

PATENT SPECIFICATION

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(54) WINDING CORE FOR STRIP MATERIAL

(71) We, EASTMAN KODAK COMPANY, a Company organized under the Laws of the State of New Jersey, United States of America of 343 State Street, 5 Rochester, New York 14650, United States of America, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

10 The invention relates to a winding core for strip material and to a method for attaching the end of such material to the core.

15 A number of means are known for holding or attaching the leading end of a strip to a winding core. These have included holding means in the form of a peg, clip or tongue, which is inserted manually into a 20 recess formed in the core so as to hold the leading end of the strip in the recess. Thus a core is known consisting of a hollow cylindrical body recessed to receive the holding means which is linked to it by 25 means of a hinge. The hinge and the holding means are moulded integrally with the core and of a suitable plastics material which possesses elastic properties to allow the holding means to turn around its hinge 30 when it is to be inserted into the recess to attach the leading end of the strip to the core.

35 In order to insert the hinged peg into the recess of the core, it may be necessary to use radial or axial pressure. If the peg is not properly seated, there is often a problem when stacking the cores, and this occurs particularly if the peg is to be forced into the recess in a radial manner.

40 In addition, most of the known winding cores which have a hinged holding means are not ideal for attaching the leading end of the strip, in an automatic operating procedure.

45 Such automatic procedure generally in-
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volves a supply funnel for guiding the cores toward the operating area, a device for bringing the leading end of the strip between the holding means and the body of the core and a member for applying a 50 pressure to the holding means so as to pivot it at the hinge point and insert the holding means into the recess of the core so as to grip the leading end of the strip.

However, in so doing this assembly the 55 pressure applied to the holding means is not always consistent or properly applied and, therefore, the hinge of the above-described core at times will break off. The hinge is not intended to be broken and, 60 therefore, it often enters the recess in an unaligned way which results in a defective attachment of the leading end of the strip to the core. In addition, the defective attachment may result in forming an uneven 65 cylindrical surface upon which the strip is to be wound so causing problems in windup and stacking.

According to the invention, there is provided a winding core for strip material, 70 comprising a generally cylindrical body, about which the strip may be wound, said core having a recess in its periphery for receiving an end of the strip, a strip securing clip formed integrally with the core at 75 a point adjacent to the recess and joined to the periphery of the core by a frangible connection that is adapted to break when pressure is applied to the clip to cause the clip to enter the recess to secure the 80 strip end, the clip when inserted in the recess to secure the strip end cooperating with the remainder of the body periphery to form a generally cylindrical surface upon which the remainder of the strip may be 85 wound.

The invention also relates to such a core in combination with a clip which has been detached from the core.

A method in accordance with the inven- 90

tion for attaching one end of a strip to such a winding core comprises positioning the end of the strip between the recess and the strip securing clip which is joined to the core by the frangible connection, and applying a force to this clip to break the frangible connection and to cause the clip to enter the recess to be retained therein.

Such a core is particularly suitable for manufacturing by moulding, and facilitates assembly when attaching a continuous strip thereto. Only a nominal radially inwardly directed force needs to be applied to the clip to break the connection and lock the clip and end of the strip in the core recess. In its locked position in the core the clip cooperates with the remainder of the core periphery to provide a substantially continuous cylindrical surface for winding the continuous web.

In the attached drawing, given only as an example:

Figure 1 is a side view of a portion of a core according to the invention, which shows the relative positions of the core and of the leading end of a strip to be attached to the core, before the strip securing clip is embedded in the recess in the body of the core;

Figure 2 is a similar view to that of Figure 1, but taken after the strip securing clip has been embedded in the recess in the body of the core, the leading end of the strip then being gripped by the clip.

Referring now to Figure 1 wherein one portion of the periphery of a winding core is shown, a strip securing clip 2 projects from the cylindrical body 1 of the core to which it is joined by a frangible connection having a constriction 3 the axis of which is parallel to that of the body. The core is recessed, adjacent to the clip 2 and is shaped as shown in the drawing at 4,4'. This recess is shaped to receive the whole of the strip securing clip 2, with the male element or free end 5 of the clip inserted in its female element or portion 4' and with the other end, or male element, adjacent to the connection 3, of the clip 2 inserted in the female element or portion 4.

Such a core can be advantageously moulded from a piece of plastics material such as formaldehyde polymer resin; a particularly suitable thermoplastic resin is the one sold commercially under the trademark "Delrin" by the E.I. duPont de Nemours Company. A thermo-hardening plastics material would also be suitable for forming this core.

The core can have a central hole 6 for receiving a driving spindle for the core.

The method according to the invention for the attaching the leading end of a strip to this core will now be described in conjunction with Figures 1 and 2.

In order to attach the leading end 7 of a strip to the core, it is necessary to insert, either manually or automatically, this leading end between the strip securing clip 2 and the recess 4,4' formed in the core 1. The clip is then pressed in the direction of arrow F (see Figure 2). In the illustrated embodiment of the invention, this pressure is oriented radially with respect to the body of the core and toward the centre of the core. Clip 2 then presses down on the leading end 7 for the insertion of the clip end 5 into that portion 4' of the recess 4,4' designed for receiving it. The pressure that is applied produces, moreover, a rupturing force on the connection 3. After rupture of the strip securing clips 2 from the body 1, the continued pressure forces the end adjacent to the connection, into the subjacent portion of the recess, which portion is provided for receiving this end. Clip 2 then assumes the position shown in Figure 2. It is thus held in the recess 4,4' by the contact of these two ends with the portions of the wall of recess 4,4'. Leading end 7 of the strip is thus gripped between the clip 2 and the inside wall of recess 4,4' particularly at the portion 4' of the recess.

It should be noted, as seen in Figure 2, that the external surface of the strip securing clip continues the peripheral cylindrical surface of the body. Such an arrangement contributes to the winding of the strip around the core in uniform turns.

Numerous modifications can be effected on the described and illustrated core without, in so doing, departing from the scope of the invention. Thus another material could be used, the shape of the strip securing clip or of the recess designed to receive the clip can be modified, the shape or the orientation of the connection can be modified, and this may alter the direction of the force which has to be applied to the element to embed it in the body of the core. These modifications may be made in dependence upon the particular conditions of use or of manufacture.

The described and illustrated core has been designed to serve as support for a roll of magnetic tape contained within a cartridge. It is clear, however, that it can support any strip whatsoever, and that it could also be formed with a flange or flanges in order to form a spool. In the latter case, the strip securing clip can be connected to a flange of the spool by a frangible connection rather than directly to the body of the core of this spool.

WHAT WE CLAIM IS:—

1. A winding core for strip material, comprising a generally cylindrical body, about which the strip may be wound, the body having a recess in its periphery for



tion for attaching one end of a strip to such a winding core comprises positioning the end of the strip between the recess and the strip securing clip which is joined to the core by the frangible connection, and applying a force to this clip to break the frangible connection and to cause the clip to enter the recess to be retained therein.

Such a core is particularly suitable for manufacturing by moulding, and facilitates assembly when attaching a continuous strip thereto. Only a nominal radially inwardly directed force needs to be applied to the clip to break the connection and lock the clip and end of the strip in the core recess. In its locked position in the core the clip cooperates with the remainder of the core periphery to provide a substantially continuous cylindrical surface for winding the continuous web.

In the attached drawing, given only as an example:

Figure 1 is a side view of a portion of a core according to the invention, which shows the relative positions of the core and of the leading end of a strip to be attached to the core, before the strip securing clip is embedded in the recess in the body of the core;

Figure 2 is a similar view to that of Figure 1, but taken after the strip securing clip has been embedded in the recess in the body of the core, the leading end of the strip then being gripped by the clip.

Referring now to Figure 1 wherein one portion of the periphery of a winding core is shown, a strip securing clip 2 projects from the cylindrical body 1 of the core to which it is joined by a frangible connection having a constriction 3 the axis of which is parallel to that of the body. The core is recessed, adjacent to the clip 2 and is shaped as shown in the drawing at 4,4'. This recess is shaped to receive the whole of the strip securing clip 2, with the male element or free end 5 of the clip inserted in its female element or portion 4' and with the other end, or male element, adjacent to the connection 3, of the clip 2 inserted in the female element or portion 4.

Such a core can be advantageously moulded from a piece of plastics material such as formaldehyde polymer resin; a particularly suitable thermoplastic resin is the one sold commercially under the trademark "Delrin" by the E.I. duPont de Nemours Company. A thermo-hardening plastics material would also be suitable for forming this core.

The core can have a central hole 6 for receiving a driving spindle for the core.

The method according to the invention for the attaching the leading end of a strip to this core will now be described in conjunction with Figures 1 and 2.

In order to attach the leading end 7 of a strip to the core, it is necessary to insert, either manually or automatically, this leading end between the strip securing clip 2 and the recess 4,4' formed in the core 1. The clip is then pressed in the direction of arrow F (see Figure 2). In the illustrated embodiment of the invention, this pressure is oriented radially with respect to the body of the core and toward the centre of the core. Clip 2 then presses down on the leading end 7 for the insertion of the clip end 5 into that portion 4' of the recess 4,4' designed for receiving it. The pressure that is applied produces, moreover, a rupturing force on the connection 3. After rupture of the strip securing clips 2 from the body 1, the continued pressure forces the end adjacent to the connection, into the subjacent portion of the recess, which portion is provided for receiving this end. Clip 2 then assumes the position shown in Figure 2. It is thus held in the recess 4,4' by the contact of these two ends with the portions of the wall of recess 4,4'. Leading end 7 of the strip is thus gripped between the clip 2 and the inside wall of recess 4,4' particularly at the portion 4' of the recess.

It should be noted, as seen in Figure 2, that the external surface of the strip securing clip continues the peripheral cylindrical surface of the body. Such an arrangement contributes to the winding of the strip around the core in uniform turns.

Numerous modifications can be effected on the described and illustrated core without, in so doing, departing from the scope of the invention. Thus another material could be used, the shape of the strip securing clip or of the recess designed to receive the clip can be modified, the shape or the orientation of the connection can be modified, and this may alter the direction of the force which has to be applied to the element to embed it in the body of the core. These modifications may be made in dependence upon the particular conditions of use or of manufacture.

The described and illustrated core has been designed to serve as support for a roll of magnetic tape contained within a cartridge. It is clear, however, that it can support any strip whatsoever, and that it could also be formed with a flange or flanges in order to form a spool. In the latter case, the strip securing clip can be connected to a flange of the spool by a frangible connection rather than directly to the body of the core of this spool.

WHAT WE CLAIM IS:—

1. A winding core for strip material, comprising a generally cylindrical body, about which the strip may be wound, the body having a recess in its periphery for

- receiving an end of the strip, a strip securing clip formed integrally with the core at a point adjacent to the recess and joined to the periphery of the core by a frangible connection that is adapted to break when pressure is applied to the clip to cause the clip to enter the recess to secure the strip end, the clip when received in the recess to secure the strip end cooperating with the remainder of the body periphery to form a generally cylindrical surface upon which the remainder of the strip may be wound.
2. A core as claimed in Claim 1, wherein the frangible connection comprises a constriction between the body and the strip securing clip.
3. A core as claimed in Claim 2, wherein the axis of the constriction is parallel to that of the body.
4. A core as claimed in Claim 1, having at least two flange, wherein the frangible connection connects this flange with the clip.
5. A core as claimed in any one of Claims 1 to 4, wherein the ends of the strip securing clip and the corresponding portions of the recess are shaped in such a way as to obtain a double embedment when the clip is received in the recess in the body of the core.
6. A core as claimed in Claim 5, wherein each of the two embedments is obtained through the cooperation of male and female elements formed on the clip and on the body of the core.
7. A core as claimed in Claim 6, wherein

the male element of each embedment is formed on the strip securing clip.

8. A core as claimed in any one of Claims 1 to 7, wherein the strip securing clip has a surface which, after reception of the clip in the body of the core, forms part of the said cylindrical surface of the core.

9. A core as claimed in any one of Claims 1 to 8, which with its strip securing clip has been formed from a single piece of plastics material.

10. A method for attaching one end of a strip to a core as claimed in any one of Claims 1 to 9, comprising positioning the end of the strip between the recess and the strip securing clip which is joined to the core by the frangible connection, and applying a force to the clip to break the frangible connection and to cause the clip to enter the recess to be retained therein.

11. A method as claimed in Claim 10, wherein the force applied to the clip is directed radially towards the axis of the core.

12. A core with an integrally formed strip securing clip substantially as hereinbefore described with reference to the accompanying drawing.

13. A method of attaching one end of a strip to a core substantially as hereinbefore described with reference to the accompanying drawing.

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