United States Patent [19]

Samuels

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[54] **ROLLERS**

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[52] **U.S. Cl.** **29/129.5**

[51] **Int. Cl.** **B21b 31/08**

[58] **Field of Search** 29/110, 122, 129.5, 130

[56] **References Cited**

UNITED STATES PATENTS

1,856,085	5/1932	Walters	29/130 X
2,302,126	11/1942	Kennedy	29/129.5
880,205	2/1908	Evans et al.	29/110
1,572,759	2/1926	Anderson	29/129.5 X
574,804	1/1897	Johnson	29/122 X
2,329,796	9/1943	Stoffer	29/129.5 X
3,133,340	5/1964	Finelli	29/129.5

FOREIGN PATENTS OR APPLICATIONS

497,733	9/1954	Italy	29/129.5

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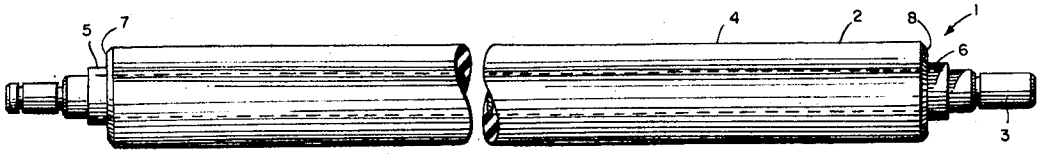
[57] **ABSTRACT**

A roller having a resilient body member mounted on a shaft, with the body member embodying integral hub portions of reduced cross section extending from the opposite ends thereof.

3 Claims, 3 Drawing Figures



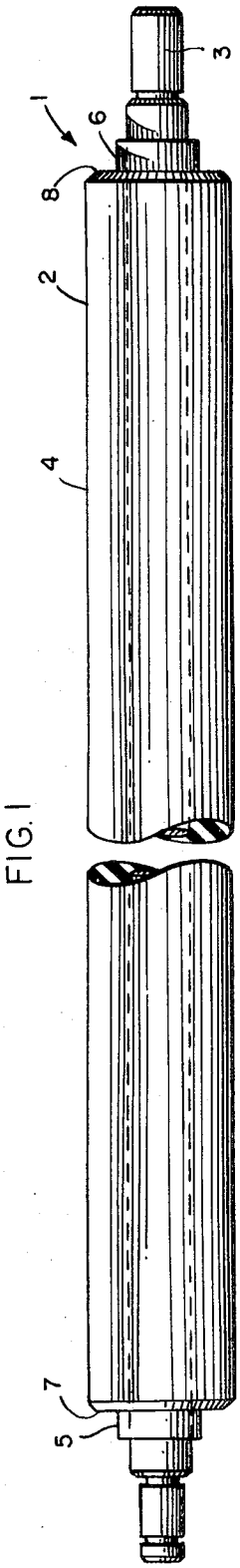


FIG. 1

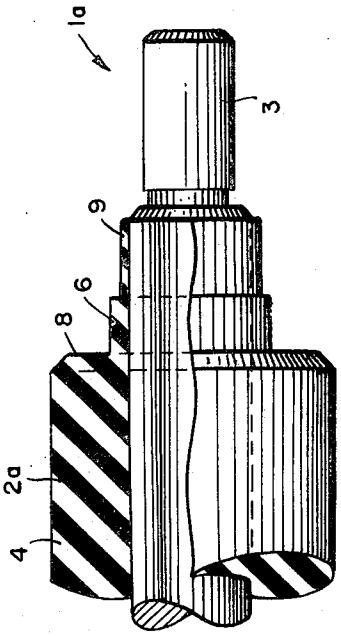


FIG. 3

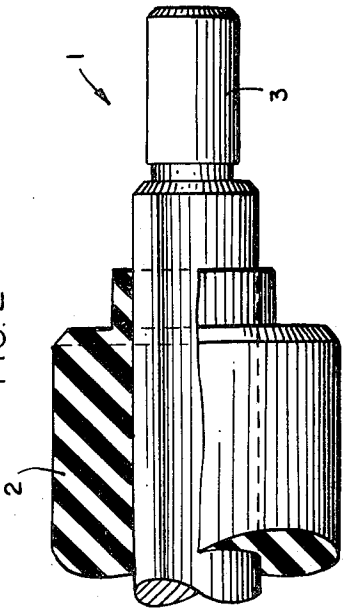


FIG. 2

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ROLLERS

BACKGROUND OF THE INVENTION

This invention relates to rollers, and, more particularly, to rollers which are particularly well adapted for use as wringer rollers, squeegee rollers, inking rollers, and the like.

It is a primary object of the present invention to afford a novel roller.

Another object of the present invention is to afford a novel roller of the type embodying a resilient body member mounted on a shaft, with the body member constituted and arranged in a novel and expeditious manner.

Rollers, which embody resilient body members molded on or otherwise suitably secured to elongated shafts, for rotation therewith, have been heretofore known in the art. Such rollers as have been heretofore known in the art have been so constructed that when the rollers were subjected to moisture, such as, for example, when they were used as wringer rollers or squeegee rollers to remove moisture from articles, such as the wringer rollers in photocopying machines, and the like, or when they were used to apply liquid to articles, such as, for example, when used as inking rollers, and the like, the liquid commonly would seep or otherwise pass inwardly between the shaft and the outer end portions of the body member secured thereto. In the past, when this occurred, it has commonly caused swelling of the end portions of the body members of the rollers heretofore known in the art, causing the article-engaging portion of the body members of the rollers to be deformed so that they no longer were effective to properly operatively engage such articles. It is an important object of the present invention to prevent such deformation of the article engaging portions of rollers used as wringer-rollers or liquid-applying rollers, and the like.

Another object of the present invention is to afford a novel roller embodying a resilient body member mounted on a shaft, wherein the parts thereof are constituted and arranged in a novel and expeditious manner so as to effectively prevent entry of liquid into such position between the body member and the shaft that it would be effective to cause swelling of the article-engaging portion of the body member.

A further object is to afford a novel roller embodying a body member secured to the outer surface of a shaft, wherein the body member embodies a main body portion which is protected in a novel and expeditious manner against seepage or other entry of liquid into the area between the shaft and the aforementioned body portion.

Another object of the present invention is to afford a novel roller having a resilient body portion molded on to an elongated shaft, and wherein the body portion embodies parts which are constituted and arranged in a novel and expeditious manner.

A further object of the present invention is to afford a novel roller 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 preferred

embodiments of the present invention and the principles thereof and what I now consider to be the best mode in which I 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

FIG. 1 is a side elevational view of a roller embodying the principles of the present invention;

FIG. 2 is an enlarged, fragmentary, detail sectional view of one end of the roller shown in FIG. 1; and

FIG. 3 is a fragmentary, detail sectional view similar to FIG. 2, but showing a modified form of the present invention.

DESCRIPTION OF THE EMBODIMENTS SHOWN HEREIN

A roller 1, embodying the principles of the present invention is shown in FIGS. 1 and 2 of the drawings to illustrate the presently preferred embodiment of the present invention.

The roller 1 embodies, in general, an elongated, cylindrical-shaped body member 2 mounted on an elongated shaft 3, which extends longitudinally through the body member 2. The shaft 3 may be made of any suitable material such as, for example, steel, and is longer than the body member 2, FIG. 1.

The body member 2 may be made of any suitable material such as, for example, rubber, but, preferably, is made from a suitable, resilient, synthetic-rubber, such as, for example, the co-polymer of butadiene and acrylonitrile, commonly known as "Buna N." It is mounted on the shaft 3 in inwardly spaced relation to the outer ends thereof and may be secured thereto by any suitable means for rotation therewith. I prefer to form the body member 2, and secure it to the shaft 3 by molding it directly to the shaft 3.

The body member 2 includes an elongated main body portion 4, which is cylindrical in shape, and two hubs 5 and 6 which project outwardly from respective ends 7 and 8 of the body portion 4 in axial alignment with the latter. The hubs 5 and 6 also are cylindrical in shape, and the wall thickness thereof preferably is not substantially less than one-eighth of an inch and not substantially more than one-half of an inch, and preferably is in the nature of one-fourth of an inch. In any event, the outside diameter of the hubs 5 and 6 is less than the outside diameter of the main body portion 4 and, preferably, is less than three-fourths of the outside diameter of the body portion 4. Also, for a purpose which will be discussed in greater detail presently, the hubs 5 and 6 project outwardly from the respective ends of the body portion 4 a distance not substantially less than one-eighth of an inch and not substantially more than one-half of an inch, and preferably in the nature of one-fourth inch.

In the roller 1 the body member 2 is mounted on the shaft 3 with a tight fit and is secured thereto for rotation therewith. The body member 2 may be secured to the shaft 3 by any suitable means such as, for example, by means of a suitable adhesive which, preferably also

acts as a sealant between the interior of the body member 2 and the exterior of the shaft 3 for the purpose of preventing liquid from penetrating into the area between the body member 2 and the shaft 3. I prefer to secure the body member 2 to the shaft 3 in tightly fitting sealing engagement therewith by molding the body member 2 directly onto the shaft 3.

With a roller constructed in the manner of the roller 1 shown in FIGS. 1 and 2, when liquid is present on the outer periphery of the body member 2, any such liquid which passes down around the ends 7 and 8 of the body portion 4 passes on to the hubs 5 and 6, respectively, and then on to the shaft 3. This positions any such liquid on the shaft 3 a substantial distance from the body portion 4 of the body member 2.

Heretofore, in the construction of rollers subjected to liquid, such as, for example, wringer rollers, squeegee rollers, inking rollers, and the like, which rollers embodied a resilient body member secured on a shaft, it has been common practice to construct the rollers in such a manner that the body member consisted only of a body portion of uniform cross sectional size. One of the disadvantages of such rollers heretofore known in the art has been that even when the body members have been effectively sealingly secured to the shafts in the initial manufacture thereof, it has been common that during use the seal between the shaft and the body member broke down to a sufficient extent to permit seepage of liquid into the area between the outer end portions of the body members and the shafts, commonly resulting in swelling of the outer end portions of the body members and thereby deforming the outer peripheral surfaces of such body members. This is particularly undesirable in machines, such as, for example, photocopying machines, and the like, wherein predetermined, uniform pressure on the article engaged by such a roller, is desired.

It has been found that by constructing a roller having a resilient body portion mounted on the axially extending shaft in the manner of the roller 1, the hub portions 5 and 6 thereof are sealingly engaged with the shaft 3 in such a manner as to effectively prevent seepage or other passage of liquid between the shaft 3 and the body member 2 into position wherein it is effective to cause the body portion 4 of the body member 2 to swell. It is expected that such construction will be effective to add materially to the operating life of rollers subjected to liquid, such as, for example squeegee rollers, wringer rollers and inking rollers, and the like.

In FIG. 3 a modified form of the present invention is shown and parts which are the same as parts shown in FIGS. 1 and 2 are indicated by the same reference numerals, and parts which are similar to parts shown in FIGS. 1 and 2 but have been substituted therefor, are indicated by the same reference numerals with the suffix *a* added thereto.

In FIG. 3, a roller 1*a* is shown, which embodies an elongated, cylindrical-shaped body member 2*a* mounted on an elongated shaft 3. The shaft 3 of the roller 1*a* is identical to the shaft 3 of the roller 1, and the body member 2*a* is identical to the body member 2 of the roller 1 except that an additional hub portion 9 is disposed at each end of the body member 2*a* and projects outwardly from the hub portions 5 and 6 thereof, respectively, as illustrated with respect to the hub 6 in FIG. 3. Each of the hub portions 9 are smaller in outside diameter than the respective adjacent hub portions 5 and 6 and are disposed in axial alignment therewith, terminating at their outer ends in inwardly spaced relation to the outer ends of the shaft 3. Preferably, the hub portions 9 project outwardly from the respective hub portions 5 and 6 not substantially less than one-eighth of an inch and not substantially more than one-fourth inch, and preferably in the nature of three-sixteenths of an inch. Also, the hub portions 9 have a thickness of not substantially less than one thirty-second of an inch and not substantially more than three-sixteenths of an inch and preferably in the nature of one-sixteenth of an inch.

With this construction, the overall hub portion at each end of the body portion 2*a* and which includes the hub portions 5 and 6 and the adjacent portions 9, respectively, preferably project outwardly from the adjacent ends 7 and 8 of the body portion 4 of the body member 2*a* a greater distance than the hub portions 5 and 6 shown in FIGS. 1 and 2. This affords a construction wherein any liquid which is to pass between the shaft 3 and the body member 2*a* into position to cause the body portion 4 thereof to swell must pass along the shaft 3 for a correspondingly greater distance.

In making the body member 2*a* the hub portions 9 may be formed in any suitable manner such as, for example, making them with a larger outside diameter than is desired in the finished roller, and then grinding them down to the desired size. However, I prefer to form the body member 2*a* by molding it directly onto the shaft 3, and to cause the hub portions 9 to be formed as molding flash during the molding operation. With this construction an effective seal may be afforded between the hub portions 9 and the shaft 3, which enhances the sealing of the roller 1*a* against the entry of liquid into the areas between the shaft 3 and the body portion 4 of the body member 2*a*.

From the foregoing it will be seen that the present invention affords a novel roller which is particularly well adapted for use as a squeegee roller, wringer roller, inking roller, or the like, wherein the roller will be subjected to liquid.

Also, it will be seen that the present invention affords a novel roller of the type embodying a body member mounted on a shaft, and wherein the body member is constituted and arranged in a novel and expeditious manner.

In addition, it will be seen that the present invention affords a novel roller of the type embodying a body member mounted on a shaft, and having a body portion adapted to engage an article, and wherein the body portion is protected, in a novel and expeditious manner, against the entry of liquid into the area between it and the shaft on which the body member is mounted.

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

Thus, while I have illustrated and described the preferred embodiments of my invention, it is to be understood that this is capable of variation and modification, and I therefore do not wish to be limited to the precise details set forth, but desire to avail myself of

such changes and alterations as fall within the purview of the following claims.

I claim:

1. A roller comprising
a. an elongated body member, and
b. an elongated shaft extending longitudinally through and secured to said body member,
c. said body member comprising a resilient, one-piece molded member, and having
1. an elongated, cylindrical-shaped body portion of substantially uniform diameter, and
2. two cylindrical-shaped hub portions,
d. said hub portions
1. being smaller in diameter than said body portion,
2. extending from respective ends of said body portion in axial alignment therewith, and
3. being sealingly secured to the outer peripheral surface of said shaft,
e. each of said hub portions comprising
1. one cylindrical-shaped portion directly attached to said body portion, and
2. another cylindrical-shaped portion of smaller diameter than said one portion and attached thereto on the side thereof remote from said body portion.

2. A roller as defined in claim 1, and in which
a. said one portion has a maximum external diameter not substantially greater than three-fourths that of said body portion, and
b. said other portion has a minimum wall thickness of not substantially less than one thirty-second of an inch.

3. A roller as defined in claim 1, and in which
a. said body member is directly molded to said shaft.

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