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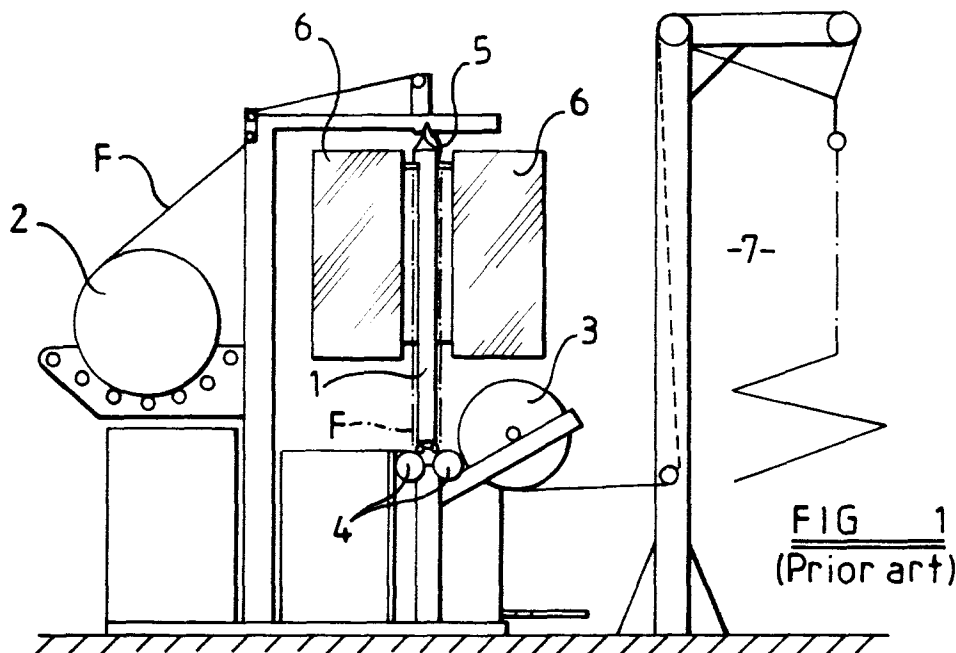
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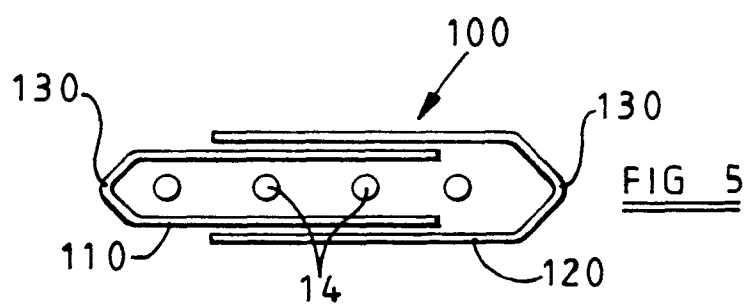
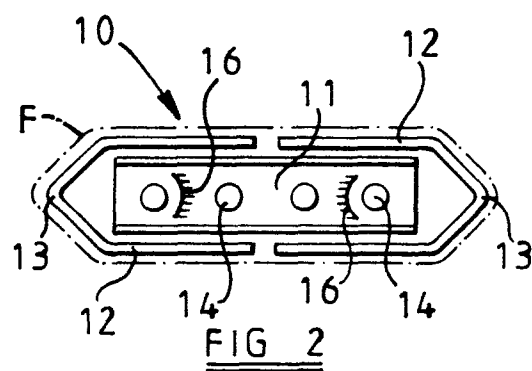
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AL LT LV MK RO SI(30) Priority: **06.06.1997 GB 9711620**(71) Applicant: **Alan Shelton Ltd.****Croft, Leicestershire (GB)**(72) Inventor: **Shelton, Mark****Houghton on the Hill, Leicester, LE7 9HR (GB)**(74) Representative: **Spoor, Brian et al****Lewis & Taylor****144 New Walk****GB-Leicester LE1 7JA (GB)****(54) Fabric inspection light box**

(57) A fabric inspection light box for use in fabric inspection apparatus is provided in which the box is of light transmitting e.g. translucent material and contains light source means such as fluorescent lamps for providing substantially uniform light emission from the box and through tubular fabric material as the latter is passed over and about the box. The box comprises an assembly (10 or 100) of relatively movable box portions (11, 12 or 110, 120) whereby the effective width of the box assem-

bly (10 or 100) can be adjusted (17) to suit a particular diameter of tubular fabric material (F). One form of the box assembly (10) may consist of a central portion (11) with relatively slidable side portions (12) or the assembly (100) may consist of two relatively slidable or telescopic box portions (110, 120). Lateral side edges of the box assembly (10 or 100) are preferably of closed taper or pitch form (13 or 130) for widthwise contact with the tubular fabric material (F).





Description

This invention relates to light boxes for use in inspecting fabric material ie of tubular form such as that produced by a circular knitting machine.

The light box is of light transmitting eg translucent material such as perspex or polycarbonate and contains a number of fluorescent tubes or other suitable lamps for providing a substantially uniform or diffused light emission. In use in a fabric inspection machine or apparatus, tubular fabric material is passed over the box so as to contain or encapsulate the latter in a continuous manner whilst the width of the box is such as to expand or stretch the fabric about it. The flat form box is located between two mutually inclined mirrors which are each inclined to the vertical plane of the box eg at 45° or thereabouts, the plane of the box bisecting the included angle (90°) between the mirrors.

The internally illuminated and expanded fabric is viewed for any faults by an operator looking from one mirror to the other so that all the fabric can be seen in one pass of the fabric over the box.

At present fabric expanding light boxes are each of a fixed size widthwise and usually a range of boxes of different width sizes is necessary for the inspection of tubular fabric of different diameters. Owing to the cost of the boxes such procedure is expensive and changing from one size of box to another in an inspection machine can be time consuming.

The object of this invention is to provide an improved light box which is readily adaptable to suit a considerable range of fabric diameters in a cost and time saving manner. Practical advantages in this and other respects will be apparent from the following description.

According to the invention a fabric inspection light box of the kind above referred to comprises an assembly of relatively movable box portions whereby the effective width of the box assembly can be adjusted to suit a particular diameter of tubular fabric material for inspection purposes, adjustment means being provided for selectively adjusting and retaining the box assembly in a laterally adjusted condition especially for widthwise expansion of the fabric material passing about the box assembly.

The light box assembly preferably comprises a central box portion movably or slidably receiving side box portions or covers which are arranged to contact and expand fabric passing about the box.

The central box portion preferably contains the fluorescent tubes or other suitable lamps for internal illumination of fabric passing about the box and may also include reflecting means for directing light from the tubes or lamps throughout the box assembly for substantially uniform or diffused light emission in illuminating the fabric.

In carrying the invention into practice reference is made by way of example to the accompanying diagrammatic drawings in which:-

Figure 1 is a front elevation of a known form of tubular fabric inspection machine in which hitherto fixed width light boxes have been employed;

Figure 2 is an enlarged scale cross sectional view of an adjustable light box assembly according to this invention shown in a retracted or minimum width condition;

Figure 3 is a side elevation of the box assembly as shown in Figure 2;

Figure 4 is a cross sectional view of the light box assembly shown in an extended or maximum width condition, and

Figure 5 is a cross sectional view of an alternative construction of box assembly.

Like parts are referred to by the same or similar reference numerals throughout the drawings.

Referring firstly to Figure 1 the known form of tubular fabric inspection machine receives a vertically positioned light box 1 over which the fabric F is passed from a supply roll 2 to a take off roll 3 or to fabric handling or folding apparatus 7. In view of the encapsulation of the box 1 by the tubular fabric F, ie totally within the latter, the box 1 is supported at its lower end on a pair of rollers 4 between which the fabric passes from the box 1 whilst the latter is also located at its upper end at 5 where it initially receives the fabric.

In the manner already referred to the box 1 is positioned in front of mutually inclined mirrors 6 to enable an operator to fully inspect the fabric expanded and internally illuminated by the box. The fabric e.g. of elasticated yarn is only temporarily expanded widthwise by the box and returns to its original diameter on leaving the box.

The box 1 contains a number of fluorescent tubes which, due to the total encapsulation of the box by the fabric, are operated for illumination by an external ultrasonic generator (not shown) operating in conjunction with receiver coil means carried by or within the box 1, again in a known manner.

Whereas the expanded fabric material snugly fits about the box 1 and interfitting portions of the box assembly 10 hereafter described with reference to Figures 2 to 5 have a close working fit, clearance is shown in the drawings for clarity.

In order to conveniently cater for different diameters of tubular fabric F and in accordance with this invention a box assembly 10 (Figures 2 to 4) is extendible widthwise and is shown comprising a central box portion 11 which slidably receives side box portions or covers 12 all of translucent perspex or like material. The box assembly 10 is shown fully retracted in Figures 2 and 3 to a minimum width (eg 400mm) and fully extended in Figure 4 to a maximum width (eg 800mm). These dimen-

sions are given by way of example only and may be varied according to requirements. The side edges 13 of the end covers are shown of taper or pitched form, whilst the side edges of the central box portion 11 are shown of open form, i.e. preferably at at least one side edge.

The central box portion 11 contains vertical spaced apart parallel fluorescent tubes 14 and receiver coil means is indicated at 15 for their illumination by an external ultrasonic generator. The number and arrangement of the tubes 14 may be varied according to requirements.

Reflectors 16 are also shown provided in the central box portion 11 which are concave about the outer tubes 14 so as to direct light into the side covers 12 for uniform illumination especially when they are fully extended as in Figure 4. The convex back of the reflectors 16 may also be reflective for suitable distribution of light from the inner tubes 14 within the central box portion 10.

The side covers 12 are laterally extended as necessary to expand the illuminated fabric F about the box assembly 10 and so assist any fault detection by an operator viewing the mirrors 6. Suitable means is provided for selectively retaining the side covers 12 in their outwardly adjusted position ie against the pressure of the expanded fabric acting on them. Such means may consist of clamp screw and slot connections 17 between the side covers 12 and central box portion 11 which can be quickly released and tightened as required when effecting adjustment. Alternatively locking pin and holes or screw connection or releasable ratchet engagement may be employed.

In contrast to the limited coarse step adjustment afforded by the use of a series of fixed size light boxes, the adjustment provided by the light box assembly 10 of this invention can be infinitely variable to accommodate slight variations in fabric diameter.

Lower adjacent edges of the side covers are shown gapped at one side at 18 in Figure 3 to accommodate the receiver coil 15. This largely avoids exterior protrusion from the box assembly 10 which in general should be kept to a minimum to avoid possible damage to the fabric F.

Also as indicated in Figure 3 the lower end of the central portion 11 is provided with taper formation shown in the form of a pair of taper edged feet 19 for location between the rollers 4 (Figure 1).

In an alternative arrangement of the light box shown in Figure 5, the box assembly 100 consists of two box portions 110,120 each having a closed taper form side edge 130, one portion 110 slidably interfitting within the other 120 in a telescopic manner. Each portion 110,120 accommodates the fluorescent tubes 14 and any reflectors and the portions 110,120 are relatively adjustable and retained in an adjusted condition in the same or a similar way to that already described.

It is to be understood that various developments or modifications of the above described light box assemblies may be made within the scope of the invention

herein defined.

Claims

1. A fabric inspection light box in which the box is of light transmitting e.g. translucent material and contains light source means for providing substantially uniform light emission from the box and through tubular fabric material as the latter is passed over and about the box, characterised in that the box comprises an assembly (10 or 100) of relatively movable box portions (11, 12 or 110, 120) whereby the effective width of the box assembly (10 or 100) can be adjusted to suit a particular diameter of tubular fabric material (F) for inspection purposes, adjustment means (17) being provided for selectively adjusting and retaining the box assembly (10 or 100) in a laterally adjusted condition especially for widthwise expansion of the fabric material (F) passing about the box assembly (10 or 100).
2. A fabric inspection light box according to claim 1 wherein the box assembly (10) comprises a central box portion (11) movably or slidably receiving side box portions or covers (12) which are arranged to contact and expand tubular fabric material passing about the box assembly (10) on appropriate lateral adjustment of one or both side box portions or covers (12) relative to the central box portion (11).
3. A fabric inspection light box according to claim 2 wherein the central box portion (11) movably or slidably receives the side box portions or covers (12) there about for said relative lateral adjustment.
4. A fabric inspection light box according to claim 2 or 3 wherein the central box portion (11) is open at one or both side edges.
5. A fabric inspection light box according to any of the preceding claims wherein the central box assembly portion (10 or 100) contains light source means such as fluorescent tubes (14) and any reflectors (16), for substantially uniform light emission from the box assembly (10 or 100).
6. A fabric inspection light box according to claim 5 wherein reflectors (16) within the box assembly (10 or 100) are of concave form in relation to at least part of the light source means such as about at least some of the fluorescent tubes (14).
7. A fabric inspection light box according to claim 1 wherein the box assembly (100) comprises two box portions (110, 120) which are movably or slidably interfitting within one another in a telescopic manner for appropriate relative lateral adjustment.

8. A fabric inspection light box according to any of the preceding claims wherein lateral side edges of the assembly (10 or 100) of relatively movable box portions (11, 12 or 110, 120) are of closed taper or pitched form (13 or 130) for widthwise contact with tubular fabric material (F) passing about the box assembly (10 or 100) 5
9. A fabric inspection light box according to any of the preceding claims wherein adjustment means (17) 10 for laterally and retentively adjusting the relatively movable box portions (11, 12 or 110, 120) of the box assembly (10 or 100) is of any suitable form such as clamp screw and slot means, locking pin and holes means, screw connection or releasable ratchet engagement means. 15

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