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Samuels et al.

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[54] **SQUEEGEE ASSEMBLY FOR PHOTO-COPY MACHINES**

[75] Inventors: **Abe Samuels**, Chicago; **Roger A. Wiggerman**, McHenry, both of Ill.

[73] Assignee: **Speed-O-Print Business Machine Corporation**, Chicago, Ill.

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[52] **U.S. Cl.** ..... **95/89 A**, 118/104, 355/10

[51] **Int. Cl.** **G03d 3/10**

[58] **Field of Search** ..... 95/89 R, 89 A; 118/104; 355/10

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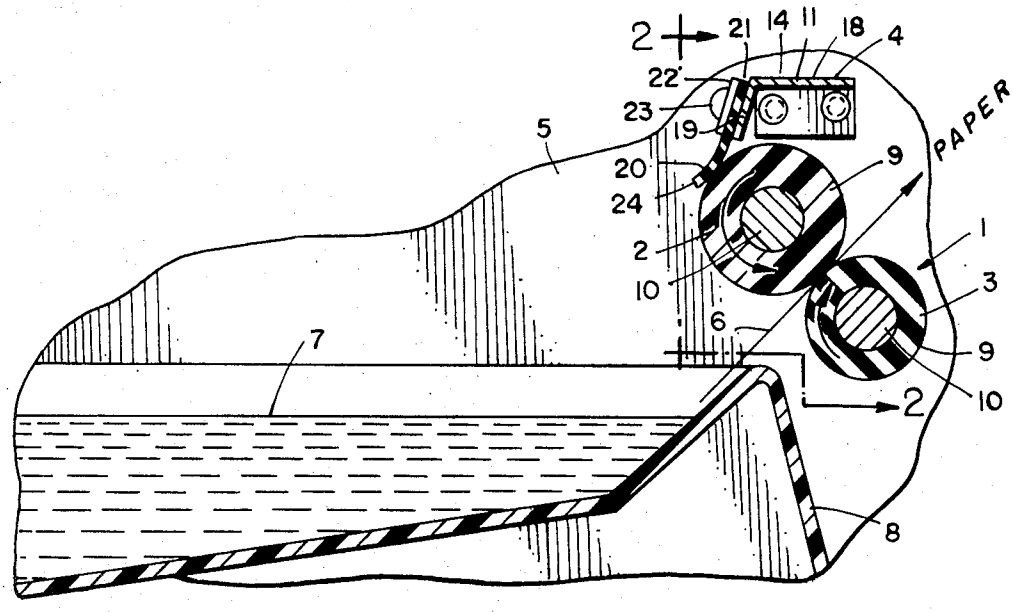
Primary Examiner—Fred L. Braun

Attorney—Root, O'Keeffe

[57] **ABSTRACT**

A wringer assembly, embodying engaging rollers, for use in feeding paper through photocopy machines, and having a moisture impervious, flexible wiper blade in yieldable wiping contact with one of the rollers for removing moisture therefrom. One of the rollers has a durometer hardness greater than that of the other roller, and the wiper blade has a durometer hardness less than that of the roller it contacts.

6 Claims, 3 Drawing Figures



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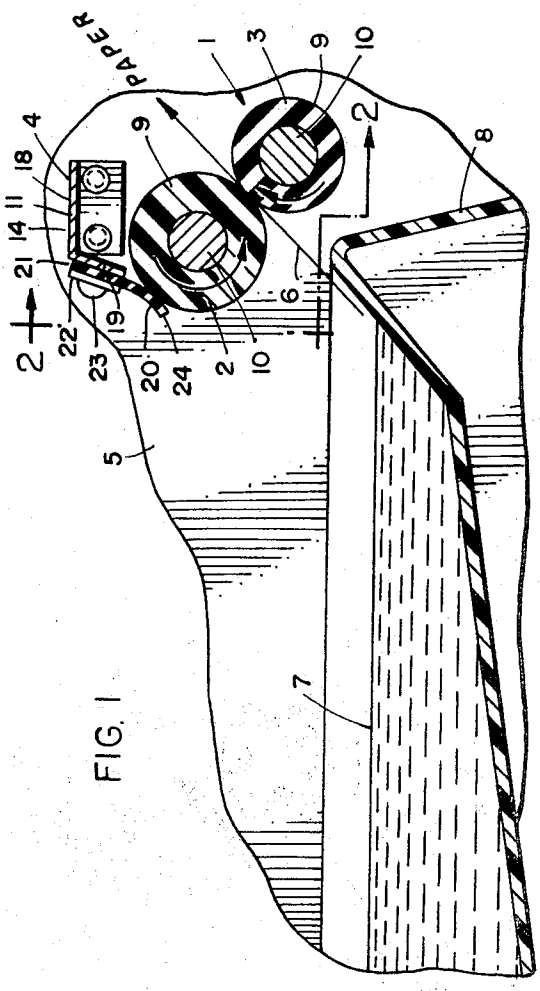

FIG. 1

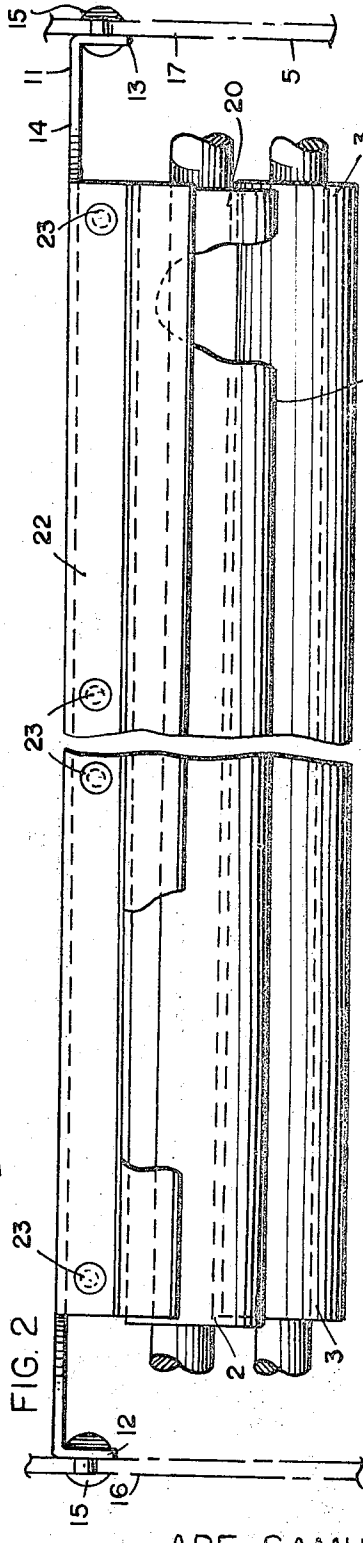

FIG. 2

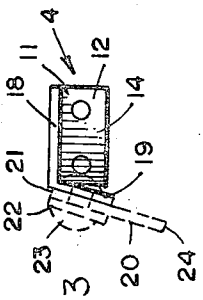

FIG. 3

INVENTORS:
ABE SAMUELS
ROGER A. WIGGERMAN

BY: Johnston, Root, O'Keeffe, Keil, Thompson & Shurtleff
ATT'YS

SQUEEGEE ASSEMBLY FOR PHOTO-COPY MACHINES

BACKGROUND OF THE INVENTION

This invention relates to photocopy machines and, more particularly, to photocopy machines of the type wherein paper is passed through developer solution.

It is a primary object of the present invention to afford a novel wringer assembly for use in photocopy machines.

Troublesome problems in electrostatic copying machines where a developer solution is used have heretofore been the inability to produce a dry copy and the inability to prevent offsetting and what is known as "tailing." One of the types of wringer assemblies heretofore used in such photocopying machines to feed copy sheets from developer solution has consisted of two relatively soft rollers, made of material such as, neoprene, which were intended to compress and squeeze the excess fluid from the copy sheet. However, it has heretofore been found that, commonly, such an assembly did not produce a copy sheet which was sufficiently dry, and, because moisture remained on the rollers as the copy paper passed therebetween, the image would tend to run and thereby produce the aforementioned "tailing," and, in some instances, the image would be repeated across the sheet by an offset printing effect.

In an attempt to overcome the aforementioned problems, a wiper member made of such material as felt or foam rubber, which had moisture absorbent qualities, has heretofore been applied to the roller which engages the image on such a copy sheet. However, such constructions commonly have also had several inherent disadvantages, such as, for example, not drying the roller sufficiently, or scoring the roller, such scoring being reflected in the completed copy.

Heretofore, in order to prevent such scoring, the roller coming in contact with the image often has been made of metal, such as steel. However, such construction also has had several inherent disadvantages such as, for example, that such rollers did not compress and did not have good wringer characteristics; and the wipers heretofore known in the art did not sufficiently remove the moisture from the image-engaging roller to prevent the aforementioned tailing and repeating of the image. As a result, heating elements commonly have been introduced into such metal rollers of wringer assemblies heretofore used in photocopy machines.

It is an important object of the present invention to overcome the disadvantages of wringer assemblies heretofore known in the art for use in photocopy machines.

Another object of the present invention is to eliminate the necessity for embodying heating elements in such wringer assemblies.

A further object of the present invention is to afford a novel wringer assembly for use in photocopying machines of the type wherein a developer solution is used, which will produce a copy of the desired dryness.

Another object of the present invention is to afford a novel wringer assembly for use in photocopy machines which embodies a novel wiper member constituted and arranged in a novel and expeditious manner relative to rollers between which a copy sheet is passed for drying the same.

A further object is to afford a novel wringer assembly of the aforementioned which which embodies a novel roller mechanism therein.

Another object of the present invention is to afford a novel wringer assembly for use in photocopy machines which is practical and efficient in operation and which may be readily and economically produced commercially.

Other and further objects of the present invention will be apparent from the following description and claims and are illustrated in the accompanying drawings which, by way of illustration, show a preferred embodiment of the present invention and the principles thereof and what we now consider to be the best mode in which we have contemplated applying these principles. Other embodiments of the invention embodying the same or equivalent principles may be used and structural changes may be made as desired by those skilled in the art without departing from the present invention and the purview of the appended claims.

DESCRIPTION OF THE DRAWINGS

In the drawings:

FIG. 1 is a fragmentary sectional view of a photocopy machine embodying a wringer assembly embodying the principles of the present invention;

FIG. 2 is a fragmentary, detail sectional view taken substantially along the line 2—2 in FIG. 1; and

FIG. 3 is a detail end elevational view of a portion of the wringer assembly shown in FIG. 1, showing certain parts in different positions.

DESCRIPTION OF THE EMBODIMENT SHOWN HEREIN

A wringer assembly 1 embodying the principles of the present invention is shown in the drawings to illustrate the presently preferred embodiment of the present invention.

The wringer assembly 1 embodies, in general, an elongated upper roller 2 and an elongated lower roller 3 disposed in substantially parallel, abutting engagement with each other, with a wiper unit 4 disposed in position to operatively engage the roller 2.

The wringer assembly 1 is shown in the drawings disposed in position in a housing 5 of an electrostatic photocopying machine, or the like, in position to withdraw paper, not shown, along a path of travel 6 from developer solution 7 in a tank 8, disposed in operative position in the housing 5. Suitable drive mechanism, not shown, may be connected, in a manner well known in the art, to either one or both of the rollers 2 and 3 to cause the roller 2 to rotate in a counterclockwise direction, as viewed in FIG. 1, and the roller 3 to rotate in a clockwise direction, as viewed in FIG. 1.

Such positioning of the two wringer rollers in an electrostatic photocopying machine for the purpose of withdrawing paper from developing solution therein has been heretofore known in the art. However, as will be discussed in greater detail presently, the parts of the wringer assembly 1 are constructed, and arranged relative to each other in a novel and expeditious manner heretofore unknown in the art.

Each of the rollers 2 and 3 embodies an elongated, substantially cylindrical shaped body portion 9 mounted on and secured to an elongated core or shaft 10 for rotation therewith, the shafts 10 extending longitudinally through the respective body portions 9, FIG.

1. The shafts **10**, like the shafts of rollers of wringer assemblies heretofore known in he art, may be made of any suitable material, but preferably, are made from a relative hard material, such as, for example, steel.

In the preferred form of the present invention, the body portion **9** of the roller **3** is made of a relatively soft, moisture-impervious material such as, for example, neoprene, having a durometer hardness of 25 to 40 and preferably of from 30 to 35; and the body portion **9** of the roller **2** is made of a substantially harder, but still compressible, moisture-impervious material such as, for example, neoprene or urethane, having a durometer hardness of 60 to 85 and preferably of from 70 to 75.

Heretofore, in wringer assemblies known in the art, the body portions of the rollers thereof commonly have been constructed of such material that either both of them were relatively soft, such as, for example, having a durometer hardness of 30 to 35, or one or both were made of steel, or other similarly hard material, having a durometer hardness in the nature of 100 and being incompressible. It has been found that wringer assemblies having such heretofore known body portions have had several inherent disadvantages, such as, for example, not sufficiently drying the paper being fed therethrough, causing the aforementioned tailing or repeat printing, or being damaged by scoring, and the like.

The wiper unit **4** embodies a substantially U-shaped bracket **11**, FIGS. **1** and **2**, having two substantially parallel side flanges **12** and **13** disposed at opposite ends of an elongated body portion **14**. The bracket **11** may be mounted in position in a photocopy machine by any suitable means, such as, for example, by securing the side flanges **12** and **13** thereof by rivets **15** to suitable supporting structure, such as oppositely disposed side walls **16** and **17**, respectively, of the housing **5**, as shown in FIG. **2**. The body portion **14** of the bracket **11** embodies a top wall **18**, which is disposed in substantially horizontally extending position in the housing **5**, and a longitudinally extending flange **19** sloping downwardly and outwardly from one longitudinal edge of the top wall **18**.

An elongated wiperblade **20** has one longitudinal edge portion **21** disposed on the outer face of the flange **19**. A plate **22** is disposed in covering relation to the longitudinal edge portion **21**, which is secured to the flange **18** by suitable fastening means, such as rivets **23** extending through the plate **22**, the longitudinal edge portion **21** of the wiper blade **20**,and the flange **19**. The wiper blade **20** has a free longitudinal edge **24** remote from the longitudinal edge portion **21**, which latter edge portion, in the completed assembly constitutes a fixed longitudinal edge portion of the blade **20**.

In the practice of the present invention, the wiper blade **20** is made of a suitable, flexible, nonabsorbent, or moisture-impervious material, which preferably is tough, such as, for example, neoprene having a durometer hardness of between 25 and 40 and preferably between 30 and 35.

In the assembled wringer assembly **1**, the wiper unit **4** is so disposed in the housing **5** that it is disposed above and extends along the roller **2** in substantially parallel relation thereto. One face of an intermediate longitudinally extending portion **25** of the blade **20**, which is disposed between the free edge **24** and the longitudinal edge portion **21** of the blade **20**, is disposed in substantially tangential, wiping engagement with the body portion **9** of the roller **2**, along the full length of the side thereof remote from the roller **3**. The blade **20** engages the roller **2** with sufficient wiping force that the free end **24** thereof is flexed outwardly around the longitudinal edge portion **21** of the blade **20** in a direction away from the roller **2**, as illustrated in FIG. **1**.

In the wringer assembly **1**, the roller **2** constitutes the image-engaging roller thereof, and the roller **3** constitutes the roller disposed in engagement with the sides of the sheets of paper withdrawn from the tank **8** remote from the image-carrying surface thereof. The rollers **2** and **3** and the wiper blade **20** are so disposed in the housing **5** that moisture wiped from the outer peripheral surface of the roller **2** by the blade **20** is caused to drop downwardly into the tank **8**.

It has been found that with the roller **2** made of the aforementioned materials which are compressible, but have a relatively substantial hardness, and with the wiper blade **20** made of the aforementioned material, which is flexible and moisture-impervious, the rollers **2** and **3** are effective, in the operation of a photocopy machine, to effectively dry and feed paper, withdrawn thereby from a developer solution, such as the solution **7**, without causing the aforementioned tailing or repeat printing, and without scoring of the roller **2**, which problems have heretofore been common in the art.

Also, although the broader aspects of the present invention are not limited thereto, in the preferred form of the present invention we prefer to make the body portion **9** of the lower roller **3** of substantially softer material than that of the body portion **9** of the upper roller **2**. For example, we prefer that the durometer hardness of the body portion **9** of the roller **3** be 35 to 45 points, and, preferably in the nature of 40 points, less than that of the body portion **9** of the roller **2**.

It is believed that with the body portion **9** of the roller **2** being compressible, while still having a relatively high durometer hardness, such as, for example, 60 to 85, and with the body portion **9** of the roller **3** being substantially softer, such as, for example, having the aforementioned durometer hardness of 25 to 40, improved operative engagement of the rollers **2** and **3** with the sheet being fed therebetween is afforded, with resultant improved drying of the sheets fed by the wringer assembly **1** as compared to wringer assemblies wherein the upper roller **2** is incompressible, both of the rollers **2** and **3** are relatively soft, or the body portion **9** of the roller **3** is of substantially the same hardness as the body portion **9** of the roller **2**.

From the foregoing it will be seen that the resent invention affords a novel wringer assembly for use in photocopy machines, wherein the parts thereof are constructed, and are arranged in a novel and expeditious manner.

Also it will be seen that the present invention affords a novel wringer assembly which is practical and efficient in operation, and which may be readily and economically produced commercially.

Thus, while we have illustrated and described the preferred embodiment of our invention, it is to be understood that this is capable of variation and modification, and we therefore do not wish to be limited to the precise details set forth, but desire to avail ourselves of such changes and alterations as fall within the purview of the following claims.

I claim:

1. A wringer roller assembly for use in a photocopy machine for feding and drying a sheet of photocopy paper, comprising

a. two elongated rollers rotatably mounted in a substantially horizontal plane and in substantially parallel contacting relation to each other for feeding the sheet therebetween,

b. the surfaces of both of said rollers being compressible, with the surface of one of said rollers having a durometer hardness greater than that of the other said roller, and

c. a flexible, moisture impervious, elongated wiper blade extending substantially horizontally in wiping engagement with the surface of said one roller, the durometer hardness of said wiper blade being less than that of said one roller.

2. The combination of elements defined in claim 1, wherein the durometer hardness of said one roller is

within the range of approximately 60 to 85.

3. The combination of elements defined in claim 1, wherein the durometer hardness of said other roller is within the range of approximately 25 to 40.

4. The combination of elements defined in claim 1, wherein the durometer hardness of said one roller is withing the range of approximately 60 to 85, and the durometer hardness of said other roller is within the range of approximately 25 to 40.

5. The combination of elements defined in claim 1, wherein the durometer hardness of said wiper blade is within the range of approximately 25 to 40.

6. The combination of elements defined in claim 1, wherein the durometer hardness of said one roller is within the range of approximately 70 to 75, and the durometer hardness of said other roller is within the range of approximately 30 to 35.

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