(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 102 250**
A2

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **83305057.8**

(22) Date of filing: **01.09.83**

(51) Int. Cl.³: **G 03 G 15/00**
B 65 H 75/30

(30) Priority: **01.09.82 US 413850**

(43) Date of publication of application:
07.03.84 Bulletin 84/10

(84) Designated Contracting States:
DE FR GB IT

(71) Applicant: **XEROX CORPORATION**
Xerox Square - 020
Rochester New York 14644(US)

(72) Inventor: **Geddes, Glenn F.**
6710 Tamarisk Drive
LaVerne California 91750(US)

(72) Inventor: **Jeromin, Lothar S.**
573 Camillo Street
Sierra Madre California 91024(US)

(74) Representative: **Prior, Nicholas J. European Patent Attorney et al,**
Rank Xerox Patent Department 338 Euston Road
London NW1 3BH(GB)

(54) Mechanisms for providing drag during unwinding of tapes.

(57) Mechanisms are described for providing a predetermined amount of drag during the unwinding of tape from a cylindrical core (11) and for providing two layers of tape (10) under tension for the lamination of a toner image. The former includes a stationary cylindrical spool (13) and the latter includes two such spools (13).

A foam strip (12) occupying the space between the stationary cylindrical spool (13) and a roll of tape (10), wound on the concentric cylindrical core (11), the strip (12) being attached to said spool (13). The uncompressed thickness of the foam strip (12) is greater than the space between the spool (13) and core (11) to provide a constant drag force when the core is rotated by pulling out tape. The foam strip is made from open pore polyether-polyurethane.

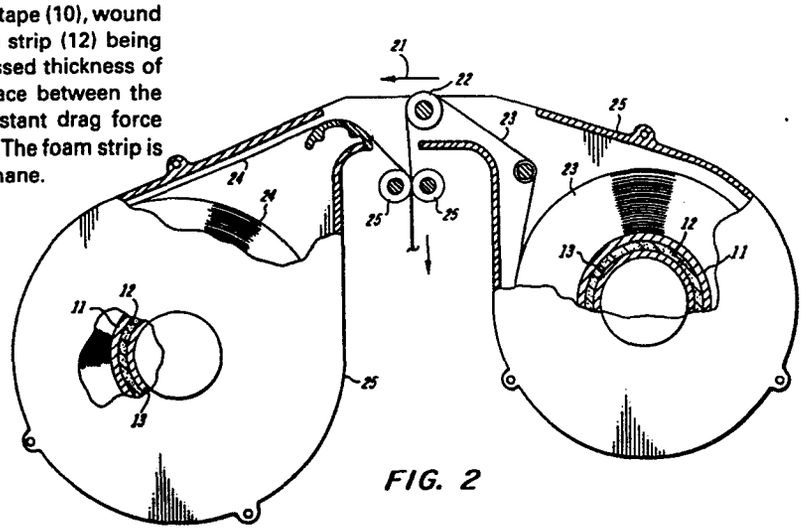

FIG. 2

EP 0 102 250 A2

D/82169

MECHANISMS FOR PROVIDING DRAG DURING UNWINDING OF TAPES

This invention relates to a mechanism for providing a predetermined amount of drag during the unwinding of tape from a cyclindrical core. The invention also relates to a mechanism for providing two layers of tape under tension for the lamination of a toner image.

It is frequently necessary to produce a drag force on a spool from which a line or strip of material is being unwound, to assure tracking of the strip and to prevent a sudden surge or stoppage of spool speed from tangling the material.

A special case is where the strip being unwound is adhesive on one side, and is used to remove a toner image from a xeographic plate. The strip must be adhesive enough to pull all or most of the developed toner image from the plate, but for that reason, will also tend to stick to the plate itself. To pull the tape from a plate, a drag force of 100 to 200 grams pulling back on the strip must be generated so that the plate may be removed from the strip after the transfer of the toner image, without pulling more material from the spool.

Any friction-producing means may be used to slow the motion of a spool, but most cannot be used in an image-producing process because of their tendency to produce dust. For instance, if a spring member is brought to bear on the spool, the contact point tends to wear, producing dust. A second consideration is shelf life and active life of the product. If a spool is rotably mounted on a shaft which is covered with a friction-producing material that will take a set, shrink or wear over a period of time, then the friction force produced will not be constant. Additionally, the covering material must be dust free. Finally, the drag mechanism must be low in cost.

The embodiment described herein comprises a plastic spindle covered with an open pore polyether-polyurethane foam layer which forms an interference fit with the inside diameter of the spool. This material does not take a set, even when compressed for long periods, doesn't

deteriorate over time, and doesn't wear to produce a residue or dust. Also, the foam itself, the plastic part on which it is attached, and the glue used to cement it, are all cheap and easily applied.

In order that the invention may be more easily understood, reference will now be made to the accompanying drawings, in which:-

Figure 1 is a diagram of the tape, core, drag strip and spool, and

Figure 2 is a diagram of the case housing two rolls of tape.

As shown in Figure 1, the tape 10 is supplied on a plastic core 11, the core having an inside surface that is substantially cylindrical and smooth. However, this inner surface need not be manufactured to exacting standards since the foam roll 12 on which it fits will conform to slight irregularities.

The core 11 fits over the foam roll or strip 12 which is glued to a stationery spool 13 having notches 14 to mate with matching projections, not shown, to prevent spool rotation.

The foam roll 12 is made of polyether-polyurethane foam having sixty open pores per inch and a density of 1.2 pounds per cubic foot. The foam roll 12 is bonded to the spool 13 by an adhesive or double face tape. The adhesive may be Dow Corning Corporation's Part No. 8662 urethane bond. The spool 13 is black polycarbonate.

Figure 2 shows the tape cartridge in which the invention is used. A small xeroqraphic plate, not shown, which has a developed toner image on its lower surface is driven in the direction of arrow 21 in contact with idler roller 22. Between the roller 22 and the plate is a transparent tape 23 having its adhesive side up. At the nip between plate and roller 22, the toner image will be transferred to the tape 23.

A problem may arise at the point where the plate and tape 23 are pressed together by roller 22 in that the transparent tape 23 may continue to stick to the plate after it has passed the roller 22. If this happens, a jam or tangle of tape is likely. To prevent this from occurring, a drag force pulling back (to the right in Figure 2) is created by the foam strip so that the tape 23 will part cleanly from the plate after the plate has completely passed the roller 22.

At the same time a translucent backing tape 24 is fed from a second roll mounted on an identical spool 13 with its associated foam roll

12. This backing tape 24 is pressed against the adhesive tape 23 at rollers 25 to form a laminated image.

Each roll of tape has a core 11 which rotates around the stationary spool 13 and foam strip 12. The notches, not shown, of the spool 13 lock onto matching projections built into the case 25 which is made from medium impact styrene. The case encloses the two rolls of tape and the spools, and constitutes an easily replaceable unit.

While the invention has been described with reference to specific embodiments, it will be understood by those skilled in the art that various changes will be made and equivalents may be substituted for elements thereof without departing from the true spirit and scope of the invention. In addition, many modifications may be made without departing from the essential teachings of the invention.

CLAIMS:

1. A mechanism for providing a predetermined amount of drag during the unwinding of tape (10) from a cylindrical core (11) characterised by:

a stationary cylindrical spool (13) concentric with said core, the outside diameter of said spool being smaller than the inside diameter of said core, and

a foam strip (12) attached to, and encircling, said spool (13), the uncompressed thickness of the strip exceeding the difference in radii to the outside of said spool and to the inside of said case, to produce a drag force when said core is rotated by the unwinding of tape.

2. A mechanism according to Claim 1, wherein said foam strip (12) is a strip of open pore polyether-polyurethane.

3. A mechanism according to Claim 1 or 2, wherein said strip is aligned to said spool.

4. A mechanism for providing two layers of tape under tension for the lamination of a toner image, characterised by two stationary cylindrical spools (13),

foam strips (12) attached to the outside circumference of respective said spools,

two rolls of laminating tape (10) each on a cylindrical core (11), the inner diameter of said core being smaller than the outside diameter of the foam strip and larger than the outside diameter of said spool, said rolls of tape (10) mounted on said spools (13) to form an interference fit.

5. A mechanism according to Claim 4, wherein said foam strips (12) are of open pore polyether-polyurethane.

6. A mechanism according to claim 4 or 5, wherein said strips (12) are attached to said spools (13) by glue.

7. A mechanism according to Claim 4, 5 or 6 further comprising a case (25) enclosing said rolls of tape (10) and said spools (13) so that the entire mechanism may be replaced as one unit.

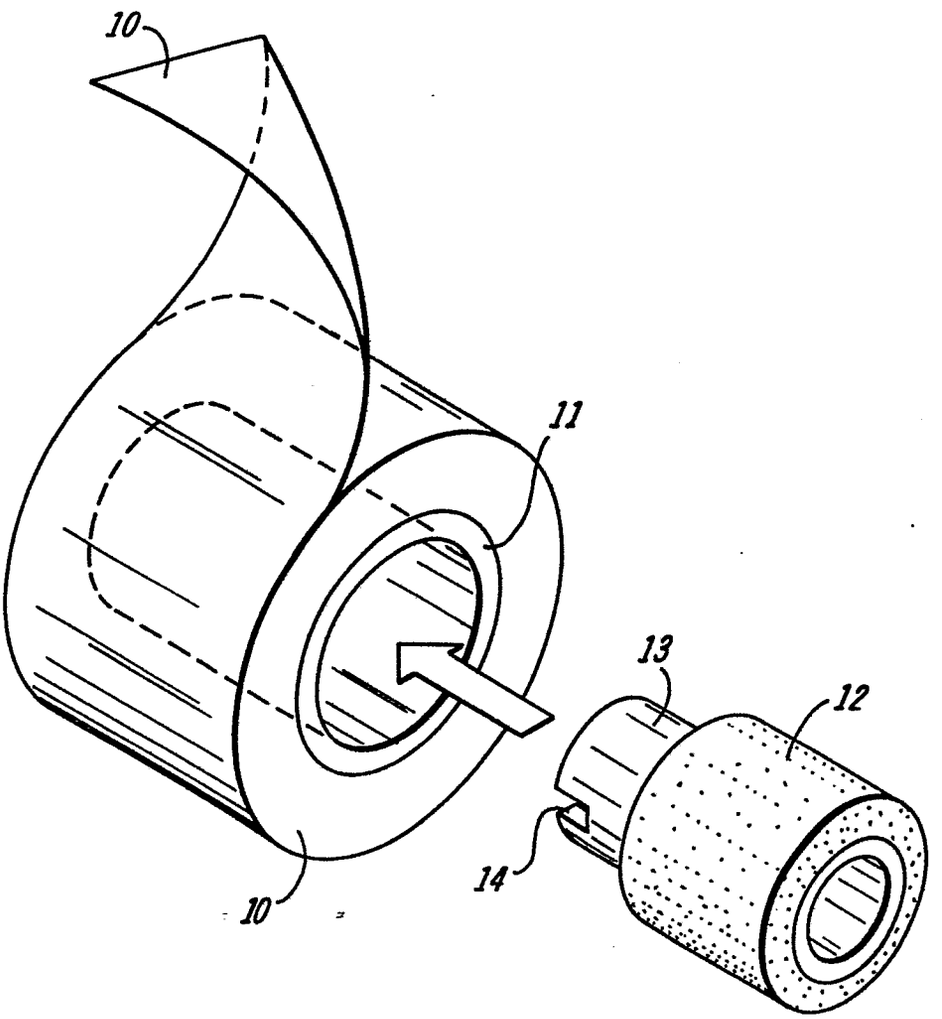

FIG. 1

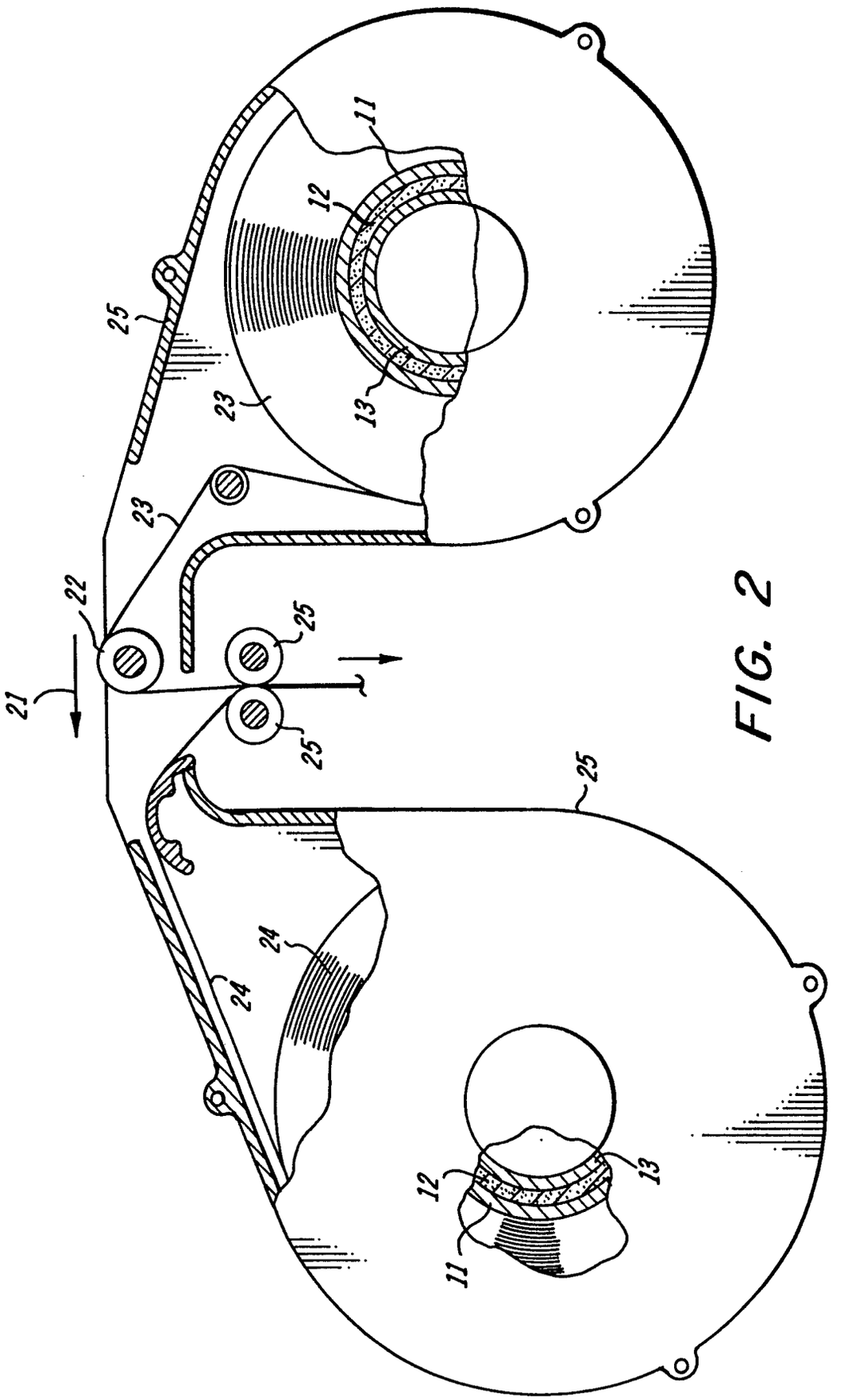

FIG. 2