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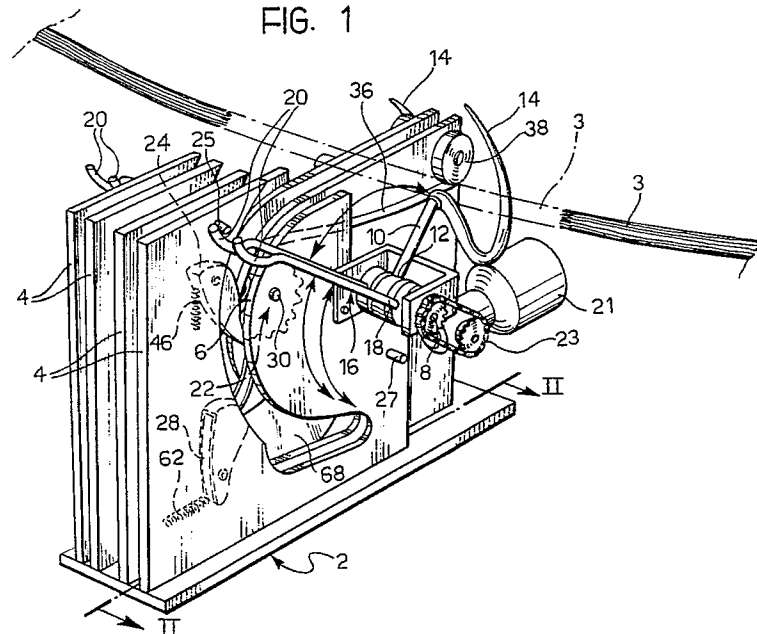
**I-10121 Torino(IT)**

(54) **An automatic machine for taping and cutting bundles of fibres.**

(57) The machine comprises a support frame (2), means (10, 16) for moving the bundle (3) to be cut and taped, and taping means (22, 24, 26, 28) for wrapping respective lengths of adhesive tape (36) around at least two spaced-apart peripheral portions (74) of the bundle (3) of fibres supported by the movement means (10, 16). The machine also includes a blade (68) mounted on the frame (2) down-

stream of the taping means (22, 24, 26, 28), with respect to the path followed by the bundle (32), for cutting the bundle (32) supported by the movement means (10, 16) between the peripheral portions (74) which are wrapped in the adhesive tape (36), dividing the bundle (3) into two pieces whose facing ends are taped.

FIG. 1



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The present invention relates to an automatic machine for taping and cutting continuous bundles of fibres, particularly natural and artificial textile fibres. These operations are necessary in order to insert bundles of fibres into the containers used for their transportation. More specifically such automatic machine has the features disclosed in the precharacterising portion of claim 1.

WO-A-8501266 discloses a device for applying a strip closure around an envelope having such features. This device comprises a support frame with a slot, a bracket and a rotor having peripheral recesses disposed on both sides of the slot. In operation the envelope is inserted in the slot and received into one of the recesses of the rotor, wherein the taping takes place. This device is conceived for hand use and is not suitable for application in automatised industrial processes.

The object of the present invention is to provide an automatic machine for taping and cutting continuous bundles of fibres, which is easy to use, very reliable and suitable for use in automatised continuous processes.

The subject of the present invention is constituted by a machine of the type indicated above, having furthermore the features set forth in the characterising portion of claim 1.

Advantages and characteristics of the present invention will become clear from the detailed description which follows with reference to the appended drawings, provided by way of non-limiting example, in which:

Figure 1 is a perspective view of a machine according to the invention,

Figure 2 is a schematic sectional view taken on the line II-II of figure 1,

Figures 3 to 5 are schematic perspective views of some parts of the machine according to the invention during different operating stages, and

Figure 6 is a perspective view of a bundle of fibres cut by the machine.

An automatic machine (Figures 1 and 2) for cutting and taping continuous bundles of fibres 3 comprises a support frame 2 constituted by a plurality of parallel vertical walls 4 formed with a substantially semicircular slot 6 into which the bundle of fibres is passed, as will be described in further detail below.

The support frame 2 is preferably made of metallic material with a very smooth surface, which prevents damage the fibres during operation.

Means for moving the bundle 3 are mounted about a pin 8 fixed to the frame 2. These comprise two main arms 10 each of which has one end 12 hinged on the pin 8 and a hook-shaped opposite end 14. Each main arm 10 has an associated pair of auxiliary arms 16 each having one end 18 hinged on the pin 8 and an opposite U-shaped end

whose concavity is opposite that of the hooked end 14 of the main arm 10. The arms 10 and 16 are driven by an electric motor 21 through a chain transmission mechanism of known type. Moreover, pins 25 and 27 project from the frame 2 for stopping the arms 10 and 16 respectively. The two main arms 10 and their auxiliary arms 16 are arranged symmetrically of the longitudinal median plane of the machine.

Cogwheels 22, taping levers 24, cutting levers 26 and compacting levers 28 are also mounted in pairs symmetrically of the longitudinal median plane (Figures 3 to 5).

A portion of the periphery of each cogwheel 22 extends within the slot 6 and faces a respective taping lever 24. The two cutting levers 26 and the two compacting levers 28 are mounted downstream of the cogwheels 22 and the levers 24, and face each other on opposite sides of the slot 6.

Each of the two cogwheels, which are both freely rotatable on the same spindle 30, has a series of peripheral teeth 32 and notches 34 and supports a respective length of adhesive tape 36 unwound from a respective reel 38 supported by the frame 2. Both reels 38 are mounted so that the adhesive side of the tape 36 faces upwards with reference to Figures 1 to 5.

Each taping lever 24 is hinged on a first pin 40 and has a shaped active end 42 facing the respective cogwheel 22 on the opposite side of the slot 6, its opposite end 44 being subject to the action of resilient biasing means 46.

Each cutting lever 26 is hinged on a second pin 48, has an operating end 50 which projects into the slot downstream of the associated cogwheel 22, and has an opposite cutting end 52 which is upstream of the operating end 50 and is subject to the action of resilient biasing means 54. The cutting end 52 has a suitably-shaped and interchangeable blade.

Each compacting lever 28 is hinged on a third pin 56 and has an operating end 58, its opposite end 60 being subject to the action of resilient biasing means 62. Each compacting lever 28 also has a convex projection 64 which, as will be described in further detail below, is intended to face a correspondingly-shaped recess 66 in the respective cutting lever 26.

A circular rotary blade 68 is mounted in the longitudinal median plane of the machine, is driven by a motor and extends into the slot 6 downstream of the cutting levers 26 and the compacting levers 28. The blade 68 is driven by an electric motor, not shown, and its position relative to the frame 2 is adjustable so that its projection into the slot 6 can be varied.

When the machine is in operation, the bundle of fibres 3 is positioned near the frame 2 by a

supply device of known type, not shown (Figures 1, 2 and 3). The main arms 10 are rotated by the motor 21 and capture the bundle 3 with their hooked ends 14, thrusting it against the U-shaped ends 20 of the auxiliary arms 16.

These are then also rotated by the motor 21. The bundle 3 is thus clamped between the opposite concavities of the distal ends of the main arms 10 and the auxiliary arms 16 and is drawn into the semicircular slot 6 by their rotation.

Here (Figure 4) the bundle 3 enters a notch 34 in the periphery of each cogwheel 22 and traps therein a respective length of tape 36 which adheres to the portion of the bundle 3 which is radially inward of the cogwheel 22. The shaped end 42 of each lever 24 turns over the respective end portion of the tape 36 situated downstream of the bundle 3, thus also wrapping the portion of the bundle 3 which is radially outward of the cogwheels 22. Two spaced-apart peripheral portions 74 of the bundle 3 are thus completely wrapped in the adhesive tape 36.

As the bundle continues to move in the slot 6, it interferes (Figure 5) with the operating ends 50 of the cutting levers 26 which pivot about the pins 48, causing their cutting ends 52 to enter the slot 6 and cut the adhesive tapes 36 in positions upstream of the bundle 3.

As they pivot, the cutting levers 26 also cause the associated compacting levers 28 to rotate by interfering with their operating ends 58. The convex projection 64 of each lever 28 is thus positioned opposite the corresponding recess 66 in the respective cutting lever 26 and the respective peripheral portions 74 of the bundle 3, which are wrapped in the adhesive tape 36, are trapped between them and hence compacted.

Conveniently, the resilient biasing means 46, 54 and 62 return the respective levers 24, 26 and 28 to their original positions as soon as they are no longer acted upon by other external forces.

Finally, as it continues to move in the slot 6, the bundle 3 comes into contact with the rotary blade 68 which cuts it between the two taped peripheral portions 74. Two pieces of the bundle, taped at their facing ends, are thus produced (Figure 6) and, under operating conditions, one of these is a piece whose opposite end has already been taped during the previous operating cycle of the machine, whilst the other is the end of a continuous bundle which will be divided into several pieces during the subsequent operating cycles of the machine.

The two pieces of the bundle 3 produced by the cutting continue to be entrained by the arm 10 and 16 until the main arms 10 meet the respective stop pins 25, whilst the auxiliary arms 16 rotate still further before being stopped by electrical travel

stops.

The pieces of the bundle 3 are thus released from the arms 10 and 16 and can be removed from the machine.

At this point, the arms 10 and 16 can return to their initial positions by rotating, under the action of the motor 21, in the opposite sense from that in which they rotated previously. This movement finishes when the auxiliary arms 16 are stopped by the pins 27 and the main arms 10 are stopped by electrical travel stops. The machine is thus ready to carry out a new operating cycle.

Naturally, the principle of the invention remaining the same, the details of construction and forms of embodiment may be varied widely with respect to those described and illustrated purely by way of example, without thereby departing from its scope.

## Claims

1. An automatic machine for taping and cutting continuous bundles of fibres (3) comprising:

a support frame (2) provided with a slot (6), through which the bundle of fibres (3) is moved,

taping means (22, 24, 26, 28) adapted to wrap respective lengths of adhesive tape (36) around one portion of the bundle of fibres (3), and

a blade (68) mounted on the frame (2) downstream of the taping means (22, 24, 26, 28), with respect to the path followed by the bundle (3), and adapted to cut the taped bundle (3)

characterised in that it comprises means (10, 16) supported by the frame (2) for moving the bundle (3) to be cut and taped through the slot (6),

and in that the taping means (22, 24, 26, 28) are adapted to wrap respective lengths of adhesive tape (36) around at least two spaced-apart peripheral portion of the bundle of fibres (3), whereby said blade (68) can cut the taped bundle (3) between the peripheral portions which are wrapped in the adhesive tape (36).

2. A machine according to Claim 1, characterised in that the means for moving the bundle (3) comprise two main arms (10) provided with drive means and each having one end (12) hinged on a pin (8) fixed to the frame (2) and a hook-shaped opposite end (14), a pair of auxiliary arms (16) with drive means being associated with each main arm (10) and each hav-

ing one end (18) hinged on the pin (8) and an opposite U-shaped end (20) whose concavity is opposite that of the hooked end (14) of the main arm (10), the bundle of fibres (3) being clamped between the opposite concavities of the distal ends (14, 20) of the main arms (10) and the auxiliary arms (16) and being drawn along a substantially semicircular slot (6) in the support frame (2) by the rotation of the arms (10, 16).

3. A machine according to Claim 2, characterised in that the means for driving the main arms (10) and the auxiliary arms (16) comprise an electric motor (21).

4. A machine according to Claim 2 or Claim 3, characterised in that the two main arms (10) and their respective auxiliary arms (16) are arranged symmetrically of the longitudinal median plane of the machine.

5. A machine according to any one of the preceding claims, characterised in that the taping means comprise:

a pair of reels (38) of adhesive tape (36),

a pair of cogwheels (22) which are freely rotatable on the same spindle and portions of the peripheries of which extend within the slot (6) in the frame (2) and support the lengths of adhesive tape (36) unwound from the respective reels (38),

a pair of taping levers (24) hinged on a first pin (40), each having a shaped active end (42) facing a respective cogwheel (22) on the opposite side of the slot (6) and an opposite end which is subject to the action of resilient biasing means (46), and

a pair of cutting levers (26) each associated with a respective cogwheel (22), the bundle of fibres (3) moving in the slot (6) entering a notch (34) in the periphery of each cogwheel (22) and trapping therein a respective length of tape (36) which adheres to the portion of the bundle (3) which is radially inward of the cogwheel (22), the shaped active end (42) of each lever (24) turning over the respective length of adhesive tape (36) situated downstream of the bundle (3) so as also to wrap the portion of the bundle (3) which is radially outward of the cogwheel (22), two spaced-apart peripheral portions (74) of the bundle (3) thus being completely wrapped in the adhesive tape (36) which is then cut by the cutting levers (26).

6. A machine according to Claim 5, characterised in that each cutting lever (26) is hinged on a second pin (48) and has an operating end (50) which projects into the slot (6) downstream of the associated cogwheel (22) and an opposite cutting end (52) arranged upstream of the operating end (50) and subject to the action of resilient biasing means (54), the bundle (3) moving in the slot (6) interfering with the operating ends (50) of the cutting levers (26) which thus rotate about the second pin (48) to cause their cutting ends (52) to enter the slot (6) and cut the respective adhesive tapes (36).

7. A machine according to Claim 6, characterised in that it includes a pair of compacting levers (28) each hinged on a third pin (56) and facing a respective cutting lever (26) on the opposite side of the slot (6), each compacting lever (28) having an operating end (58) and being subject at its opposite end (60) to the action of resilient biasing means (62), the rotation of each cutting lever (26) also causing the associated compacting lever (28) to rotate by acting on its operating end (58) so as to position a convex projection (64) of each compacting lever (28) opposite a corresponding-shaped recess (66) in the associated cutting lever (26), the respective peripheral portion (74) of the bundle (3) which is wrapped in the adhesive tape (36) being trapped therebetween and thus compacted.

8. A machine according to Claim 7, characterised in that the pairs of reels (38), cogwheels (22), taping levers (24), cutting levers (26), and compacting levers (28) are arranged symmetrically with respect to the longitudinal median plane of the machine.

9. A machine according to any one of the preceding claims, characterised in that a circular rotary blade (68) is mounted in its longitudinal median plane, is driven by a motor and extends into the slot (6) downstream of the taping means (22, 24, 26, 28) to cut the bundle (3) between its taped peripheral portions (74).

10. A machine according to Claim 9, characterised in that the position of the circular blade (68) relative to the frame (2) is adjustable.

11. A machine according to any one of the preceding claims, characterised in that the support frame is of metallic material.

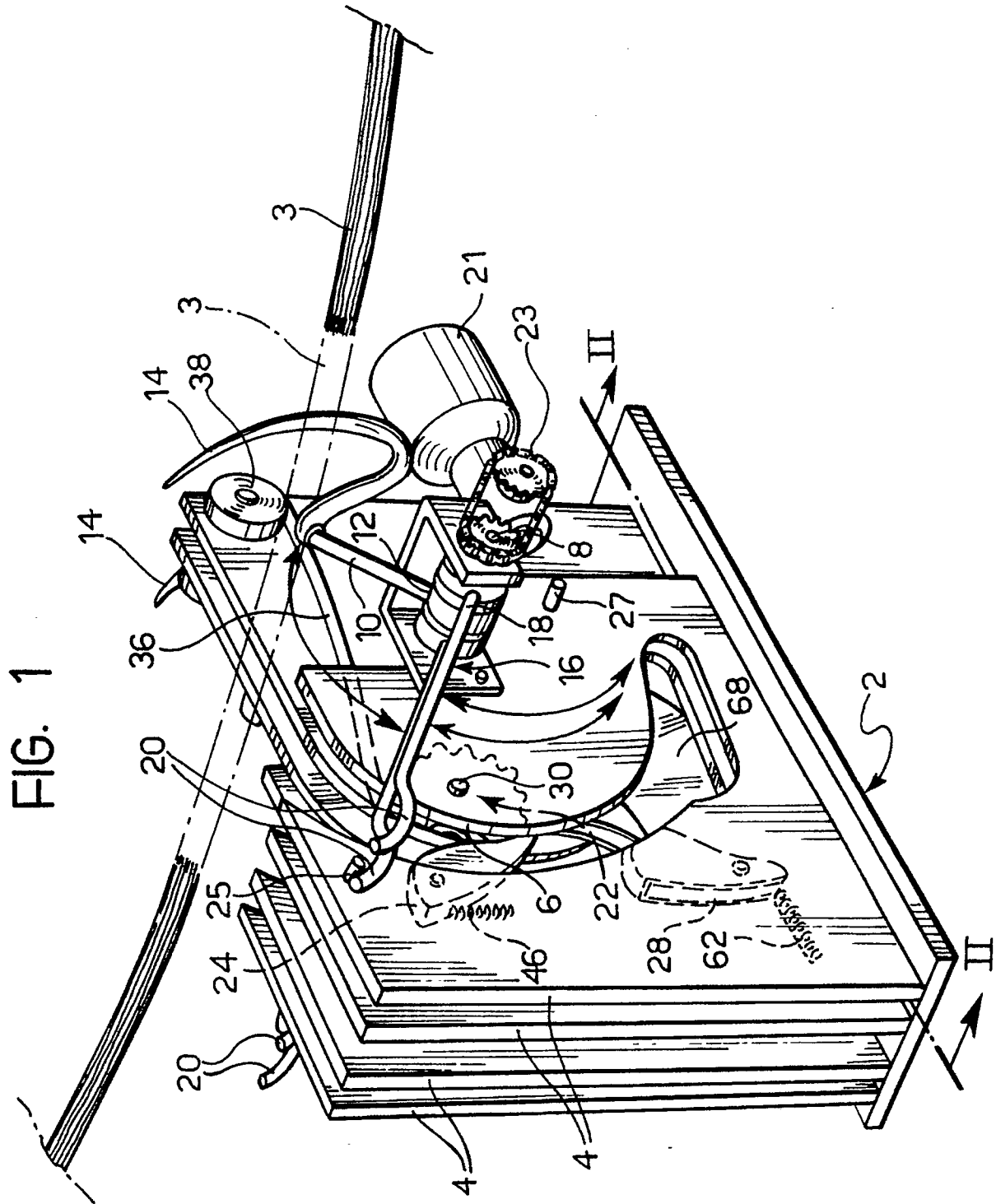


FIG. 2

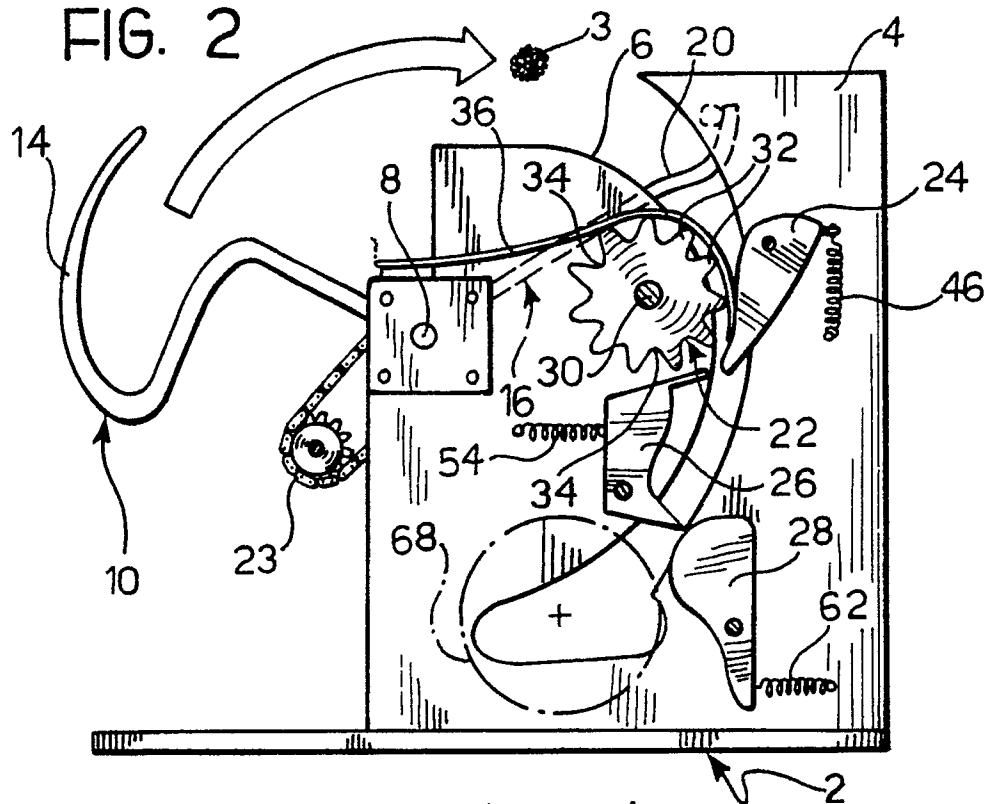
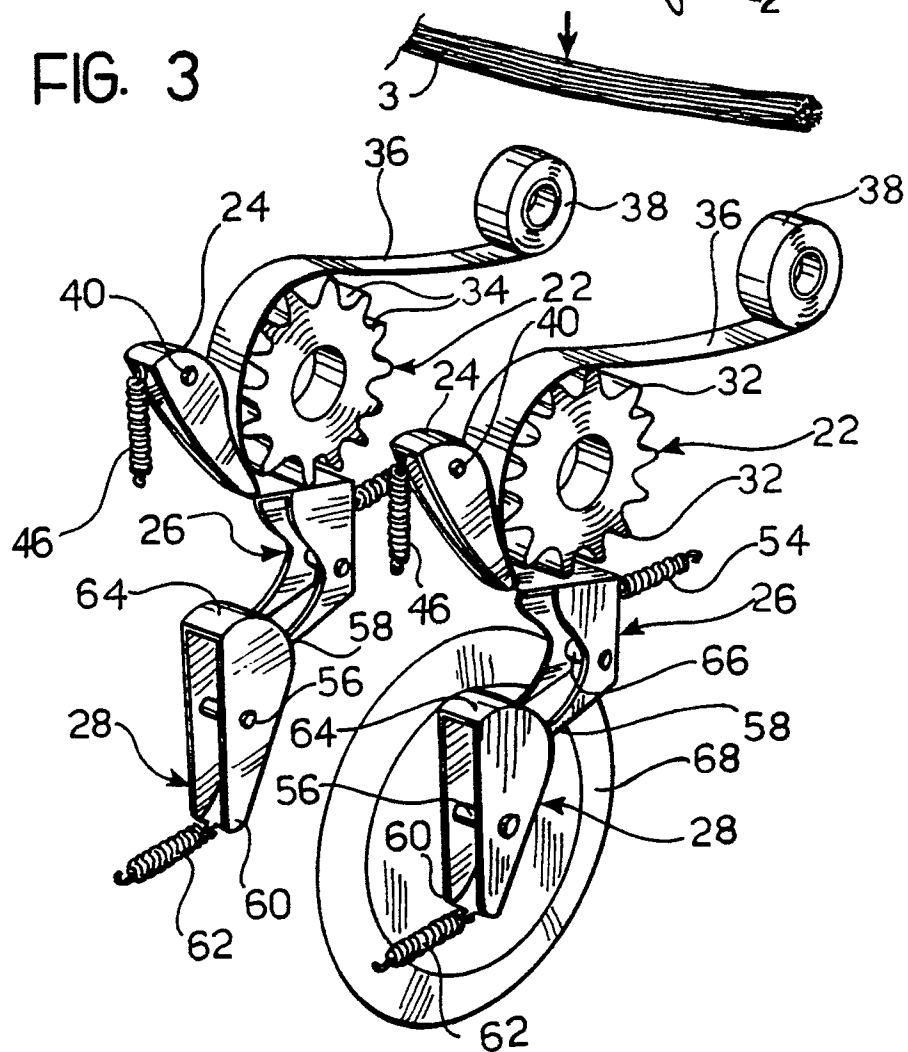


FIG. 3



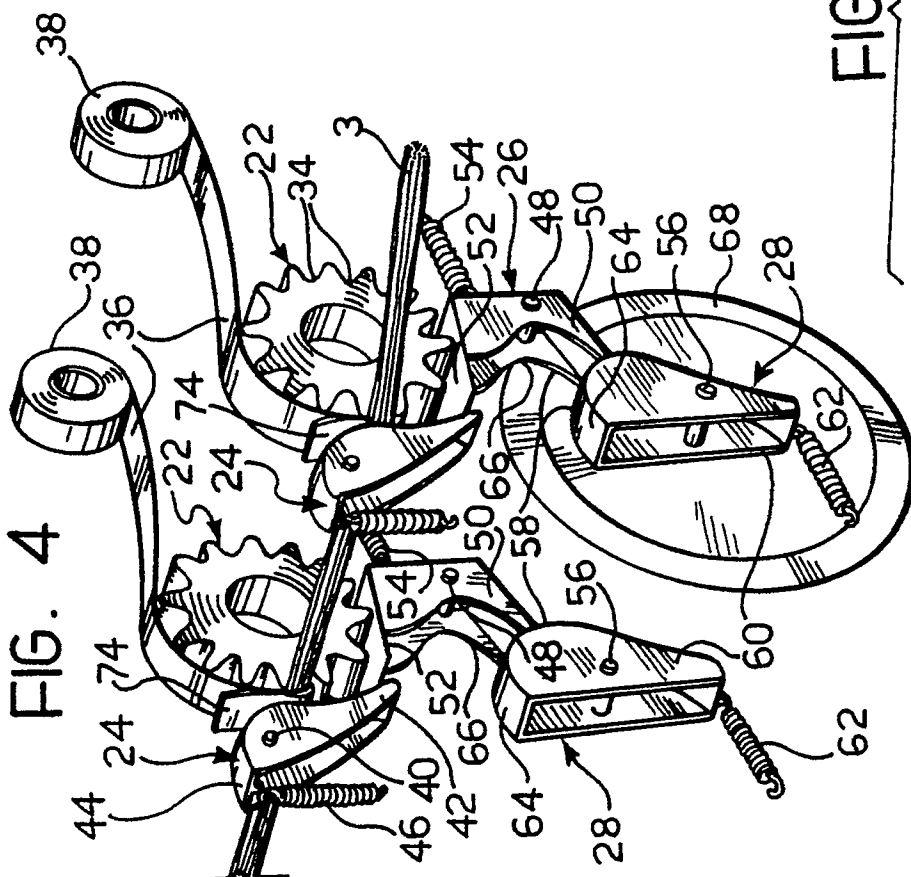
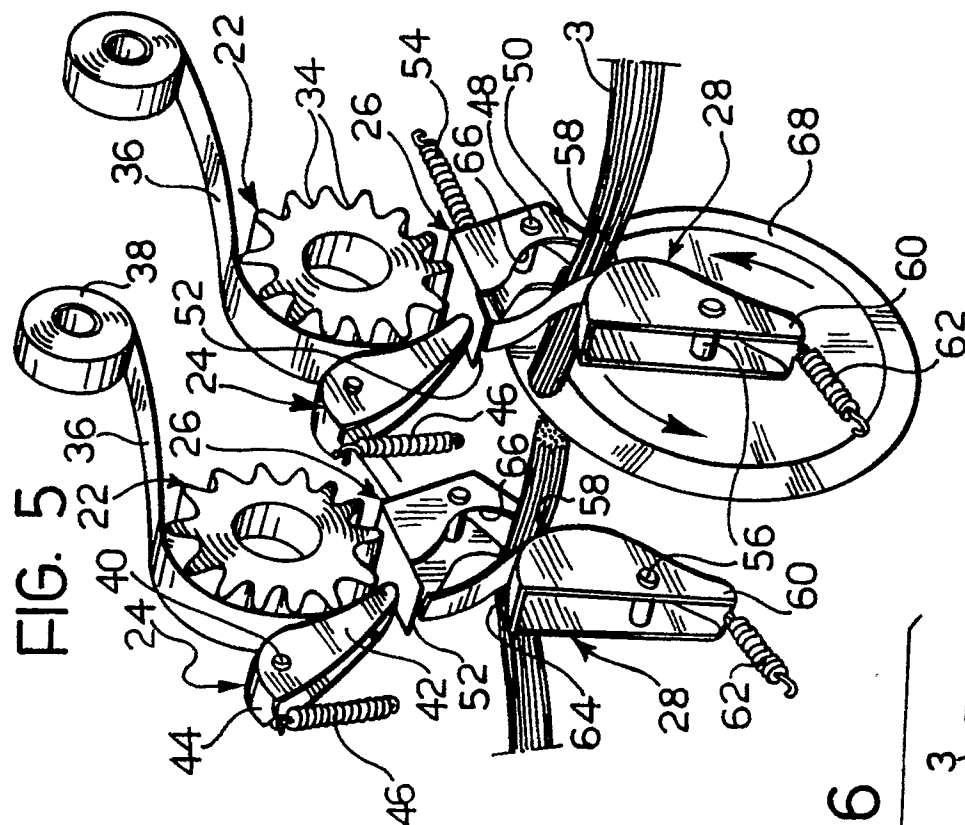
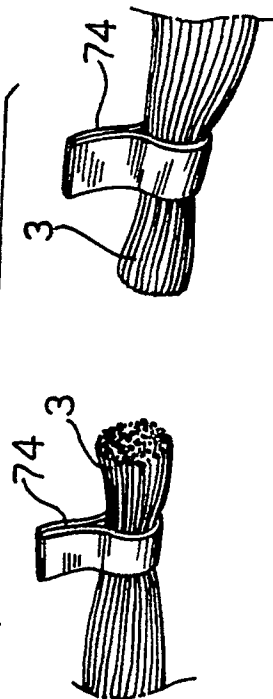


**FIG. 6**





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## EUROPEAN SEARCH REPORT

Application Number

**EP 91 10 7281**

| DOCUMENTS CONSIDERED TO BE RELEVANT                                             |                                                                                                         |                                                                        |                                               |
|---------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------|-----------------------------------------------|
| Category                                                                        | Citation of document with indication, where appropriate, of relevant passages                           | Relevant to claim                                                      | CLASSIFICATION OF THE APPLICATION (Int. Cl.5) |
| D,Y                                                                             | WO-A-8 501 266 (INT. PROJECT AGENCY)<br>* page 4, line 35 - page 5, line 21; claims; figures *<br>- - - | 1                                                                      | B 65 B 27/10<br>B 65 B 51/06                  |
| Y                                                                               | EP-A-0 286 017 (DEVIS)<br>* column 4, line 39 - column 5, line 55; figures 10,16 *<br>- - -             | 1                                                                      |                                               |
| A                                                                               | CA-A-9 965 85 (W. BRODIE)<br>* page 10, line 1 - page 11, line 30; figures *<br>- - -                   | 1,2                                                                    |                                               |
| A                                                                               | EP-A-0 133 701 (YOSHIDA KOGYO)<br>* page 8, line 11 - page 10, line 16; figures *<br>- - - - -          | 1                                                                      |                                               |
|                                                                                 |                                                                                                         |                                                                        | TECHNICAL FIELDS<br>SEARCHED (Int. Cl.5)      |
|                                                                                 |                                                                                                         |                                                                        | B 65 B<br>A 01 G                              |
| The present search report has been drawn up for all claims                      |                                                                                                         |                                                                        |                                               |
| Place of search                                                                 |                                                                                                         | Date of completion of search                                           | Examiner                                      |
| The Hague                                                                       |                                                                                                         | 04 July 91                                                             | JAGUSIAK A.H.G.                               |
| <b>CATEGORY OF CITED DOCUMENTS</b>                                              |                                                                                                         |                                                                        |                                               |
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