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EUROPEAN PATENT APPLICATION

21 Application number: 81200233.5

51 Int. Cl.³: **G 03 G 15/20**
B 41 F 31/26

22 Date of filing: 26.02.81

30 Priority: 06.03.80 NL 8001340

43 Date of publication of application:
16.09.81 Bulletin 81/37

84 Designated Contracting States:
DE FR GB IT NL

71 Applicant: **Océ-Nederland B.V.**
St. Urbanusweg 102
NL-5914 CC Venlo(NL)

72 Inventor: **Bömers, Johannes Petrus**
Burgemeester Termeerstraat 17
Grubbenvorst(NL)

72 Inventor: **Koeleman, Gerardus Antonius Josef**
Bernhardstraat 15
Velden(NL)

74 Representative: **Bleukx, Lucas Lodewijk Maria,**
Ir. et al,
Océ-Nederland B.V. Patents & Information Dept Postbus
101
NL-5900 MA VENLO(NL)

54 Roller consisting of a cylindrical core and a sleeve, also a device provided with such a roller.

57 Roller consisting of a cylindrical core (1) and a sleeve (4), the portions (5,5') of the sleeve (4) projecting beyond the end surfaces (8,8') of the core (1) being wrapped around and clenched, characterised in that the core (1) is provided at the end surfaces (8,8') with means (6,7,9) which fasten the projecting portions (5,5') of the sleeve (4) in such a way that rotation of the sleeve (4) around the core (1) is possible, whereas movement of the sleeve (4) in the axial direction of the core (1) is impossible. Each of the means (6,7 and 6,7,9) consists of at least one ring (6) rotatable along the end surface (8,8') on which ring (6) the projecting portion (5,5') of the sleeve (4) is fastened.

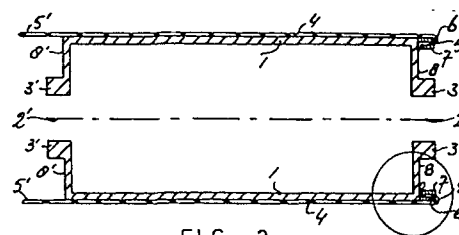


FIG. 2

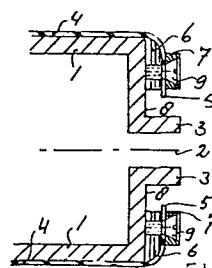


FIG. 4

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Roller consisting of a cylindrical core and a sleeve, also a device provided with such a roller.

The invention relates to a roller consisting of a cylindrical core and a sleeve, the portions of the sleeve projecting beyond the end surfaces of the core being wrapped around and clenched.

Such a roller is already known. In Research Disclosure, dated
5 August 1977 on pp. 10 and 11 a description is given of a roller which consists of a tube with sleeve. Such a roller is in principle suitable as a component of a roller fusing device for an electro(photo)graphic copying device. In a roller fusing device a toner image which is present loose on a paper sheet is fused onto the sheet by means of
10 heat and pressure.

In the case of the above-mentioned tube the projecting portions of the sleeve are wrapped around inwards and glued against the inner surface of the tube by means of an adhesive. A ring which is thrust into the tube clamps the wrapped around ends against the inner surface
15 and thus ensures a consolidation of the glued connection.

Stringent requirements are imposed on such a protective sleeve: inter alia it must not only be heat resistant and wear resistant, but also, in spite of being compressed a large number of times, it must remain rigidly connected with the underlying layer for a long period.
20 It has appeared that the sleeves employed hitherto have not been able to satisfy particularly the latter requirement. As the sleeve is frequently compressed, the connection between the sleeve and the substrate loosens or even breaks completely. In such cases, where the sleeve is attached to the core only by means of the glued ends,
25 the sleeve exhibits a tendency to start "wandering" around the core, this causing wrinkling and twisting at the ends.

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This twisting results in accelerated wear and rupture at the ends.

The object of the invention is to provide a sleeved core which does not exhibit the above-mentioned disadvantages and additionally to enable the sleeve to be fastened in a much simpler manner than
5 hitherto.

Therefore the invention relates to a sleeved core of the type mentioned in the preamble which is characterised in that the core is provided at the end surfaces with means which fasten the projecting portions of the sleeve in such a way that rotation of the sleeve around
10 the core is possible, whereas movement of the sleeve in the axial direction of the core is impossible.

Preferably each of the means consists of at least one ring, rotatable along the end surface, on which ring the projecting portion of the sleeve is fastened, these means each consisting more parti-
15 cularly of two rings of which at least one (the first) has an outer diameter which is equal to that of the core.

The way in which the ends are fastened between the two rings can vary. For example the two rings can be clamped, glued or screwed on or against each other. Preferably each of the ends of the sleeve is
20 wrapped around the outer surface of the first ring (towards the inside) and

- either with the aid of the second ring which has an outer diameter less than the inner diameter of the first ring, is held clamped against the inside of the first ring,
- 25 - or is clamped to the outer surface by means of the second ring which is fastened to the outer surface of the first ring.

In the latter case the second ring is preferably fastened by means of screws to the outer surface of the first ring.

The simplicity of the fastening method will already be evident
30 from what has been stated above and will become even clearer after examination of the Figures and the following specification. This method of fastening a sleeve around a core is much more simple than known methods which have been employed hitherto for this purpose.

35 Preference is given to a sleeve which consists of a covering which squeezes tightly around the core. By this is meant that the sleeve is not glued, screwed, clenched or the like to the core, but is purely held around the core by means of its own elastic

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forces, i.e. under tension.

In that case an entity consisting of the sleeve and the two ring systems is formed, which entity as such can rotate around the core. Consequently, the sleeve can "wander" around the core without wrinkling or twisting occurring at the ends. A sleeve assembled in this way thus not only possesses better fixing properties but above all a longer service life.

If as sleeve a shrunk-on stocking consisting of Teflon (= polytetrafluoroethylene) is selected, which by its nature already possesses to a considerable extent toner-repellent properties, the fixing characteristics of a roller covered in this way are even further improved. Preferably the sleeve therefore consists of a Teflon shrunk-on stocking.

In view of the fact that a roller covered in accordance with the invention is suitable not only in a roller fusing device, but in all cases in which two rollers rotate in contact with each other, i.e. for example in a roller transport or transfer device, the invention also relates to an electro(photo)graphic copying device provided with a sleeved roller in accordance with the invention.

The invention is aimed more especially at a fusing device for an electro(photo)graphic copying device provided with a sleeved roller in accordance with the invention, particularly a roller sleeved with a Teflon shrunk-on stocking.

The invention will now be described in detail with the aid of the Figures 1-4 in which:

Fig. 1 shows the outer view of a roller sleeved in accordance with the invention, the left end of the sleeve of which still has to be wrapped around and fixed,

Fig. 2 shows a cross section through the roller of Fig. 1,

Fig. 3 is a magnification of the portion encircled in Fig. 2, and

Fig. 4 is a portion of a cross section of a roller sleeved in accordance with the second embodiment of the invention.

In the Figures the same parts are identified by the same numerals. In the Figures 1 is a core, e.g. made of steel and hollow, having two concentric apertures 2 and 2' through which the core can be pushed onto a shaft, e.g. a drive shaft. Two ring-shaped thickened portions 3 and 3' around the apertures 2 and 2' form part of the end surfaces (or side walls) 8 and 8'. Around the core there is a sleeve 4, in the case illustrated this consists of a Teflon shrunk-on stocking, with

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projecting portions 5 and 5'. The ends 5 are wrapped around ring 6, which has the same outer diameter as the core .

By means of ring 7 (Figures 1-3), the outer diameter of which is less than the inner diameter of the ring 6 but greater than this inner diameter minus twice the thickness of the sleeve 4, the remaining ends are clenched against the inside of the ring 6. The ring 7 can be pushed inwards to such an extent that the end of the sleeve is also clamped between the side wall 8 of the core and the side edge of ring 7. Any portion of the sleeve which still projects beyond the ring 7 can be cut off.

A second embodiment of the invention is illustrated in Fig. 4. The ends 5 of the sleeve 4 are wrapped around the outer surface of ring 6. In these ends there are holes which correspond to holes provided in ring 6, which are provided with screw threads. The ring 7, similarly provided with threaded holes which correspond to those in ring 6, is screwed firmly with the aid of screws 9 to the outer surface of ring 6. The ends 5 located between the two rings 6 and 7 are thus fixed rigidly between these.

As appears from the above, nowhere between the core 1 and the sleeve 4 there is an unbreakable or even a solid connection. As a result of its own elastic forces the sleeve is tightly seated around the core and if required can rotate with respect to the core surface. Admittedly this rotational capacity is extremely slight, but is just sufficient to allow the sleeve to "wander" over the core surface, in this case the rings and the ends clenched between them co-rotate, so that no twisting occurs at the ends.

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Claims.

1. Roller consisting of a cylindrical core (1) and a sleeve (4), the portions (5, 5') of the sleeve (4) projecting beyond the end surfaces (8,8') of the core (1) being wrapped around and clenched, characterised in that the core (1) is provided at the end surfaces
5 (8,8') with means (6,7,9) which fasten the projecting portions (5,5') of the sleeve (4) in such a way that rotation of the sleeve (4) around the core (1) is possible, whereas movement of the sleeve (4) in the axial direction of the core (1) is impossible.
2. Roller according to claim 1 characterised in that each of the
10 means (6,7 and 6,7,9) consists of at least one ring (6) rotatable along the end surface (8,8'), on which ring (6) the projecting portion (5,5') of the sleeve (4) is fastened.
3. Roller according to claim 2, characterised in that the means
15 (6,7 and 6,7,9) each consist of two rings (6,7), of which at least one ring (6) has an outer diameter equal to that of the core (1).
4. Roller according to claim 3, characterised in that each of the projecting portions (5,5') of the sleeve (4) is turned back around the outer surface of the first ring (6) and is clenched with the aid of the
20 second ring (7) against the inside of the first ring (6).
5. Roller according to claim 3, characterised in that each of the projecting portions (5,5') of the sleeve (4) is wrapped around the outer surface of the first ring (6) and is clenched thereto with the aid of the second ring (7) which is fastened to the outer surface of the first ring
25 (6).
6. Roller according to claim 5, characterised in that the second ring (7) is fastened to the outer surface of the first ring (6) by means of screws (9).
7. Roller according to one or more claims 1-6, characterised in that

the sleeve (4) consists of a covering which squeezes tightly around the core (1).

8. Roller according to claim 7, characterised in that the sleeve (4) consists of a Teflon shrunk-on stocking.

5 9. Electro(photo)graphic copying device provided with a roller according to one or more of claims 1-8.

10. Fixing device for an electro(photo)graphic copying device provided with a roller according to one ore more of claims 1-8.

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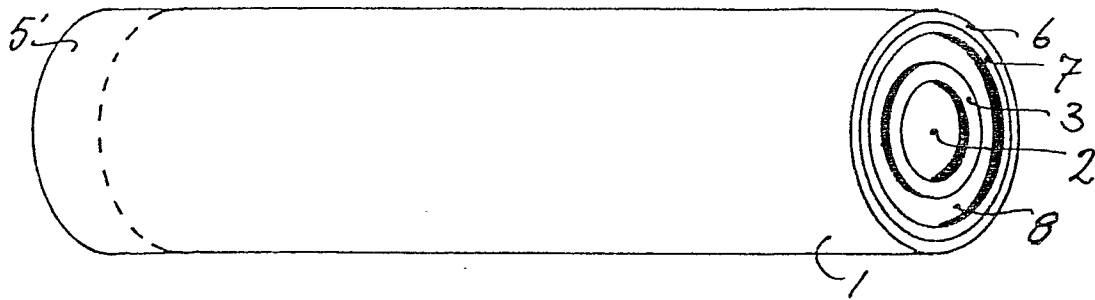


FIG. 1

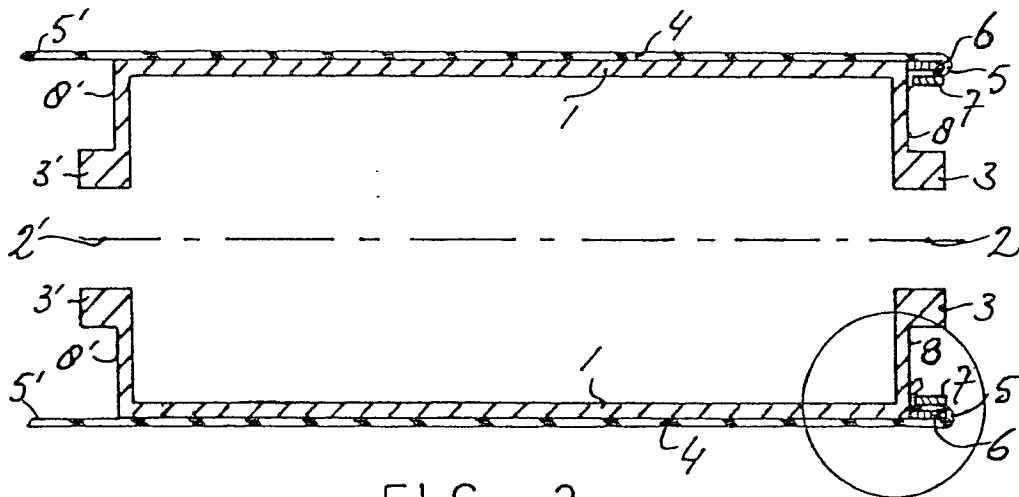


FIG. 2

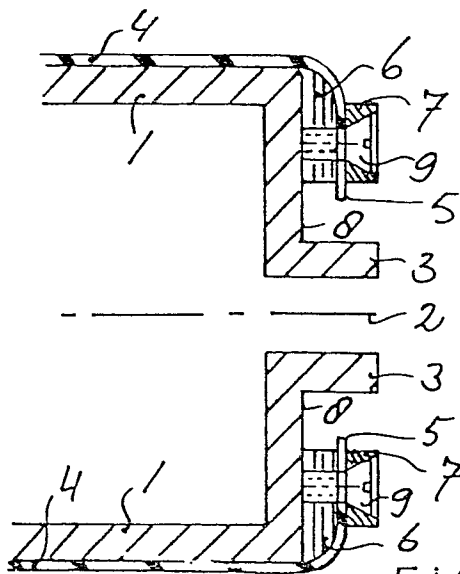


FIG. 4

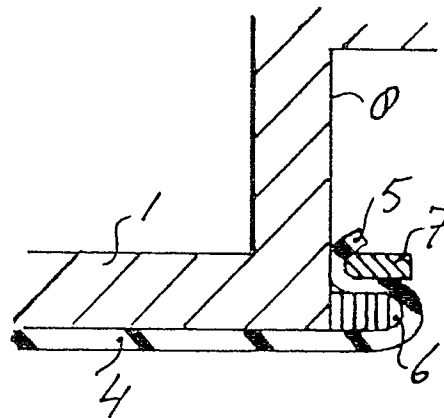


FIG. 3



European Patent
Office

EUROPEAN SEARCH REPORT

Application number

EP 81 20 0233

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int. Cl.)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
	US - A - 4 069 758 (RUSSELL WILLIAM DOCTEUR) * Column 2, lines 34-66 * -- DA RESEARCH DISCLOSURE, no. 160, August 1977, abstract 16019 Havant, GB "Method for manufacturing a compliant roller for use in an electrographic apparatus" * Pages 10 and 11 * ----	1	G 03 G 15/20 B 41 F 31/26
			TECHNICAL FIELDS SEARCHED (Int. Cl.)
			G 03 G 15/20 B 41 F 31/26
			CATEGORY OF CITED DOCUMENTS X: particularly relevant A: technological background O: non-written disclosure P: intermediate document T: theory or principle underlying the invention E: conflicting application D: document cited in the application L: citation for other reasons
			&: member of the same patent family, corresponding document
☒ The present search report has been drawn up for all claims			
Place of search	Date of completion of the search	Examiner	
The Hague	15-06-1981	TREVETIN	