United States Patent [19]

Greiner

[11] **3,744,693**

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[54] **TURNING BAR FOR THE DEFLECTION OF PAPER WEBS**

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[52] **U.S. Cl.** **226/97,** 226/196

[51] **Int. Cl.** **B65h 17/32**

[58] **Field of Search** 226/197, 97

[56] **References Cited**

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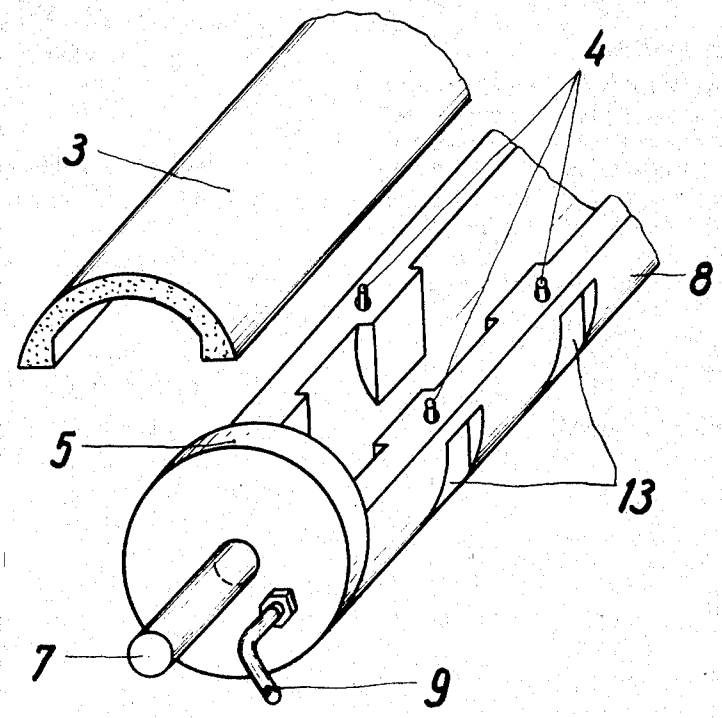
[57] **ABSTRACT**

A turning bar to deflect a moving web has part of its cylindrical periphery of porous air permeable material so that air may pass therethrough from within the bar to prevent the web making surface contact with the bar, which part is readily detachable from the rest of the bar for cleaning or replacement. The detachable part can be secured by screws or may consist of a porous flexible sheet stretched over a perforated segment of the bar and secured by quick fastening devices. To render the bar useful for locks which are narrower than the bar length detachable covers are provided to mask off end portions of the porous part.

6 Claims, 6 Drawing Figures



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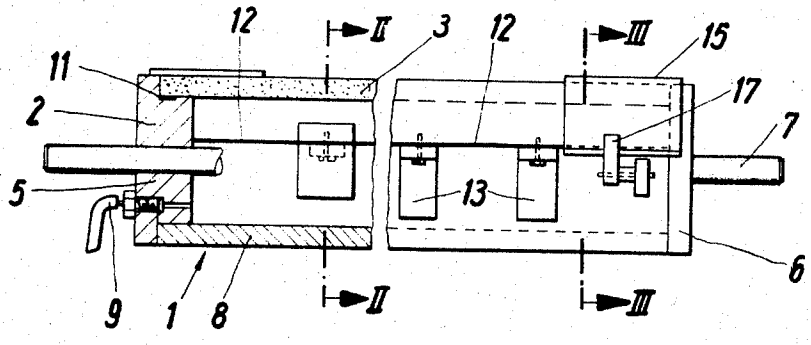

Fig.1

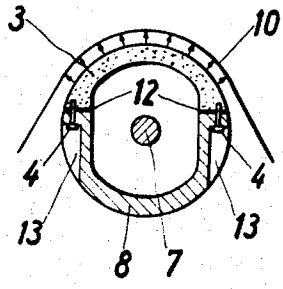

Fig.2

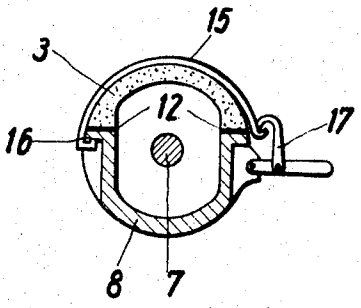

Fig.3

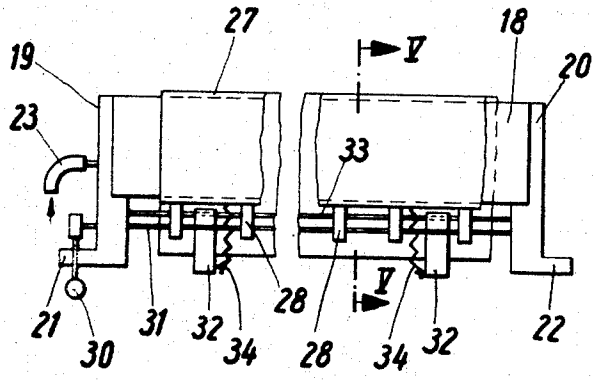

Fig.4

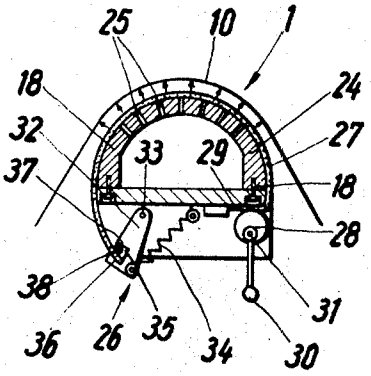

Fig.5

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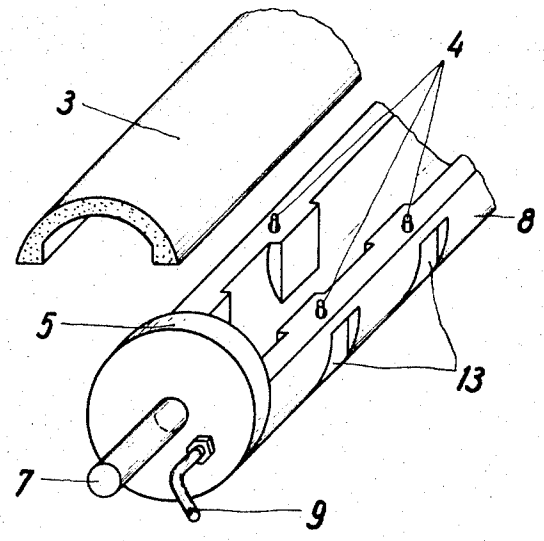

Fig.6

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TURNING BAR FOR THE DEFLECTION OF PAPER WEBS

The invention relates to a turning bar for the deflection of paper webs, the cylindrical periphery of which bar consists of porous, air-permeable material through which air from the interior of the turning bar can escape to atmosphere.

Such turning bars serve for the deflection of webs of material. The air issuing from the periphery of the turning bar forms an air cushion between the turning bar and the material web and reduces the friction between the turning bar and the web. Especially in the case of freshly printed paper webs conducted between printing mechanisms of a rotary web printing machine, friction between the turning bar and the paper web leads to smearing of the printing ink.

A turning bar is already known which possesses a cylindrical periphery of porous, sintered material through which air escapes from the interior of the turning bar. However, despite the air cushion it is not entirely possible to prevent contact between the paper web and the turning bar, and ink is thus transferred to the periphery of the turning bar, resulting in clogging of the pores in the sintered material. The turning bar ultimately becomes incapable of functioning properly and must be replaced. However, for this purpose the turning bar mountings and the air connections to it have to be disconnected. Under favourable circumstances the turning bar can then be cleaned after dismantling, but the cleaning of the entire turning bar is complicated, and it is important that the turning bar is freed of cleaning agent, after cleaning, in order to avoid corrosion.

The invention has the object of avoiding the disadvantages of the known turning bars and of rapidly and easily eliminating the soiling of the porous surface of a turning bar.

In accordance with the invention, a segment of the cylindrical periphery co-operating with the paper web is arranged to be easily detachable from the rest of the structure of the turning bar. Thus it is only necessary to replace that part of the turning bar which becomes smeared with ink, and the remainder of the body of the turning bar with its air connections can remain in the machine. The segment can be replaced, or, since in comparison with the turning bar body it is small and convenient, can easily be cleaned on all sides.

Preferably the segment is made as an easily flexible covering body. It is possible for example to use porous cardboard which is cheap and therefore constantly renewable.

In the invention device for rapid securing of the segment on the turning bar is provided. In the case of a rigid segment fastening with a few screws is advantageous; on the other hand for a flexible segment a rapidly operable clamping device is especially suitable.

In a further development of the invention a device is provided for covering that part of the segment which the paper web does not overlie in the case of smaller web widths. This device has the advantage that it is always possible to use segments of equal width, since the area not covered by the paper web can be sealed off and thus air losses are avoided. Covering plates coated with a synthetic plastics material can be used for coverings which are displaceable over the width of the turning bar. Since the covering plates do not come into contact with the paper web, they are also not soiled and do not need to be cleaned or replaced.

Embodiments of the invention by way of example are shown diagrammatically in the accompanying drawings, wherein:

FIG. 1 shows a longitudinal elevation of a turning bar according to the invention, partly in section;

FIG. 2 shows a cross-section of the same turning bar along the line II—II in FIG. 1;

FIG. 3 shows a cross-section of the same tubing bar along the line III—III in FIG. 1;

FIG. 4 shows a longitudinal elevation of a further embodiment of a turning bar according to the invention;

FIG. 5 shows a cross-section of the turning bar along the line V—V in FIG. 4; and

FIG. 6 shows a perspective illustration of the bar shown in FIGS. 4 and 5 with a segment removed.

The turning bar or roll **1** shown in FIG. 1 consists of a turning bar body **2** on to which there is screwed a segment **3** of porous, air-permeable material, by securing screws **4** (see also FIG. 2). The turning bar body **2** consists of two end discs **5, 6,** through which a shaft **7** extends for securing in the side walls of a rotary web printing machine (not shown), and to which a cut-away hollow body **8** is welded. Air is supplied to the interior of the turning bar through an air connection **9** provided on one end disc **5,** which air passes through the porous material of the segment **3** and forms an air cushion between a paper web **10** looping around the turning bar and the segment **3.** The segment is sealed off from the turning bar body by packings **11, 12.** The securing screws **4** are arranged in depressions **13** of the hollow body **8.**

At each of the ends of the turning bar there is provided a device for covering the part of the porous segment **3** not covered by the paper web (see also FIG. 3). At each end a cover palte **15,** which can be coated with rubber or synthetic plastics material, is hooked on a projection **16** on the hollow body **8** of the turning bar and stretched over the segment **3** by a snap fastener **17.**

In another embodiment of the invention (FIGS. **4** and **5**) the turning bar consists of a hollow body **18** which can be secured on the machine with projections **21, 22** provided on end walls **19, 20.** On the end wall **19** there is again provided an air connection **23** for the supply of air into the interior of the turning bar. The periphery **24** of the turning bar hollow body **18** comprises a plurality of openings **25** through which air can escape. Over this region of the turning bar provided with air outlet openings **25** a flexible segment **27** consisting of porous material is stretched by an easily and rapidly operated fastening device **26.** As best shown in FIG. **5,** one end of the segment **27** is clamped fast between clamping eccentrics **28** and a clamping face **29** on the turning bar. The clamping eccentrics **28** are secured on a shaft **31** which is pivotable by a hand lever **30.** The other end of the segment **27** is held in holders **32** which are secured on a pivotable shaft **33.** Tension springs **34** ensure taut tensioning of the segment **27.** The clamping of the segment **27** in the holders **32** is effected by a wedge action. The segment end is introduced into an opening **35** having two opposite surfaces **36, 37** inclined somewhat towards one another. On an attempt to extract the segment end a ball **38** movable in the opening **35** is forced into a narrowing cross-section and the segment is clamped fast.

I claim:

1. An aero-dynamic turning roll for supporting and guiding a web moving along an elongate path including an arcuate turn, said turning roll comprising an elongate generally tubular body, said body being composed of two longitudinally extending complementary parts, one of said parts being stationarily mounted and the other part having a substantially circularly curved cross-sectional outline and being made of an air-pervious material, the outer surface of said other part being a surface for supporting and guiding the web; fastening means for releasably fastening said other part to said one part to constitute said tubular body; and conduit means for directing a flow of air into said body for causing air to escape through said other part, the escaping air forming an air cushion between said outer surface and the web moving over the roll.

2. The turning roll according to claim 1 wherein end walls close the ends of said body parts, said conduit means communicating with the interior of the body through one of said end walls.

3. The device according to claim 1 wherein said one part of the body comprises a flexible sheet of air-pervious material.

4. The device according to claim 1 wherein said fastening means comprise two quick-release fastening means each for rastening one of the longitudinal edges of said other part, one of said quick-release fastening means including a clamping means for clamping the respective longitudinal edge of said other body part against said one body part and the other of said quick-release fastening means including a pivotally supported member and defining an inwardly narrowing slot, and a ball freely movable in a wide part of said slot whereby upon fitting the respective longitudinal edge of said other body part into said slot and past said ball, an outwardly directed pull acting upon said other part edge forcing the ball deeper into the slot thus anchoring the respective longitudinal edge in the slot.

5. The device according to claim 4 wherein said other body part is in the form of a flat form-sustaining strip, said clamping member coacting with said strip and said slotted member being pivotally mounted on the strip.

6. The device according to claim 1 wherein an air-impervious cover member is attachable upon the outer surface of said other part to close off air passage through a corresponding surface portion of said other body part.

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