(12) STANDARD PATENT (11) Application No. **AU 2008217112 B2**
(19) AUSTRALIAN PATENT OFFICE

(54) Title
Method for producing a shutter and method for producing a set of two toothed belts

(51) International Patent Classification(s)
E06B 9/13 (2006.01)

(21) Application No: **2008217112** (22) Date of Filing: **2008.01.31**

(87) WIPO No: **WO08/101779**

(30) Priority Data

(31) Number	(32) Date	(33) Country
07101861.8	**2007.02.07**	**EP**

(43) Publication Date: **2008.08.28**
(44) Accepted Journal Date: **2014.03.06**

(71) Applicant(s)
Dynaco Europe N.V.

(72) Inventor(s)
Coenraets, Benoit

(74) Agent / Attorney
Griffith Hack, GPO Box 3125, Brisbane, QLD, 4001

(56) Related Art
US 2006/037718

(12) DEMANDE INTERNATIONALE PUBLIÉE EN VERTU DU TRAITÉ DE COOPÉRATION EN MATIÈRE DE BREVETS (PCT)

(19) Organisation Mondiale de la Propriété Intellectuelle
Bureau international

(43) Date de la publication internationale
28 août 2008 (28.08.2008)

PCT

(10) Numéro de publication internationale
WO 2008/101779 A1

(51) Classification internationale des brevets :
E06B 9/13 (2006.01)

(21) Numéro de la demande internationale :
PCT/EP2008/051203

(22) Date de dépôt international :
31 janvier 2008 (31.01.2008)

(25) Langue de dépôt : français

(26) Langue de publication : français

(30) Données relatives à la priorité :
07101861.8 7 février 2007 (07.02.2007) EP

(71) Déposant *(pour tous les États désignés sauf US)* : **DYNACO INTERNATIONAL S.A.** [BE/BE]; Boulevard Général Wahis 16 D, B-1030 Bruxelles (BE).

(72) Inventeur; et

(75) Inventeur/Déposant *(pour US seulement)* : **COENRAETS, Benoit** [BE/BE]; Chaussée de Waterloo 496 D, B-1050 Bruxelles (BE).

(74) Mandataire : **CALLEWAERT, Koen**; Bureau Callewaert b.v.b.a., Brusselsesteenweg 108, B-3090 Overijse (BE).

(81) États désignés *(sauf indication contraire, pour tout titre de protection nationale disponible)* : AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LA, LC, LK, LR, LS, LT, LU, LY, MA, MD, ME, MG, MK, MN, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RS, RU, SC, SD, SE, SG, SK, SL, SM, SV, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, ZA, ZM, ZW.

(84) États désignés *(sauf indication contraire, pour tout titre de protection régionale disponible)* : ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), eurasien (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), européen (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, MT, NL,

[Suite sur la page suivante]

WO 2008/101779 A1

(54) Title: METHOD FOR PRODUCING A SHUTTER AND METHOD FOR PRODUCING A SET OF TWO TOOTHED BELTS

(54) Titre : PROCEDE DE FABRICATION D'UN VOLET ET PROCEDE DE FABRICATION D'UN ENSEMBLE DE DEUX COURROIES CRANTEES

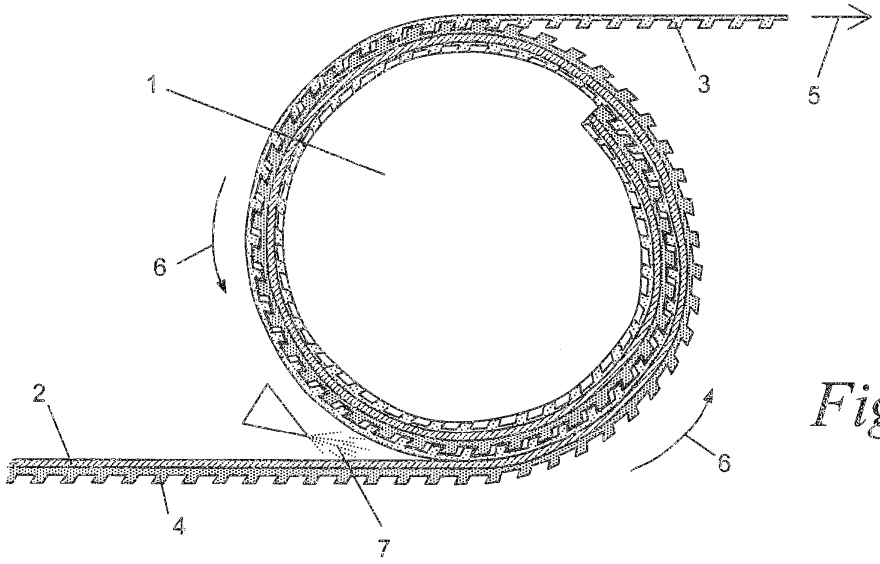

Fig. 1

(57) Abstract: The invention relates to a method for producing a shutter (2) designed for rolling and unrolling, characterised in being provided on each of the opposing faces thereof with a toothed belt (3, 4), comprising a series of teeth which permit the two belts (3, 4) to engage one with the other, the position of the teeth being adjusted on at least own of said belts (3, 4) by means of the deformation of said belt (3, 4) such as to allow the two belts (3, 4) to engage and the relative position of said belts (3, 4) is then stabilised.

[Suite sur la page suivante]

NO, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

Déclaration en vertu de la règle 4.17 :
— *relative à la qualité d'inventeur (règle 4.17.iv))*

Publiée :
— *avec rapport de recherche internationale*

(57) Abrégé : La présente invention est relative à un procédé de fabrication d'un volet (2) destiné à être enroulé et déroulé, caractérisé en ce que l'on prévoit sur chacune de ses faces, en regard l'une de l'autre, une courroie crantée (3, 4) comprenant ainsi une succession de dents, et en ce que, pour permettre à ces deux courroies (3, 4) de s'engrener l'une avec l'autre, l'on adapte la position des dents d'au moins une des courroies (3, 4) par la déformation de cette courroie (3, 4) d'une manière telle à permettre aux deux courroies (3, 4) de s'engrener et à ce que l'on stabilise ensuite cette position des courroies (3, 4) l'une par rapport à l'autre.

METHOD FOR PRODUCING A SHUTTER AND METHOD FOR PRODUCING A SET OF TWO SERRATED BELTS

The present invention concerns a method for producing a shutter designed to be rolled up and unrolled and having a belt on either face, whereby both belts are situated opposite one another and work in conjunction in such a manner that one of both belts can drive the other one. Both belts are preferably serrated.

A major problem with this type of shutters with serrated belts is due to the fact that, while it is being rolled up, the distance between two consecutive teeth changes constantly. Indeed, this distance not only depends on the angle of curvature of the rolled-up shutter, but it also varies continuously during the winding. Moreover, for shutters and belts with varying thicknesses, one also has to reckon with said variation in those spots where the belts are fixed to the shutter. Thus, in order to make it possible for the belt situated on one of the faces to engage with the belt on the other face, the distance between two consecutive teeth of one of the belts should be adjusted to the distance between the teeth of the other belt while compensating any thickness and length tolerances.

It has been found, based on the actual knowledge of the professional, that this cannot be realised with the required precision in order to obtain a perfect meshing of two co-operating belts.

One of the main aims of the present invention is to offer a very simple and very efficient solution to this problem, which does not require any special technical know-how and which can be obtained within a very short time span.

To this end, the method according to a first aspect of the invention adjusts the position of the teeth of at least one of the belts, while the shutter is being rolled up simultaneously with the belts, by deforming said belt in such a way that both belts can mesh, and subsequently this position of the belts in relation to the shutter is stabilized; and wherein the position of the teeth of at least one of the belts is adjusted when at least a part of said shutter is being rolled up, whereby this part comprises a lateral edge of said shutter, simultaneously with the belts and in that this position of the belts is subsequently stabilized in relation to the shutter or in relation to said part of the shutter; and wherein the shutter, or said part is rolled up while a belt which is free in

2008217112 10 Jan 2014

relation to the shutter, or in relation to said part, and which is provided opposite one of the faces of the shutter or of said part, is made to mesh with a belt which is fixed in relation to the opposite face of the shutter or of said part, and the meshing takes place while the shutter or said part is being rolled up, there where the two belts make contact, after which the free belt is fixed in relation to the shutter or in relation to said part, to the face opposite the one with the fixed belt while the belts mesh.

According to a first special embodiment of the invention, the shutter is being rolled up while a belt which is free in relation to the shutter and which is placed opposite one of the faces of the latter is made to mesh with a belt which has been previously fixed to the opposite face of the shutter, whereby this meshing takes place during the winding of the shutter as soon as both belts make contact, whereby the free belt is subsequently fixed to the shutter on the face opposite the one of the fixed belt while the teeth of the belts engage.

According to a second special embodiment of the invention, both belts are made to mesh before they are fixed to the shutter, after which the shutter is rolled up simultaneously with both belts in such a manner that they are inserted between the successive windings of the rolled-up shutter and, as a consequence, between the opposite faces of the shutter, whereby each of the belts is then fixed to the face facing the shutter while the latter is being rolled up.

According to a third special embodiment, a belt made of plastic, in particular a thermoplastic or thermosetting material, is provided on one of the faces of the shutter, and facing this belt is provided a serrated belt on the other face of the shutter, whereby the shutter is then rolled up in such a manner that, during this winding, the teeth of the serrated belt penetrate in the plastic belt and form teeth in the latter, such that both belts are made to mesh. Next, the plastic is made to set so as to stabilize the position of the teeth in relation to the shutter.

In another aspect there is provided a shutter designed to be rolled up and unrolled, wherein on each face, opposite one another, is provided a serrated belt comprising a succession of teeth, and in that, in order to make it possible for both belts to mesh, the position of the teeth of at least one of the belts is adjusted by deforming said belt in such a way that both belts can mesh, and that this mutual position of the belts can subsequently be stabilized, whereby the position of the teeth of at least one of

2008217112 10 Jan 2014

the belts is adjusted when at least a part of said shutter is being rolled up, whereby this part comprises a lateral edge of said shutter, simultaneously with the belts and in that this position of the belts is subsequently stabilized in relation to the shutter or in relation to said part of the shutter, wherein the two belts are made to mesh before they are fixed to the shutter or to said part, and in that the shutter or the part is subsequently rolled up simultaneously with said two belts in such a manner that they are inserted between the successive windings of the rolled-up shutter or the rolled-up part, and as consequence between the opposite faces of the shutter or of the part, and in that each of the belts is fixed to the face opposite the shutter or the part while the latter is being rolled up.

In yet another aspect, there is provided a shutter designed to be rolled up and unrolled, wherein on each face, opposite one another, is provided a serrated belt comprising a succession of teeth, and in that, in order to make it possible for both belts to mesh, the position of the teeth of at least one of the belts is adjusted by deforming said belt in such a way that both belts can mesh, and that this mutual position of the belts can subsequently be stabilized, whereby the position of the teeth of at least one of the belts is adjusted when at least a part of said shutter is being rolled up, whereby this part comprises a lateral edge of said shutter, simultaneously with the belts and in that this position of the belts is subsequently stabilized in relation to the shutter or in relation to said part of the shutter, wherein a non-serrated belt made of plastic, in particular a thermoplastic or thermosetting material, is provided on one of the faces of the shutter or of the part, in that a serrated belt is provided facing said belt on the other face of the shutter or of the part, in that the shutter or said part of the shutter is rolled up, such that during this winding the teeth of the serrated belt penetrate into the non-serrated belt made of plastic, thus forming teeth in the latter such that the belts are made to mesh, and in that the plastic is subsequently made to set so as to stabilize the position of the teeth in relation to the shutter or in relation to the part.

Other details and particularities of the invention will become clear from the following description of some special embodiments, given by way of example only without being limitative in any way, with reference to the accompanying drawings.

Figure 1 is a schematic cross section of a first embodiment of the invention.

Figure 2 is a section analogous to that in figure 1 of a second embodiment of the invention.

Figure 3 also shows a section analogous to that in figure 1 of a third embodiment of the invention.

Figure 4 is a cross section of a drum, seen transversally to its axis, according to a special embodiment of the invention.

Figure 5 is a section of the lateral edge of a shutter according to a first embodiment of the invention.

Figure 6 shows a view analogous to that in figure 5 of a second embodiment of the invention.

Figure 7 also shows a view analogous to that in figure 5 of a third embodiment of the invention.

In the different figures, the same figures of reference refer to analogous or identical elements.

In a general manner, the present invention concerns a method for producing a shutter designed to shut a bay or any other opening whatsoever, such as a window, the loading space of a vehicle, such as a lorry, a vessel or a caisson, to cover a swimming pool, etc.

In particular, a method for producing a shutter is concerned which is designed to be rolled up and unrolled between an open position and a shut position. To this end, two serrated belts are preferably provided near the lateral edges of the shutter, facing each other so that, when the shutter is rolled up and unrolled, the two belts will mesh.

According to the invention, the position of the teeth of at least one of the belts is adjusted, while the shutter is being rolled up, by deforming said belt, preferably in the longitudinal direction, in such a way that both belts can mesh, and this position of the belts in relation to the shutter is stabilized so as to maintain said belt in its deformed position.

According to the first embodiment represented in figure 1, the shutter 2 is rolled up on a drum 1 while a belt 3, which is not fixed to the shutter 2 and which is provided opposite one of the faces of the latter, is made to mesh with a belt 4 fixed to the face opposite the one which is oriented towards the drum 1, whereby this meshing then takes place while the shutter 2 is being rolled up.

In order to make the teeth of the belts mesh, the free belt 3 is stretched in the longitudinal direction, as indicated by the arrow 5, in a sense opposite the winding direction of the shutter 2, indicated by the arrows 6.

This stretching takes place while the shutter 2 is being rolled up, in such a manner that the latter will extend as a function of the position of the fixed belt's 4 teeth, and such that both belts 3 and 4 can mesh when they make contact.

In this regard, it is important that at least the free belt 3 is not only flexible but can be extended somewhat as a result of the above-mentioned stretching. To this end, at least the belt 3 is made of rubber or an analogous, relatively hard but slightly extensible and preferably somewhat elastic material. Advantageously, the two belts 3 and 4 are made of the same material.

During the meshing, the free belt 3 will be fixed to the face of the shutter opposite the one with the belt 4. The belt 3 is fixed to the shutter 2 with a fluid adhesive 7 which is injected between the shutter 2 and the belt 3, just before the shutter 2 makes contact with the belt 3. This adhesive 7, which is then compressed between the shutter 2 and the belt 3, may set during the winding so as to form a solid joint.

As a variant, one could use a strip with two adhesive sides, instead of a fluid adhesive. This variant may be considered as an equivalent technique. When such a strip offers sufficient resistance it may reinforce the belt in question. This embodiment is not represented in the drawings.

In another variant, the belt 3 may be fixed to the shutter 2 by means of welding, soldering or any equivalent technique.

In the embodiment represented in figure 1, the pitch between two teeth of the belt 3, before this belt 3 is extended, may be somewhat larger than the pitch between the teeth of the belt 4. Thus, the traction force to be exerted on the belt 3 may be somewhat less then if the pitches of both belts 3 and 4 were identical. The difference between the pitches of the teeth of said belts 3 and 4 depends on the diameter of the windings forming the roll of the shutter 2, in particular of the curvature of the windings, and it is for example in the order of 8%.

According to the second embodiment represented in figure 2, two belts 3 and 4 are made to mesh before they are fixed to the shutter 2. The pitch of the teeth of the belts 3 and 4, when they lay flat, is generally substantially identical.

Next, the shutter 2 is rolled up simultaneously with the two meshed belts 3, 4, such that they are inserted between the successive windings of the rolled-up shutter and, as a consequence, between the opposite faces of the latter. As a result of this winding, at least one of the belts will be deformed somewhat in its longitudinal direction.

Both belts 3 and 4 are fixed to the face facing the shutter 2 while the latter is being rolled up, in the same manner as the belt 3 of the first embodiment.

The third embodiment, as represented in figure 3, mainly differs from the two preceding embodiments in that a non-serrated belt 4' is initially used, formed of a simple strip made of a known thermoplastic or thermosetting material known as such, which is fixed to the face of the shutter 2 opposite the one which is directed towards the drum 1. In this embodiment, no traction whatsoever is exerted on the belt 4'.

Facing the belt 4', on the other face of the shutter 2, is provided a serrated belt 3 which may be fixed to the shutter in the same manner as in the two preceding embodiments.

While the shutter 2 is being rolled up, the teeth of the serrated belt 3 penetrate in the belt 4' made of plastic in such a way that the belt 4' is transformed into a serrated belt 4 which meshes with the belt 3.

Next, the plastic is made to set in a known manner so as to stabilize the position of the teeth of the thus engaged belts 3 and 4. To this end, the plastic may possibly contain a hardening agent which is also known as such.

Figure 4 represents a drum 1 whose section perpendicular to its axis of rotation resembles substantially to a spiral. The wall 1' of the drum represented in figure 4 is provided with a succession of notches 8 at its lateral edges in which the teeth of a serrated belt 3 may penetrate. These notches 8 may for example have a shape corresponding to the one of the serrated belt 3.

Figure 5 shows a detail of two serrated belts 3 and 4 that are fixed directly to each face of a shutter 2 while this shutter 2 is being rolled up, as is the case in the embodiments of figures 1 to 3.

Figure 6 concerns an embodiment which is different from the one represented in figure 5 in that the lateral edge of the shutter 2 is formed of a flexible strip 9 containing a reinforcement 10 extending in the longitudinal direction of said strip 9. In this embodiment, the serrated belts 3 and 4 are fixed to the strip 9 by gluing or by welding or any other equivalent means.

The reinforcement 10 is not always indispensable, however, e.g. if the strip itself is sufficiently resistant.

The embodiment represented in figure 7 is different from the one represented in figure 6 in that one of the serrated belts 3 forms a whole with the strip 9, i.e. is designed as a single piece with the latter.

In the two embodiments represented in figures 6 and 7, the serrated belts 3 and 4 are fixed to the lateral edge of the shutter 2 formed of the strip 9.

According to a variant of the method according to the invention, the strip 9 with the belts 3 and 4, fixed to either side of the latter, is rolled up independently of the body of the shutter 2, i.e. before fixing it to the latter. By 'body of the shutter' should be understood the part of the shutter 2 without the strip 9.

According to a variant of the method according to the invention, the strip 9 with the belts 3 and 4, fixed to either side of the latter, is rolled up independently of the body of the shutter 2, i.e. before fixing it to the latter. By 'body of the shutter' should be understood the part of the shutter 2 without the strip 9.

The serrated belts 3 and 4 are preferably formed of an elastomer, such as polyurethane, such that they can be fixed to the shutter 2 itself or to said flexible strip 9 of the latter by means of gluing or welding.

It is clear that the present invention is not limited to the different embodiments described above and illustrated in the accompanying drawings, but that also other variants are possible while still remaining within the scope of the invention.

Thus, the shape of the teeth may strongly vary in certain cases, provided the teeth of one of the belts can penetrate into the recesses between the teeth of the other belt and can rest on the latter while the shutter is being unrolled.

Thus, in certain cases, the teeth may be formed of pens that are evenly distributed over one of the belts and of slots formed of corresponding cavities in the other belt.

Moreover, it is not absolutely necessary that there is a play between the teeth of the two meshed belts.

It is to be understood that, if any prior art publication is referred to herein, such reference does not constitute an admission that the publication forms a part of the common general knowledge in the art, in Australia or any other country.

In the claims which follow and in the preceding description of the invention, except where the context requires otherwise due to express language or necessary implication, the word "comprise" or variations such as "comprises" or "comprising" is used in an inclusive sense, i.e. to specify the presence of the stated features but not to preclude the presence or addition of further features in various embodiments of the invention.

CLAIMS

1. Method for producing a shutter designed to be rolled up and unrolled, wherein each face, opposite one another, is provided a serrated belt comprising a succession of teeth, and in that, in order to make it possible for both belts to mesh, the position of the teeth of at least one of the belts is adjusted by deforming said belt in such a way that both belts can mesh, and that this mutual position of the belts can subsequently be stabilized; and wherein the position of the teeth of at least one of the belts is adjusted when at least a part of said shutter is being rolled up, whereby this part comprises a lateral edge of said shutter, simultaneously with the belts and in that this position of the belts is subsequently stabilized in relation to the shutter or in relation to said part of the shutter; and wherein the shutter, or said part is rolled up while a belt which is free in relation to the shutter, or in relation to said part, and which is provided opposite one of the faces of the shutter or of said part, is made to mesh with a belt which is fixed in relation to the opposite face of the shutter or of said part, and the meshing takes place while the shutter or said part is being rolled up, there where the two belts make contact, after which the free belt is fixed in relation to the shutter or in relation to said part, to the face opposite the one with the fixed belt while the belts mesh.

2. Method according to claim 1, wherein, in order to make the belts mesh, the free belt is stretched in the longitudinal direction while the shutter, or said part is being rolled up, in such a way that it is extended as a function of the position of the teeth of the fixed belt, and such that both belts can mesh.

3. Method for producing a shutter designed to be rolled up and unrolled, wherein on each face, opposite one another, is provided a serrated belt comprising a succession of teeth, and in that, in order to make it possible for both belts to mesh, the position of the teeth of at least one of the belts is adjusted by deforming said belt in such a way that both belts can mesh, and that this mutual position of the belts can subsequently be stabilized, whereby the position of the teeth of at least one of the belts is adjusted when at least a part of said shutter is being rolled up, whereby this part comprises a lateral edge of said shutter, simultaneously with the belts and in that this position of the belts is subsequently stabilized in relation to the shutter or in relation to said part of the shutter, wherein the two belts are made to mesh before they are fixed

2008217112 10 Jan 2014

to the shutter or to said part, and in that the shutter or the part is subsequently rolled up simultaneously with said two belts in such a manner that they are inserted between the successive windings of the rolled-up shutter or the rolled-up part, and as consequence between the opposite faces of the shutter or of the part, and in that each of the belts is fixed to the face opposite the shutter or the part while the latter is being rolled up.

4. Method for producing a shutter designed to be rolled up and unrolled, wherein on each face, opposite one another, is provided a serrated belt comprising a succession of teeth, and in that, in order to make it possible for both belts to mesh, the position of the teeth of at least one of the belts is adjusted by deforming said belt in such a way that both belts can mesh, and that this mutual position of the belts can subsequently be stabilized, whereby the position of the teeth of at least one of the belts is adjusted when at least a part of said shutter is being rolled up, whereby this part comprises a lateral edge of said shutter, simultaneously with the belts and in that this position of the belts is subsequently stabilized in relation to the shutter or in relation to said part of the shutter, wherein a non-serrated belt made of plastic, in particular a thermoplastic or thermosetting material, is provided on one of the faces of the shutter or of the part, in that a serrated belt is provided facing said belt on the other face of the shutter or of the part, in that the shutter or said part of the shutter is rolled up, such that during this winding the teeth of the serrated belt penetrate into the non-serrated belt made of plastic, thus forming teeth in the latter such that the belts are made to mesh, and in that the plastic is subsequently made to set so as to stabilize the position of the teeth in relation to the shutter or in relation to the part.

5. Method according to any one of claims 1 to 4, wherein the distance between two successive teeth of the serrated belt is larger than the width of the teeth in the longitudinal direction of the belts.

6. Method according to any one of claims 1 to 5, wherein an adhesive which sets relatively slowly is applied on the back of a free belt before the latter is rolled up together with the shutter or said part of the shutter, such that said belt is fixed to the shutter or to said part in the rolled-up position of the latter.

7. Method according to any one of claims 1 to 6, wherein the belts are provided on each lateral edge of the shutter.

2008217112 10 Jan 2014

8. Method according to any one of claims 1 to 7, wherein the lateral edge of the shutter is formed by said part which is made up of a flexible strip to which the above-mentioned belts are fixed.

9. Method according to claim 8, wherein one of the serrated belts forms a single piece with the flexible strip.

10. Method according to any of claims 8 or 9, wherein a flexible strip is used provided with a reinforcement in the longitudinal direction thereof.

11. Method for producing a shutter substantially as hereinbefore described with reference to the accompanying drawings.

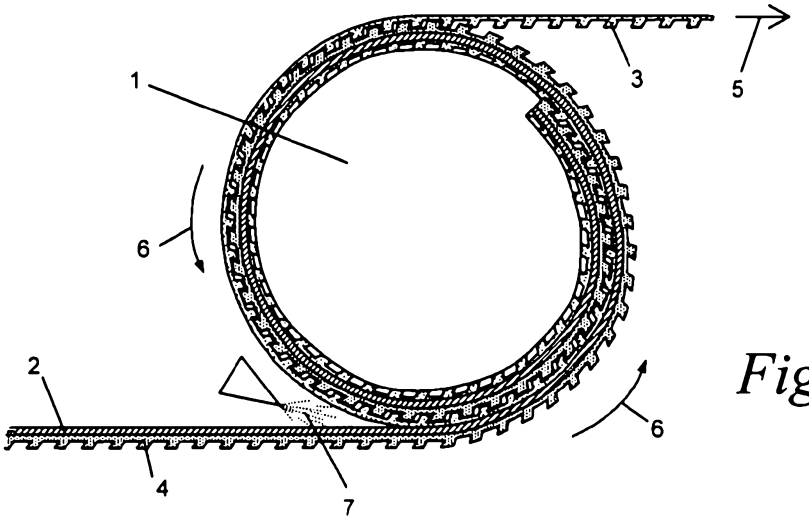

Fig. 1

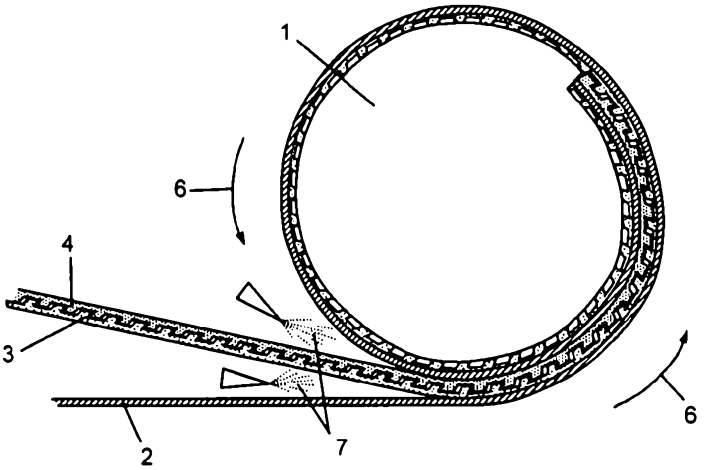

Fig. 2

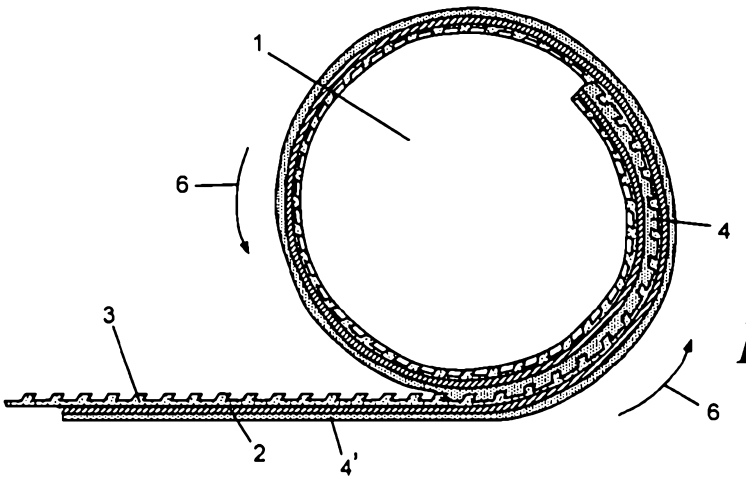

Fig. 3

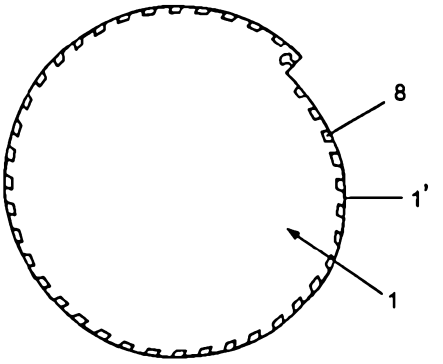

Fig. 4

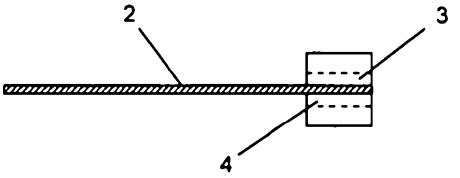

Fig. 5

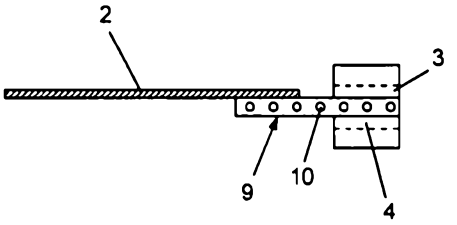

Fig. 6

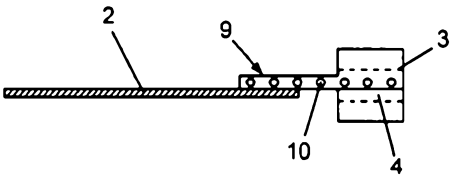

Fig. 7