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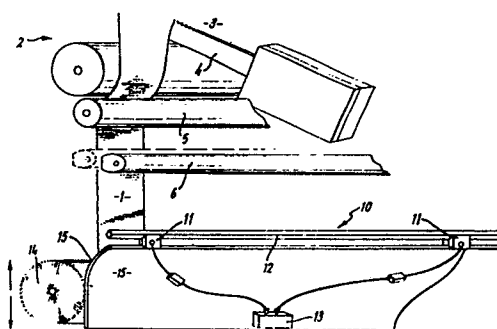
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54 **Cutting device.**

57 A cutting device for severing a strip of material, for example continuous fabric from a knitting machine, having a cutter which is actuated and deactivated at predetermined intervals along the strip as it emanates from the machine; the cutter may operate by contact with the strip or remotely by radiation. This is especially useful when the knitted fabric has a meltable row at the line of severance, the row being inserted during the knitting process.



- 1 -

Cutting Device

This invention relates to a cutting device, especially but not exclusively for use with a knitting machine.

Knitting machines which produce strips of material for cutting
5 into shorter lengths are programmed to insert into the knit at spaced intervals along the strip a lateral row of a heat-meltable material, for example a thermoplastics material. As the strip comes from the machine it is subjected to heat, causing this row to melt and sever the strip into the desired shorter lengths.

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According to the present invention there is provided a cutting device for severing a strip of material into shorter lengths, the device having transport means for moving the strip through successive predetermined distances, cutting means for severing
15 the strip at said predetermined distances, and a sensor for detecting severance of the strip by the cutting means and connected with the cutting means so that the cutting means is de-actuated with respect to the strip on severance of the strip.

20 The cutting means may be in the form of a radiation emitter, for example a radiant heater, or may operate by contact with the strip, for example as in the form of a blade or conductive heater.

25 The sensor may be a photo sensor for detecting passage of a

severed length from the strip. Preferably the sensor is a modulated light type light-emitting diode.

A counter may be included to control the distances between adjacent cuts, the counter detecting the number of rows of knitting in the case of a knitting machine. The predetermined distance may be the number of rows between adjacent heat-meltable inserts in the knit so that the cutter operates at each insert.

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The transport means may be for example a roller which contacts the material beyond the cutter to draw the material past the sensor.

15 An embodiment of the invention will now be described by way of example with reference to the accompanying drawing, in which:

Fig. 1 is a general perspective view of a cutting device of the invention in use in conjunction with a knitting machine, and Fig. 2 is a side view of the cutting means of the device of Fig. 1.

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In the drawing a strip 1 of knitted fabric is manufactured on a knitting machine indicated generally at 2, the strip 1 being formed from a broader strip 3 by a longitudinal cutter 4. The strip 1 passes from the cutter 4 over a roller 5 and thence past a heater 6 in the form of a tubular infra-red radiator as shown in Fig. 2. The heater 6 has a glass front 7 with an elliptical reflector 8 extending across its ends, to form a housing. An infra-red heater element 9 is disposed within this housing so as to produce in use a radiant heat which is concentrated by the reflector 8 into a beam passing through the glass 7. The glass 7 faces the strip 1.

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The heater 6 is movable towards and away from the strip 1, and the motor causing this movement is connected electrically with a photo sensor 10 located downwardly of the heater 6. The photo sensor 10 is in the form of a pair of modulated light type
5 LEDs 11 disposed one at each end of a carrier tube 12 and electrically connected to a control box 13 controlling the movement of the heater 6.

A driven brush roller 14 extends across the width of the strip
10 1 and bears against a smooth guide face 15. The strip 1 passes between the roller 14 and the face 15 and is fed through by the rotating roller 14.

A counter (not shown) is connected with the motor of the heater
15 6 and is programmed to count a predetermined number of rows of knitting and then to actuate the motor to advance the heater 6 to the strip 1. The predetermined number of rows is the number of rows of knitting between inserted rows of heat-meltable material.

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In use, the free end of the strip 1 is stretched between the driven roller 14 and the roller 5, and the strip 1 is drawn past the counter until the predetermined number of rows have passed. At this point the heat-meltable row is at the heater 6. The
25 counter then actuates the motor and the heater 6 moves against the strip 1, the radiant heat from the heating element 9 melting the heat-meltable row. The centre of the row generally melts first, followed by the ends, and when the ends have melted the lower part of the strip 1 is severed from the remainder and
30 drops clear. This is detected by the photo sensor 10 which then actuates the motor to retract the heater 6 from the strip 1. The severed portion of the strip 1 is drawn clear by the roller 14 and replaced by the new free end of the strip 1 as the fabric comes off the knitting machine 2. The process is
35 repeated to produce short lengths of knitted fabric.

Modifications and improvements may be made without departing from the scope of the invention.

The foregoing embodiment is only one example of the
5 manner in which this invention can be reduced to practice.
In this embodiment the heater 6 is a Philips infra-red
radiant heater which has a power of 3 kW per metre of its
length, and its overall effective length is selected in
accordance with the width of the knitted fabric; the
10 roller 5 is a polished aluminium roller which is driven
through gearing from the knitting machine at a speed
slightly greater than the speed of feed of the fabric
from the knitting machine, thereby to stretch the fabric
slightly for ease of severance by the heater 6; the
15 counter comprises an A.C. inductive type proximity sensor
which senses the motion of the knitting machine, and an
auxiliary sensor is also provided to sense the resetting
of the knitting machine for production of a new garment
or length of fabric pieces and to reset the heater 6
20 accordingly.

Various modifications can be made to the invention in its
described embodiment without departing from the scope of
the invention. For example the heater 6 can be replaced
25 by a "contact" cutter such as an electrically-heated
polished steel tube or heated blade which severs the
heat-meltable knitted row on contact. Further, the
photo sensor 10 can be omitted and the cutter switched
off after a preset time, for example a few seconds, there-
30 by simplifying the apparatus; alternatively the heater
may be permanently switched on and moved towards and away
from the fabric as necessary to melt the knitted row to be
severed without damaging the fabric. Still further, a
photo sensor can be used to sense the approach of each
35 heat-meltable row to actuate the heater 6, and this often

proves to be more accurate than using the counter of the described embodiment; this is because the fabric can become stretched as it leaves the knitting machine so that counting the number of knitted rows can result in the severed pieces being longer than required; the sensor allows the heater to be actuated accurately at the required length of fabric. In this modification the sensor is used to actuate the heater rather than deactuate it as in the described embodiment.

CLAIMS:

1. A cutting device for severing a strip of material into shorter lengths, the device having transport means for moving the strip, and cutting means for severing the strip and arranged to sever the strip at successive predetermined intervals along the length of the strip.
2. A cutting device according to Claim 1, wherein the cutting means is actuated by a signal from a sensor after each predetermined interval.
3. A cutting device according to Claim 2, wherein the sensor is photosensitive and detects passage of the strip.
4. A cutting device according to Claim 1, 2 or 3, wherein the cutting means comprises a radiation emitter.
5. A cutting device according to Claim 4, wherein the cutting means comprises an infra-red radiant heater.
6. A cutting device according to Claim 1, 2 or 3, wherein the cutting device operates by contact with the strip.
7. A cutting device according to Claim 6, wherein the cutting device comprises a conductive heater.
8. A cutting device according to any one of the preceding Claims, wherein the strip is knitted and means are provided to determine said intervals between severing of the strip.
9. A cutting device according to Claim 8, wherein the determining means comprises a photosensor.
10. A cutting device according to any one of the preceding Claims, wherein the transport means comprises a driven roller.

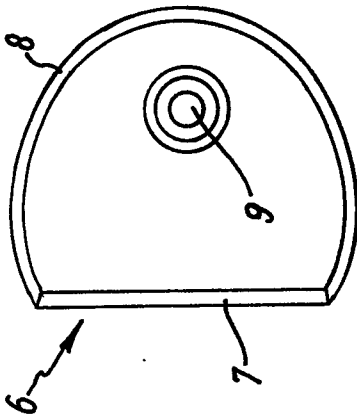


FIG. 2

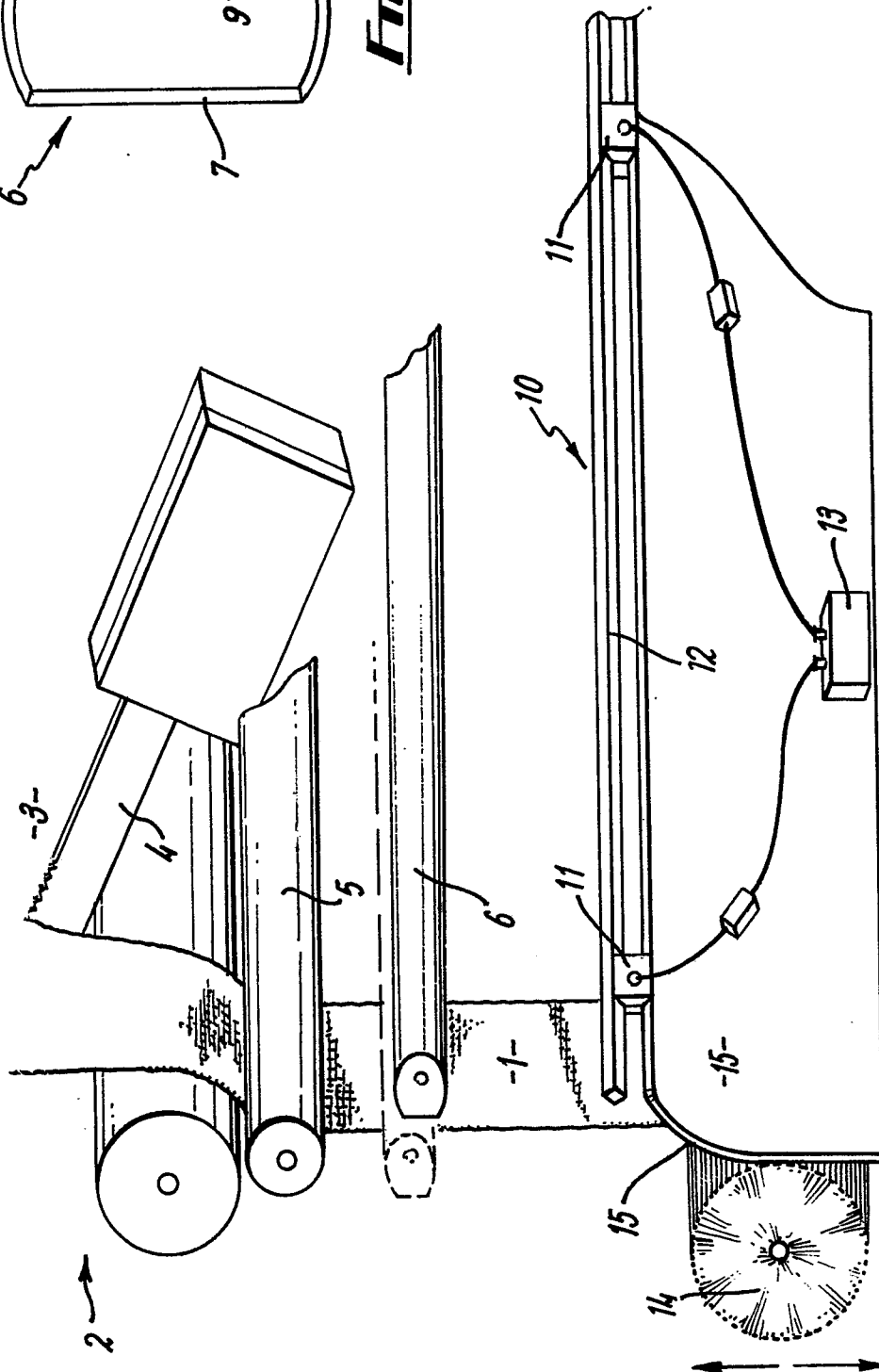


FIG. 1