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Knechtel

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[54] **DEVICE FOR SEPARATING COPY CARRIERS FROM A ROLL, DRUM OR THE LIKE BY MEANS OF A SUCTION ROLL**

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[30] **Foreign Application Priority Data**

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[52] **U.S. Cl.** **271/80,** 271/DIG. 2, 271/184

[51] **Int. Cl.** **B65h 29/20,** B65h 29/52

[58] **Field of Search** ..... 271/60, DIG. 2, 64 MA, 271/64 R, 65, 27, 80, 172, 184

[56] **References Cited**

UNITED STATES PATENTS

2,731,263 1/1956 Baril et al. ..... 271/64 MA

3,572,694 3/1971 Wilde et al. 271/64

FOREIGN PATENTS OR APPLICATIONS

1,474,167 2/1969 Germany 271/65

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[57] **ABSTRACT**

A device for separating copy carriers such as copy paper sheets from a roll, drum or the like by means of a suction roll includes a wire, rod or like member extending obliquely in front of the suction roll. The wire, rod or like member is arranged so that when a copy carrier is fed forwardly its leading edge reaches the wire for point-contact therewith and as the copy carrier is further moved the point of contact is displaced along the leading edge of the copy carrier and along the wire, whereby the copy carrier is curved toward the suction roll by the wire.

3 Claims, 2 Drawing Figures

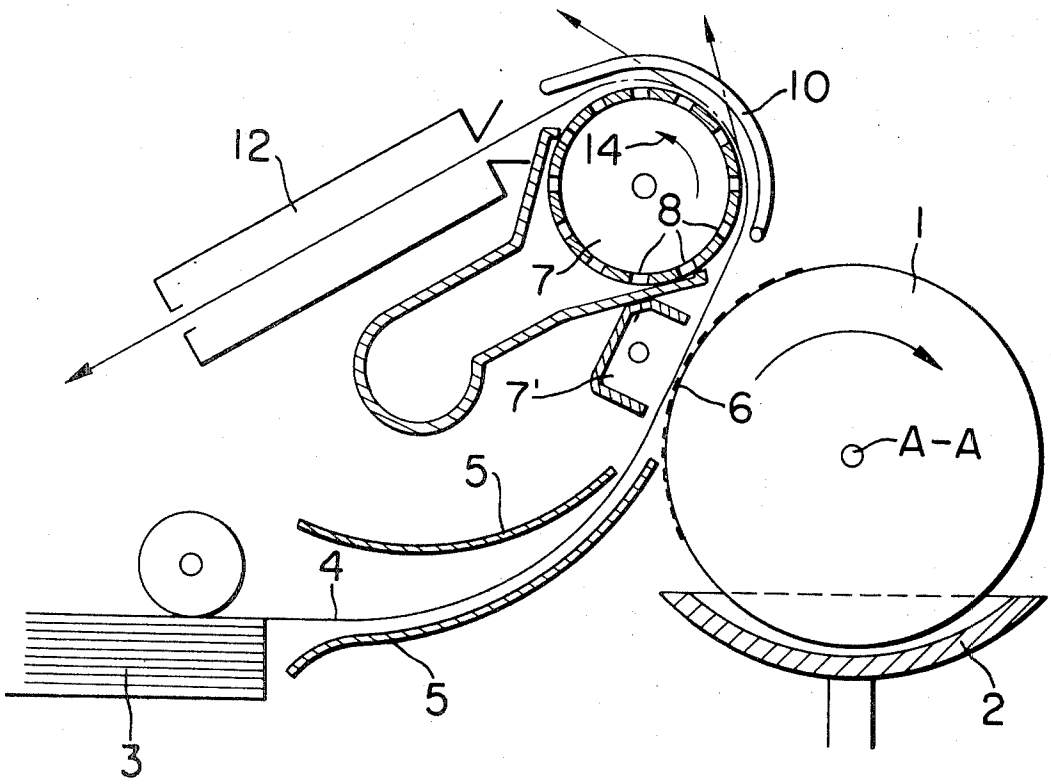


FIG. 1

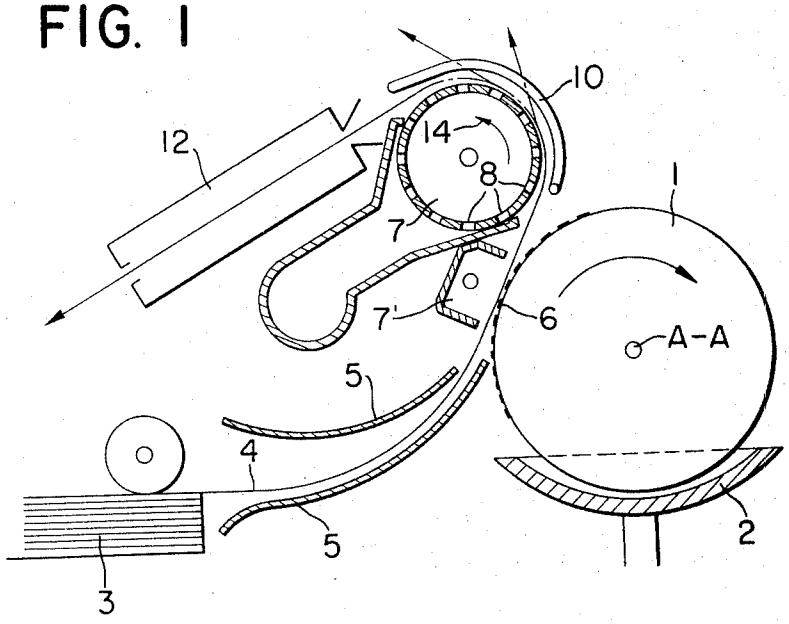
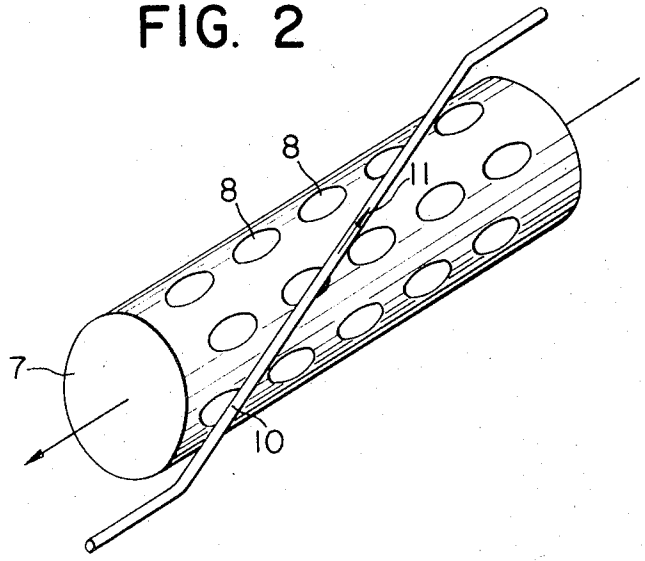


FIG. 2



DEVICE FOR SEPARATING COPY CARRIERS FROM A ROLL, DRUM OR THE LIKE BY MEANS OF A SUCTION ROLL

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to a device for separating copy carriers from a roll, drum or like member by means of a suction roll.

2. Description of the Prior Art

In a copying apparatus, a copy paper sheet drawn as from a cassette is brought into contact with a negative latent image existing on a selenium drum and after image transfer, the copy paper sheet is separated from the drum. A suction roll is used to separate the copy paper sheet from the drum. The suction roll has its interior pressure decreased so as to suck air thereinto through a number of openings formed therein. The sucked air sucks the copy sheet so that the back side thereof is brought into contact with the outer surface of the suction roll. When such suction roll is used to separate copy paper sheets, its reliability depends on the types of copy paper sheets in use and is not always high. That is, the thicker are the copy paper sheets, the more difficult is the separation thereof from the drum.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide a device which can positively separate copy carriers from a drum irrespective of the types of paper materials used for such copy sheets and which can also guide the copy carriers around a suction roll without injuring the copy carriers themselves and the copies carried thereon.

According to the present invention, such an object may be achieved by disposing a wire, rod or like member extending obliquely in front of the suction roll so that when a copy carrier is fed forwardly the leading edge thereof reaches the wire to make a point-contact with the wire, and as the copy carrier is further moved the point of contact is displaced along the leading edge of the copy carrier and along the wire, whereby the copy carrier is curved toward the suction roll by the wire.

When a copy carrier such as a copy paper sheet is curved, only the leading edge thereof contacts the wire and thus, in the device of the present invention, the image-bearing surface of the copy carrier is never scratched or otherwise injured. Futhermore, the point of contact between the leading edge of the copy paper sheet and the wire is displaced with the advancement of the copy paper sheet so that the load exerted on the leading edge of the copy paper sheet is dissipated.

As soon as the copy carrier reaches the suction area of the suction roll, the copy carrier is sucked by the suction roll so that desired separation and deflection may be effected.

Preferably, the wire, rod or the like may extend helically around a portion of the suction roll in spaced-apart relationship therewith.

It is further preferable that the distance of the wire, rod or the like from the suction roll be gradually decreased in the circumferential direction of the roll.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be described in greater detail with reference to the accompanying drawings, in which:

FIG. 1 is a fragmentary schematic view of the copying apparatus showing an embodiment of the present invention; and

FIG. 2 is an enlarged perspective view showing a portion of the apparatus of FIG. 1.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to the drawings, a drum 1 is rotatable about its axis A—A and provided with a negative latent image in an unshown manner. The negative latent image is directed into a developer tank 2. From a cassette 3 a copy paper sheet 4 is drawn and passed along a guide path 5, and then brought into contact with the drum 1 at an area thereof designated by reference numeral 6. A corona means 7' transfers the negative latent image onto the copy paper sheet 4 as a positive image. After the image transfer, the copy paper sheet 4 must be separated from the drum. For this purpose, use is made of a suction roll 7 which is rotatable in the direction of arrow 14. The suction roll 7 has a number of openings 8 through which air is sucked into the suction roll as a pressure reduction is caused within the suction roll. The air acts to separate the copy paper sheet 4 from the drum 1. Depending on the thickness of the copy sheet 4 in use, the copy sheet may not always have its back side brought into contact with the suction roll 7 and thus it may sometimes not be deflected in a proper direction. To avoid this, a wire 10 fixed to the apparatus is disposed in front of the suction roll 7. As seen in FIG. 2, the wire 10 extends substantially helically around a portion of the suction roll. The distance between the suction roll 7 and the wire 10 is selected such that a copy paper sheet may enter the space between the suction roll 7 and the wire 10 in any event. When the leading edge of the copy paper sheet comes to the wire 10, the leading edge makes a point-contact with the wire 10. As the copy sheet is further moved, the point of contact is displaced along the leading edge and along the wire in the direction of arrow 11. Thus, the wire guides the copy paper sheet toward the suction roll, and the copy paper sheet progressively approaches the suction area of the suction roll 7 until the back side thereof is finally brought into contact with the suction roll 7. The suction roll 7 deflects the copy paper sheet toward fixing means 12.

I claim:

1. In a photocopying device including a roll or drum member for contacting a copy carrier, the improvement comprising a suction roll for separating the copy carrier from the drum member, and a helical wire member disposed adjacent said suction roll to engage only a point on a forward edge of said copy carrier and to guide said copy carrier into contact with said suction roll, said point of engagement of said leading edge with said helical wire member being displacable along said leading edge and along said wire member in response to advancing movement of said copy carrier, and said wire member extending obliquely with respect to the direction of movement of the copy carier.

2. A device according to claim 1 wherein said helical wire member extends helically around a portion of said suction roll in spaced relationship therewith.

3. A device according to claim 1 wherein the distance between said suction roll and said wire member gradually decreases in the circumferential direction of said roll.

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