The present invention has essentially as its subject a cylinder covered with a printing blanket and which may be used in printing machines of various types.

It is known since a long time to use in offset printing machines cylinders covered with a blanket permitting the printing of a paper web clamped and driven between two cylinders.

Until now the blankets were fastened onto the cylinders with their ends, which ends were entered and locked into the cylinder, thereby resulting in a number of inconveniences.

In effect the mutually confronting ends of the blanket necessarily left a certain space between them so that the paper web exhibited non printed zones.

Moreover this fastening mode of the blankets imparted to the cylinder-blanket assembly a dissymmetry which as one understands it generated vibrations during the rotation of the cylinder. Therefore the speed and the yield efficiency of the printing machines were necessarily limited.

In the document DE-A-3,027,549, there is described a printing blanket which is formed of a lamination comprising a plurality of layers among which fabric base layers and which are adapted to be fastened onto a cylinder with its mutually confronting edges as explained hereabove.

Moreover in the document US-A-3,750,250 is described a cylinder with a printing blanket as defined in the preamble of claim 1 but this blanket is light and disposable once worn out and it therefore does not consist of a multiplicity of layers surrounding the cylinder without any interruption and allowing the latter to rotate with a great speed without generating vibrations.

The present invention has as its object to propose a cylinder covered with a blanket accomplishing this object.

For that purpose the invention has as its subject a cylinder covered with a printing blanket which is held upon the cylinder by completely surrounding this cylinder without any interruption in the manner of a sleeve and which comprises a base layer adhesively bonded onto the external surface of the cylinder, characterized in that the said base layer without any interruption is made from cellular rubber, has a modulus of elasticity in compression lying between about 0.1 and 100 megapascals (MPa) and is associated towards its surface opposite to the one adhesively bonded onto the cylinder with other layers without any interruption excluding the fabrics and comprising at least one layer of hard elastomer which is reinforced with fibres and which is associated with a lithographic or printing layer.

The symmetry on rotation of the cylinder provided with this blanket will be perfect and the printing machine comprising such cylinders may operate at a fast speed without generating vibrations and without resulting in printing defects.

According to another characteristic of the invention, the base layer of cellular rubber has a thickness lying between about 0.1 and 8 mm and is made fast to the external surface of the cylinder by a layer of adhesive with a thickness lying between about 0.01 and 0.2 mm and the aforesaid layer of hard elastomer has a thickness lying between about 0.05 and 0.5 mm.

According to a preferred embodiment the thickness of the base layer is equal to about 2.5 mm and that of the layer of hard elastomer is equal to about 0.25 mm.

According to a preferred embodiment the modulus of elasticity in compression of the layer of cellular rubber is equal to about 9 megapascals.

One should further specify here that the volume percentage of the gas enclosed in the layer of cellular rubber preferably in closed cells is lying between about 10 and 80%.

The aforesaid gas volume percentage may advantageously lie between 12 and 15%.

According to still another characteristic of the invention, the thickness of the lithographic layer is equal to or lower than 0.25 mm so as not to affect the advantages provided by the specific arrangement of the layers of the sleeve or blanket and in particular by the combination of the basic layer of cellular rubber and of the layer of hard elastomer.

But further characteristics and advantages of the invention will appear better in the detailed description which follows and refers to the attached drawings given by way of example only and in which :

Figure 1 is a diagrammatic view in cross-section of a cylinder covered with a sleeve-shaped printing blanket according to the principles of the invention, and

Figure 2 is an enlarged view in section of the cylinder-blanket assembly according to the framed portion II of figure 1.

Referring to this figure 1 one sees a blanket-carrying cylinder 1 which is solid but which could also be hollow, this cylinder being covered with a blanket 2 which presents itself in the shape of a sleeve surrounding the said cylinder completely and without any interruption.

The blanket or sleeve 2 may be slipped by any suitable method over the cylinder 1 which may exhibit a diameter lying between 80 and 800 mm.

One will now describe the structure of the printing sleeve or blanket 2 when referring more particularly to figure 2.

The sleeve 2 comprises a base or lower layer 4 of cellular rubber adhesively bonded to the external surface 1a of the cylinder 1 by a layer of adhesive 3 the thickness of which may lie between about 0.01 and 0.2 mm.

The layer 4 of cellular rubber has a thickness lying between 0.1 and 8 mm, preferably equal to 2.5 mm and a

modulus of elasticity preferably lying between 0.1 and 100 MPa, preferably equal to 9 MPa. This layer 4 is naturally compressible and contains a certain volume of gas enclosed in open or closed cells. The volume percentage of gas enclosed in the cells may lie between about 10 and 80% and is preferably lying between 12 and 15%. One should remark that the layer 4 may optionally be reinforced with fibres or the like.

Above this layer 4 is adhesively bonded a layer 5 of hard elastomer which may possibly be reinforced with fibres. The thickness of this layer 5 of hard elastomer may lie between 0.05 and 0.5 mm.

At last the blanket or sleeve 2 comprises an external lithographic or printing layer 6 which may have a thickness lying between 0.05 and 0.6 mm and is preferably equal to or lower than 0.25 mm. This lithographic layer 6 is made from a suitable elastomer material known per se.

All the hereabove layers of the printing sleeve or blanket 2 are adhesively bonded to each other and to the external surface 1a of the cylinder 1 which as one may understand it when referring again to figure 1 forms together with the sleeve 2 an assembly perfectly symmetrical in rotation and which does therefore not generate any vibration and allows a printing machine fitted with such cylinders to operate at a fast speed.

One will further add here that the specific arrangements of the layers of the sleeve or blanket 2 according to this invention and in particular the sandwich constituted by both layers 4 and 5 imparts to the said sleeve an ideal behaviour in the nip zone between two cylinders, namely in particular an ideal compressibility and a nearly total absence of shearing at the surface, i.e. of sidewise displacement of the material of the sleeve, wherefrom its results a perfect behaviour of the cylinders upon rolling during the printing process.

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Claims

1. Cylinder covered with a printing blanket which is held upon the cylinder (1) by completely surrounding this cylinder without any interruption in the manner of a sleeve and which comprises a base layer (4) adhesively bonded onto the external surface (1a) of the cylinder (1), characterized in that the said base layer without any interruption is made from cellular rubber, has a modulus of elasticity in compression lying between about 0.1 and 100 megapascals (MPa) and is associated towards its surface opposite to that adhesively bonded onto the cylinder (1) with other layers without any interruption (5, 6) excluding fabrics and comprising at least one layer of hard elastomer (5) which is reinforced with fibers and which is associated with a lithographic or printing layer (6).

2. Cylinder according to claim 1, characterized in that the base layer (4) of cellular rubber has a thickness lying between about 0.1 and 8 mm and is made fast to the external surface (1a) of the cylinder (1) by a layer of adhesive (3) with a thickness lying between about 0.01 and 0.2 mm and the aforesaid layer of hard elastomer (5) has a thickness lying between about 0.05 and 0.5 mm.

3. Cylinder according to claim 2, characterized in that the aforesaid base layer (4) has a thickness equal to about 2.5 mm and the aforesaid layer of hard elastomer (5) has a thickness of about 0.25 mm.

4. Cylinder according to one of claims 1 to 3, characterized in that the modulus of elasticity in compression of the layer of cellular rubber (4) is equal to about 9 megapascals.

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5. Cylinder according to one of the foregoing claims, characterized in that the volume percentage of the gas enclosed in the layer of cellular rubber (4) preferably in closed cells is lying between about 10 and 80%.

6. Cylinder according to claim 5, characterized in that the aforesaid gas volume percentage is lying between about 12 and 15%.

7. Cylinder according to claim 1, characterized in that the thickness of the lithographic layer (6) is equal to or below 0.25 mm.