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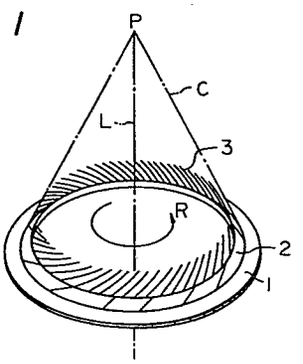
(54) **A brake ring for a yarn processing drum.**

(57) A monolithical plastic brake ring for a yarn processing drum such as a weft reservoir and metering drum for a fluid-jet type shuttleless loom is provided with a base ring section (1), a thin supporting wall section (2) extending from the base ring section and provided with skew cuts (21) at prescribed intervals, and a number of thin juxtaposed fingers (3) extending from the supporting wall section. Change in the interval of the cuts (21) enables easy and free adjustment of the braking force even by users.

Fig. 1



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A BRAKE RING FOR A YARN PROCESSING DRUM

The present invention relates to a brake ring for a yarn processing drum, and more particularly to a brake ring used for a yarn processing drum such as a weft reservoir and metering drum of a fluid-jet type shuttleless loom on which a weft provisionally wound around the drum is delivered, during picking motion, in the axial direction of the drum while passing through the gap between the drum and the brake ring inserted over the drum.

Brake rings of the above-described type have been widely used in the field of textile industry in order to prevent excessive unwinding of the yarn from the drum, to restrict generation of snarls on the yarn under delivery, and to control the tension of the yarn.

A brush-type brake ring is publicly known as a typical example of such conventional brake rings. This brake ring includes a plastic base ring section having an inner diameter somewhat larger than the outer diameter of the drum for which the brake ring is to be used, and brushes coupled to and juxtaposed along the inner periphery of the base ring section, said brushes having moderate rigidity and elasticity. Further, these brushes extend along an appropriate imaginary conical surface the bottom end of which is defined by the base ring section and top falls on the axial line of the circle defined by the base ring section. The brushes incline in the direction of rotation of the yarn to be unwound from the drum and delivered in the axial direction of the drum. Adjacent brushes overlap one another somewhat in the peripheral direction of the base ring section.

The brush-type brake ring of this construction, however, cannot apply sufficient braking force on the yarn delivered from the drum depending on the type of

the yarn to be processed. Deficient braking action tends to cause variation in yarn tension and formation of snarls on the yarn. When a spun yarn is processed, free fluffs flying around the brake ring intrude themselves into the gaps between the brushes and form clogs against smooth passage of the yarn, thereby paralysing the function of the brake ring. Further, in production of the brake ring, attachement of a number of fine brushes to the base ring section requires vast labour and time.

In order to avoid such inconveniences inherent to the brush-type brake ring, a finger-type brake ring has already been proposed, in which rubber fingers are substituted for the brushes. This finger-type brake ring has futher been modified by using plastics as the material. This finger-type plastic brake ring is almost same in construction as the above-described brush-type brake ring, in which plastic fingers are substituted for the brushes and formed monolithically with the base ring section by plastic moulding.

Although this finger-type plastic brake ring well removes demerits inherent to the brush-type brake ring, it has its own disadvantage since its braking action is based on the operation of the plastic fingers only.

The braking force applied to the yarn by the finger-type plastic brake ring acting is a function of the elasticity of the plastic material and the relationship between the diameter of the imaginary circle defined by the points of the fingers and the outer diameter of the drum for which the brake ring is used. Further, the braking force should be adjusted in accordance with the type of the yarn such as the thickness and the kind of material.

As described already, the brake ring of this sort is often used for a weft reservoir and metering drum of a fluid-jet type shuttleless loom for tension control

of the weft to be picked into the shed. In an usual weaving mill, it is very rare to use one type of weft only. Even in the case of mass production with a few types of weaving designs, it is usual to use three to five different types of wefts. Consequently, the number of the type of the brake rings should meet the number of the type of the wefts used for production. This naturally leads to increased manufacturing cost of the brake rings and, consequently, higher installation cost at the mill. In addition, such change in type of the brake ring can be practiced at the stage of the production only and cannot suffice imminent demand for the change at the mill. In order to remove this inconveniency, it is necessary for users to keep at the mill even brake rings of the types which are not so frequently used in the production.

It is one object of the present invention to provide a finger-type plastic ring in which demerits inherent to the conventional brush-type brake ring are well removed and one type can span yarns of different types whilst always assuring optimum braking effect.

It is another object of the present invention to provide a finger-type plastic brake ring which allows free adjustment of the braking force by the users in accordance with the type of the yarn to be processed.

In accordance with the present invention, the brake ring comprises, in a monlithical construction formed by plastic moulding, a base ring section, a thin supporting wall section and a number of thin elongated fingers. The base ring section has an inner diameter somewhat larger than the outer diameter of a drum over which the brake ring is to be inserted. The supporting wall section extends along the inner periphery of the base ring section and the fingers extend from the fringe of the supporting wall section in a juxtaposed arrange-

ment. The supporting wall section and the fingers extend along a prescribed imaginary conical surface the bottom of which is defined by the inner periphery of the base ring section and top falls on the axial line of the base ring section. The fingers incline in the direction of rotation of the yarn to be unwound from the drum and delivered in the axial direction of the drum. Adjacent fingers overlap somewhat one another in the peripheral direction of the base ring section. Further, the supporting wall section is provided, at positions between adjacent fingers, with cuts at prescribed intervals, which run in the extending direction of the fingers.

The present invention will hereinafter be explained in more detail in reference to the embodiment shown in the accompanying drawings in which;

FIG 1 is a perspective view of one embodiment of the brake ring in accordance with the present invention, and

FIG 2 is a side view of the brake ring shown in FIG 1.

The brake ring is made up, in a monlithical construction formed by plastic moulding, of a base ring section 1, a thin supporting wall section 2 and a number of thin elongated fingers 3. The base ring section 1 has an inner diameter D somewhat larger than the outer diameter of a drum for which the brake ring is to be used. An imaginary conical surface C is assumed whose bottom is defined by the inner periphery of the base ring section 1 and top P falls on an axial line L of the base ring section 1.

The thin supporting wall section 2 extends in axial direction over a prescribed distance from the inner periphery of the base ring section 1 along the above-described imaginary conical surface C.

The straight fingers 3 extend from the upper fringe

of the supporting wall section 2 whilst being juxtaposed along the periphery of the supporting wall section 2. They also follow the imaginary conical surface C. These fingers 3 extend substantially in parallel to each other and incline in the direction of rotation R of the yarn to be unwound from the drum and delivered in the axial direction of the drum. Adjacent fingers 3 overlap one another in the peripheral direction of the base ring section 1. The points of these fingers 3 in a free state should preferably be on a common plane normal to the above-described axial line L. An imaginary circle defined by these points of the fingers 3 should preferably have its center on the axial line L and the diameter d of such an imaginary circle should be equal to or smaller than the outer diameter of the drum for which the brake ring is to be used.

Further, in accordance with the present invention, cuts 21 are formed in the supporting wall section 2 at prescribed intervals at positions between adjacent fingers 3, which run in the extending direction of the fingers 3. In the case of the illustrated embodiment, a cut 21 is provided for every fourth finger 3. However, the interval, i.e. the number of fingers 3, between adjacent cuts 21 may be varied freely in accordance with requirement in actual process.

When the finger-type brake ring of the above-described construction is inserted over a drum such as a weft resevoir and metering drum for a fluid-jet type shuttleless loom, the points of the fingers 3 are placed in pressure contact with the peripheral surface of the drum whilst leaving an annular gap between the base ring section 1 and the drum, since the diameter d of the imaginary circle defined by the points of the fingers 3 is equal to or smaller than the outer diameter of the drum and the inner diameter of the base ring section 1

is larger than the outer diameter of the drum. Consequently, the yarn delivered through the gap sustains braking action by the brake ring.

Just like the conventional finger-type brake ring, the magnitude of this braking force is influenced by the elasticity of the plastic material used for the brake ring and the relationship between the diameter d of the imaginary circle defined by the points of the fingers 3 and the outer diameter of the drum. In accordance with the present invention, however, the magnitude of the braking force is significantly influenced by the size of the interval between adjacent cuts 21 in the supporting wall section 2. The larger the interval, the larger the braking force acting on the yarn. That is, the magnitude of the braking force can be freely adjusted by varying the size of the interval between adjacent cuts 21 even when other factors remain constant.

As long as the interval between adjacent cuts 21 is chosen at the stage of manufacturing in accordance with the expected maximum braking force in actual use, the user is able to freely obtain optimum braking force for the yarn to be processed by adding further cuts 21 to the supporting wall section. The thin construction of the supporting wall section enables easy formation of such additional cuts 21. In addition, it is also possible to broaden the inverval once fixed by bonding by suitable adhesives some of the cuts already made.

Since one type of brake ring spans various types of yarns to be processed, it is required for the user to keep only one type of brake rings in accordance with the size of the drums for which the brake drums are to be used. Braking force can be adjusted very easily in accordance with the type of the yarn to be processed. This contributes to significant saving in installation cost.

The following example is illustrative of the present invention but not to be constructed as limiting the same.

Example

Two type of brake rings of the following design were prepared by plastic moulding, one for yarns of S-twists and the other for yarns of Z-twists. They were opposite in the inclining direction of the fingers.

The internal diameter of the base ring section (D); 111.5 mm

The diameter of the imaginary circle defined by the points of the fingers (d); 101.1 mm

The axial length of the supporting wall section; 6 mm

The angle of inclination of the imaginary conical surface; about 60^{o}

After formation of the cuts, the brake rings were inserted over weft reservoir and metering drums of same type for processing of yarns of different direction of twist.

Number of fingers between adjacent cuts	Yarn tension in g.
1	5 - 15
2	10 - 25
3	14 - 30
4	17 - 35
5	20 - 40

Yarn tension can be deemed to be representative of braking force. Thus, it was confirmed by this experiment that the braking force can be adjusted over the range

of 5 to 40 g. by changing the size of the interval between adjacent cuts.

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CLAIMS

1. A brake ring for a yarn processing drum comprising, in a monolithical construction formed by plastic moulding, a base ring section having the inner diameter somewhat larger than the outer diameter of the yarn processing drum, and a number of thin elongated fingers juxtaposed along a prescribed imaginary conical surface whose bottom is defined by the inner periphery of the base ring section and top falls on the axial line of the base ring section, the fingers inclining in the direction of rotation of a yarn to be unwound from the drum and delivered in the axial direction of the drum, and adjacent fingers overlapping somewhat one another in the peripheral direction of the base ring section, c h a r a c t e r i z e d in that a thin supporting wall section (2) extends from the inner periphery of the base ring section over a prescribed distance along the above-described conical surface (C), the fingers (3) extend from the fringe of the supporting wall section, and the supporting wall section (2) is provided, at prescribed intervals, with cuts (21) which run in the extending direction of the fingers.

2. A brake ring according to claim 1, c h a r a c t e r i z e d in that points of the fingers (3) in a free state are in a common plane normal to the above-described axial line (L).

3. A brake ring according to claim 1, c h a r a c t e r i z e d in that an imaginary circle defined by points of the fingers (3) has its center on the above-described axial line (L).

4. A brake ring according to claim 3, c h a r a c t e r i z e d in that the diameter (d) of the imaginary circle is equal to or smaller than the outer diameter of the drum.

Fig. 1

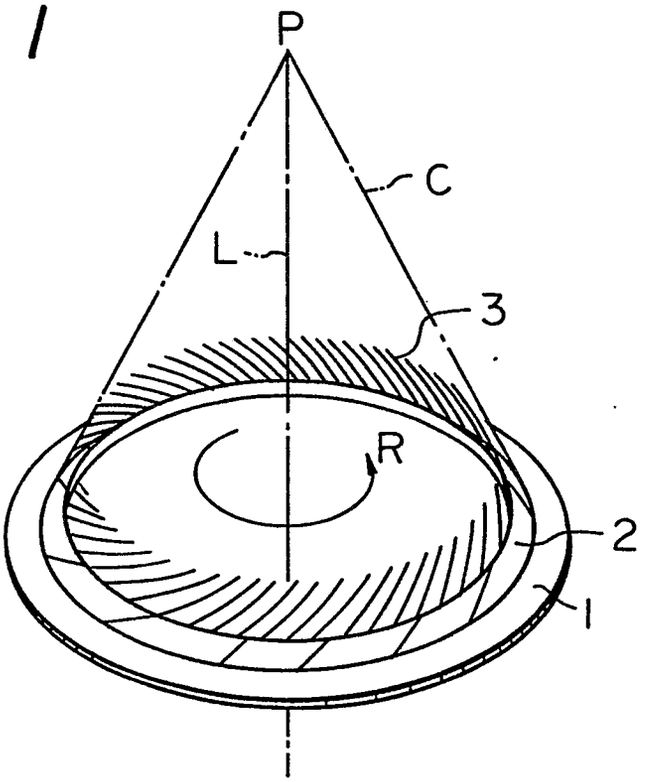
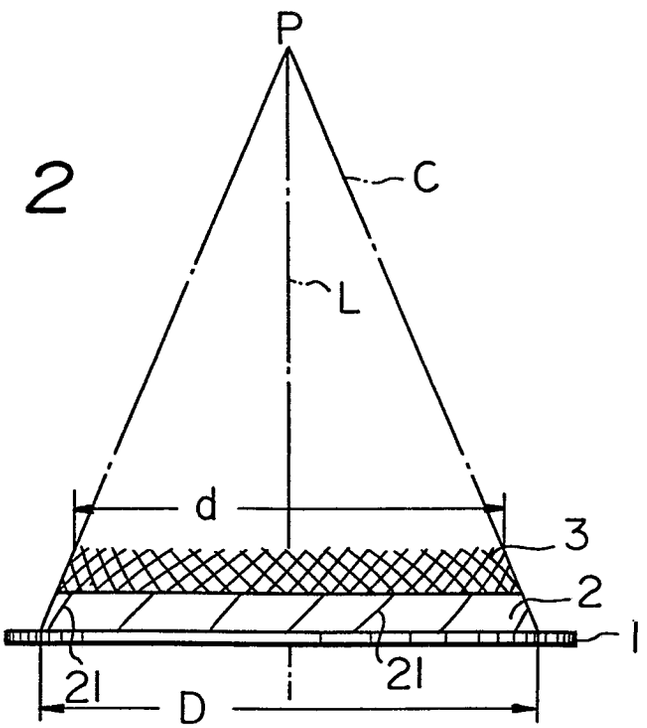


Fig. 2



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EUROPEAN SEARCH REPORT

Application number
EP 81 85 0070

DOCUMENTS CONSIDERED TO BE RELEVANT			CLASSIFICATION OF THE APPLICATION (Int. Cl. 3)
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	
	FR - A - 2 335 440 (LAWSON-HEMPHILL) * Figures 3-6; page 3, line 35 - page 4, line 18 * --	1	B 65 H 51/22
	FR - A - 2 027 851 (ROSEN) * Figures 2,3; claims * --	2-4	
	FR - A - 2 167 519 (ROSEN) * Figures 2,3; page 2, line 33 - page 4, line 31 * ---	2-4	

TECHNICAL FIELDS SEARCHED (Int.Cl. 3)

B 65 H
D 03 D

CATEGORY OF CITED DOCUMENTS

X: particularly relevant if taken alone
Y: particularly relevant if combined with another document of the same category
A: technological background
O: non-written disclosure
P: intermediate document
T: theory or principle underlying the invention
E: earlier patent document, but published on, or after the filing date
D: document cited in the application
L: document cited 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	06-01-1982	BOUTELEGIER

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