versa.

It will be understood that the stiffening tube **18** is relatively rigid and the blade support **34** relatively flexible.

The amount the blade is bowed is determined by turning the nut **27**. The amount of bowing in the blade can be changed simply and expeditiously even while the blade is in use. It is not necessary as is the case with blades such as exemplified in U.S. Pat. No. 2,970,541 that the blade be prebowed before assembly into the roller-cleaning apparatus. Moreover, if during use of the roller-cleaning apparatus the amount of the bow in the blade are changed it can be easily corrected with a device in accordance with the present invention.

In the study and practice of the invention, variations and modifications will undoubtedly occur, and it is understood that any changes in the details, combinations and arrangements of elements which have herein been described and illustrated in order to explain the nature of the invention may be made by those skilled in the art without departing from the principles and scope of the invention as expressed in the appended claims and without sacrificing its chief advantages.

What is claimed is:

1. In a printing apparatus, a roller-cleaning device including a frame, a stationary roller-cleaning blade support mounted on said frame, an elongated stiffening tube mounted on said frame and extending along the length of the roller, a plurality of internally threaded tubes spaced along the length of said elongated tube, an externally threaded tube mounted within each of said internally threaded tubes, a shaft mounted within each of said externally threaded tubes, a movable blade support attached to one end of said shaft and means for moving said shafts towards and away from said stationary blade support.

2. An apparatus as defined in claim **1** wherein each of said shafts is threaded at the end opposite from said movable blade support and has a nut in threaded engagement therewith, each of said nuts being adapted to engage the adjacent end of its associated externally threaded tube.