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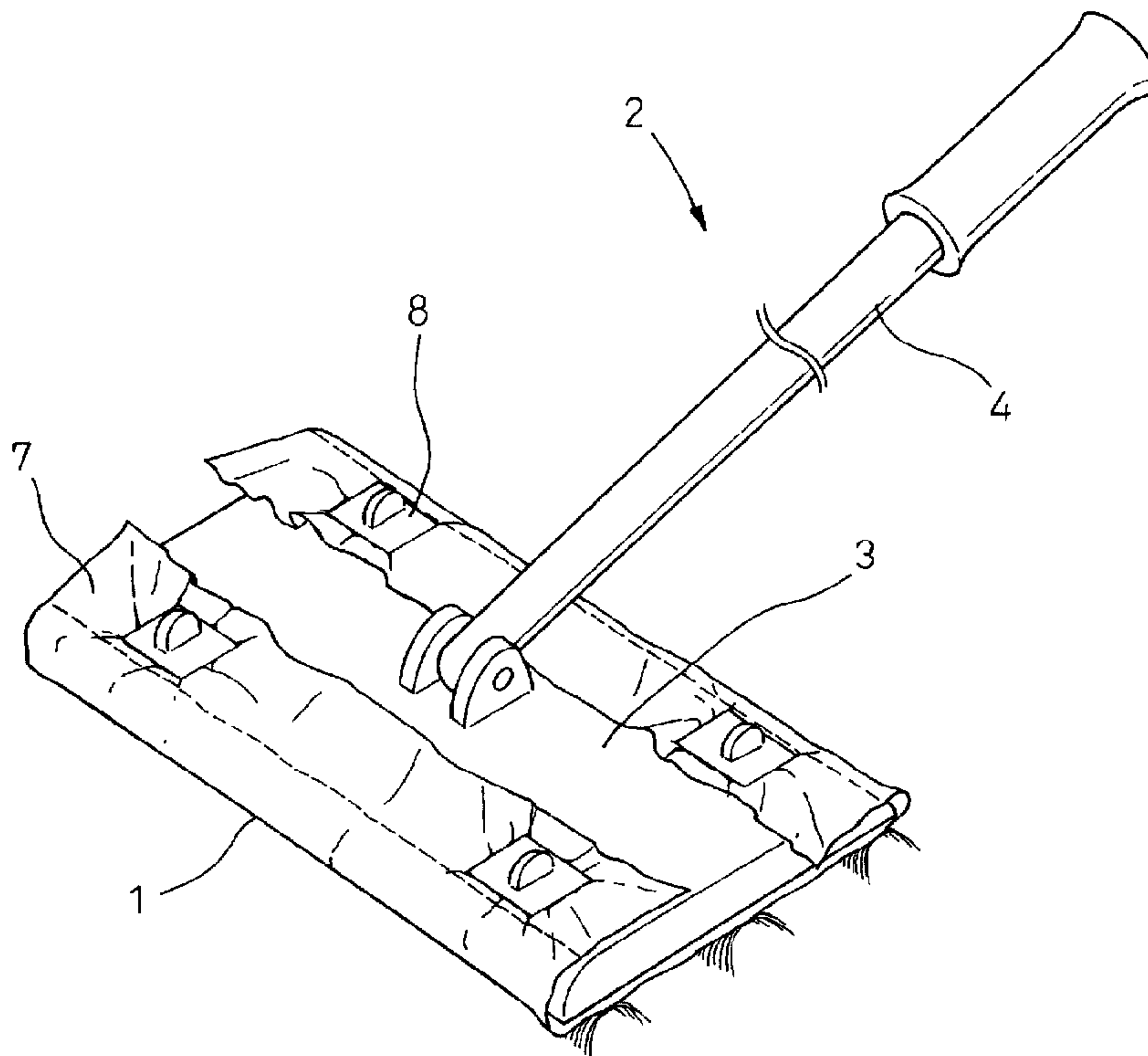
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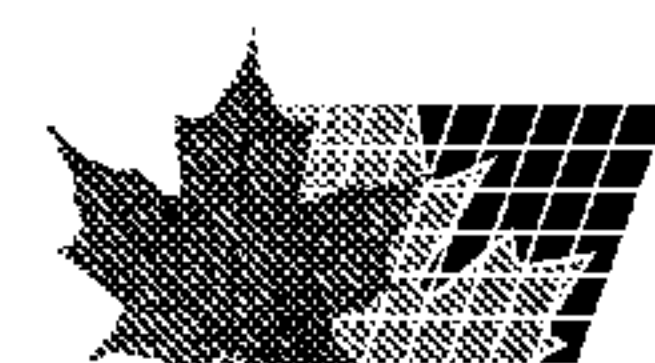
(54) Titre : METHODE DE FABRICATION DE DISPOSITIF DE BALAYAGE JETABLE

(54) Title: METHOD FOR MAKING DISPOSABLE SWEEPING DEVICE



(57) Abrégé/Abstract:

A method for making a disposable sweeping device having a plurality of brush pieces planted onto a base sheet. A continuous second web of heat-sealable filaments for forming the brush pieces is placed on a continuous first web base sheet of heat-sealable non-woven fabric or plastic film. The webs are then heat-sealed together along heat-seal lines extending transversely of the webs and intermittently arranged longitudinally of the webs to form a continuous composite third web. The second web is cut along a central line extending parallel to and between each pair of adjacent heat-seal lines, followed by cutting of the first web to obtain individual disposable sweeping devices.



Abstract of the Disclosure

A method for making a disposable sweeping device having a plurality of brush pieces planted onto a base sheet. A continuous second web of heat-sealable filaments for forming the brush pieces is placed on a continuous first web base sheet of heat-sealable non-woven fabric or plastic film. The webs are then heat-sealed together along heat-seal lines extending transversely of the webs and intermittently arranged longitudinally of the webs to form a continuous composite third web. The second web is cut along a central line extending parallel to and between each pair of adjacent heat-seal lines, followed by cutting of the first web to obtain individual disposable sweeping devices.

METHOD FOR MAKING DISPOSABLE SWEEPING DEVICEField of the Invention

This invention relates to a method for making a disposable sweeping device suitable for direct use as a floor cloth, or as an attachment to a separate device such as a mop stick in order to sweep dust and dirt from a floor or wall.

10 Background of the Invention

Prior art sweeping devices typically comprise a base sheet having a plurality of non-woven fabric or plastic film brush pieces suspended from one surface of the base sheet such that the free ends of the brush pieces may perform the desired sweeping or wiping function. The base sheet is conventionally detachably attached to a mop stick or holder in actual use.

Prior art sweeping devices are inconvenient, in that in order to increase the number of brush pieces (i.e. to increase the density at which the brush pieces are planted, per unit area of the base sheet) there must be a corresponding narrowing of the gaps between adjacent brush pieces. Such narrowing makes it more difficult to plant the brush pieces on the base sheet. This may in turn increase manufacturing costs which are preferably minimized in relation to disposable articles of this sort.

Accordingly, it is a principal object of this invention to provide a disposable sweeping device having brush pieces planted at relatively high density, without a corresponding increase in manufacturing costs.

Summary of the Invention

The foregoing object is achieved, according to the invention, by a method of making a disposable sweeping device comprising a base sheet and a plurality of brush pieces suspended from at least one surface of the base sheet, the method comprising the steps of:

- (a) continuously feeding a first web of heat-sealable material to form the base sheet;

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- (b) continuously feeding a second web of heat-sealable continuous filaments in a longitudinal direction thereof onto the first web;
- (c) heat-sealing the first and second webs together along transversely extending, longitudinally spaced heat-seal lines to yield a continuous composite third web integrally consisting of the first web and the second web;
- (d) cutting the second web transversely thereof along a central line extending parallel to and between each adjacent pair of heat-seal lines so that a length of the second web corresponding to half the distance between each pair of adjacent cutting lines defines the brush pieces; and
- (e) cutting the first web into a desired length to obtain the individual base sheets.

Brief Description of the Drawings

Fig. 1 is a perspective view showing a holder equipped with a sweeping device according to the invention;

Fig. 2 is a perspective view showing the sweeping device; and

Fig. 3 is a diagram illustrating a process of making the sweeping device.

Detailed Description of the Preferred Embodiment

Fig. 1 is a perspective view showing a holder 2 coupled to a disposable sweeping device 1. Holder 2 comprises a mounting plate 3 and a stick 4. A marginal region 7 of sweeping device 1 covering a lower surface of mounting plate 3 is folded back onto an upper surface of mounting plate 3 and fastened thereto by clips 8 provided on mounting plate 3. Holder 2 is used with stick 4 being held in the user's hands so that device 1 may be gently manipulated over a floor or wall.

As shown in Fig. 2, device 1 comprises a base sheet 10 formed of a film or non-woven fabric such as

thermoplastic synthetic resin; and, a plurality of brush pieces 11 suspended from one surface of base sheet 10. It will be understood that marginal region 7 is shown in its folded-back state in Fig. 1; and, in its unfolded state in Fig. 2. Each of brush pieces 11 comprises a desired length of thermoplastic synthetic resin continuous filament 15 having an anchoring portion 16 heat-sealed to base sheet 10, with the remaining portion suspended from base sheet 10 to form a pair of sweeping elements 17.

10 Fig. 3 is a diagram illustrating a process for making device 1. During this process, a continuous first web 310 of polypropylene having a width of 210mm and a basis weight of 30g/m² is continuously fed from left to right as viewed in the diagram. Simultaneously, a tow 312
15 comprising a bundle of 2,000 - 100,000 polyester continuous filaments 315 each of 2 - 30 deniers is continuously fed from left to right as viewed in the diagram.

The tow 312 is opened or fibrillated by a set of expanding rolls 311 to form a continuous second web having
20 a desired width and is thereafter placed upon the first web 310. The first web 310 and the second web 312 are transported to heat embossing machine 320 in which they are compressed together and integrally heat-sealed along transverse heat-seal lines 316 to form a continuous compos-
25 ite third web 321. Heat-seal lines 316 are spaced apart from one another by a distance d measured longitudinally along the third web, i.e., intermittently arranged longitudinally of third web 321.

After the heat-sealing operation, second web 312
30 is severed by first cutter 325 along a central line extending parallel to and between each pair of adjacent heat-seal lines 316. Then, first web 310 is cut by second cutter 326 into a desired length. In this manner, the individual sweeping devices 1 are obtained from the third web 321.

35 It can thus be seen that the individual base sheets 10 are obtained from first web 310, brush pieces 11 are obtained from second web 312, individual filaments 15

of brush pieces 11 are obtained from continuous filaments 315, and anchoring portions 16 are provided by heat-seal lines 316.

Preferably, each of heat-seal lines 316 has a width of 2 - 10mm and is spaced apart from the adjacent heat-seal lines by a distance d of 20 - 200mm. The brush pieces 11 or the second web or the tow 312 prior to formation of brush pieces 11 may be impregnated with a surfactant or other suitable agent at an appropriate stage of the process.

Operation of second cutter 326 may be adjusted so that the distance D between each pair of adjacent heat-seal lines 316 is dimensioned to be longer than the distance d , thus yielding a relatively large marginal region 7 to facilitate mounting of device 1 on holder 2. In such case, the section defined between the heat-seal lines which are spaced from each other by the distance D will necessarily have relatively long brush pieces 11, which should be cut to length in conformity with the remaining brush pieces 11. According to the process illustrated, the length of each filament 15 suspended from anchoring portion 16 will correspond to $1/2$ of the distance d . If desired, the length of the second web 312 fed onto the section of first web 310 defined between each pair of adjacent heat-seal lines 316 may be dimensioned to be longer than the distance d in order to yield filaments 15 which are longer than $1/2$ of the distance d .

The particular types of materials used to form base sheet 10 and brush pieces 11 are not critical, as long as they are mutually heat-sealable. However, it is generally preferable to use a thermoplastic synthetic resin to form these components. First web 310 and second web 312 may alternatively comprise a mixture of thermoplastic synthetic resin and a non-heat-sealable filament material such as rayon, although such non-heat-sealable filaments should comprise no more than about 20% by weight of the web material. Such non-heat-sealable filaments may be embedded

in the material heat-sealed along the respective heat-seal lines 316 and fixed thereto. A continuous plastic film may also be employed as the non-woven fabric used to form first web 310.

5 It can thus be seen that the invention allows the density of the brush pieces planted on the base sheet to be easily increased, simply by increasing the number of filaments constituting the tow or web, since the tow or web of heat-sealable filaments and the base sheet are heat-
10 sealed together followed by transversely cutting the tow or web to form the brush pieces of the sweeping device.

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WHAT IS CLAIMED IS:

1. A method for making a disposable sweeping device comprising a base sheet and a plurality of brush pieces suspended from at least one surface of the base sheet, the
5 method comprising the steps of:

- (a) continuously feeding a first web of heat-sealable material to form the base sheet;
- (b) opening a tow comprising heat-sealable continuous filaments to a desired width to form a second web
10 and continuously feeding the second web in a longitudinal direction thereof onto the first web;
- (c) heat-sealing the first and second webs along longitudinally spaced, transversely extending heat-seal lines to yield a continuous composite
15 third web integrating said first and second webs;
- (d) cutting the second web transversely thereof along a central line extending parallel to and between each pair of adjacent heat-seal lines so that a
20 length of the second web corresponding to about half of the length between each pair of adjacent cutting lines define the brush pieces; and
- (e) cutting the first web into a desired length to obtain the individual base sheets.

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2. The method according to claim 1, wherein the tow comprises a bundle of 2,000 - 100,000 continuous filaments each of 2 - 30 deniers.

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3. The method according to claim 1, wherein the first web comprises a non-woven fabric or plastic film.

4. The method according to claim 1, wherein each of the heat-seal lines has a width of 2 - 10mm and is spaced apart
35 from the adjacent heat-seal line by a distance of 20 - 200mm.

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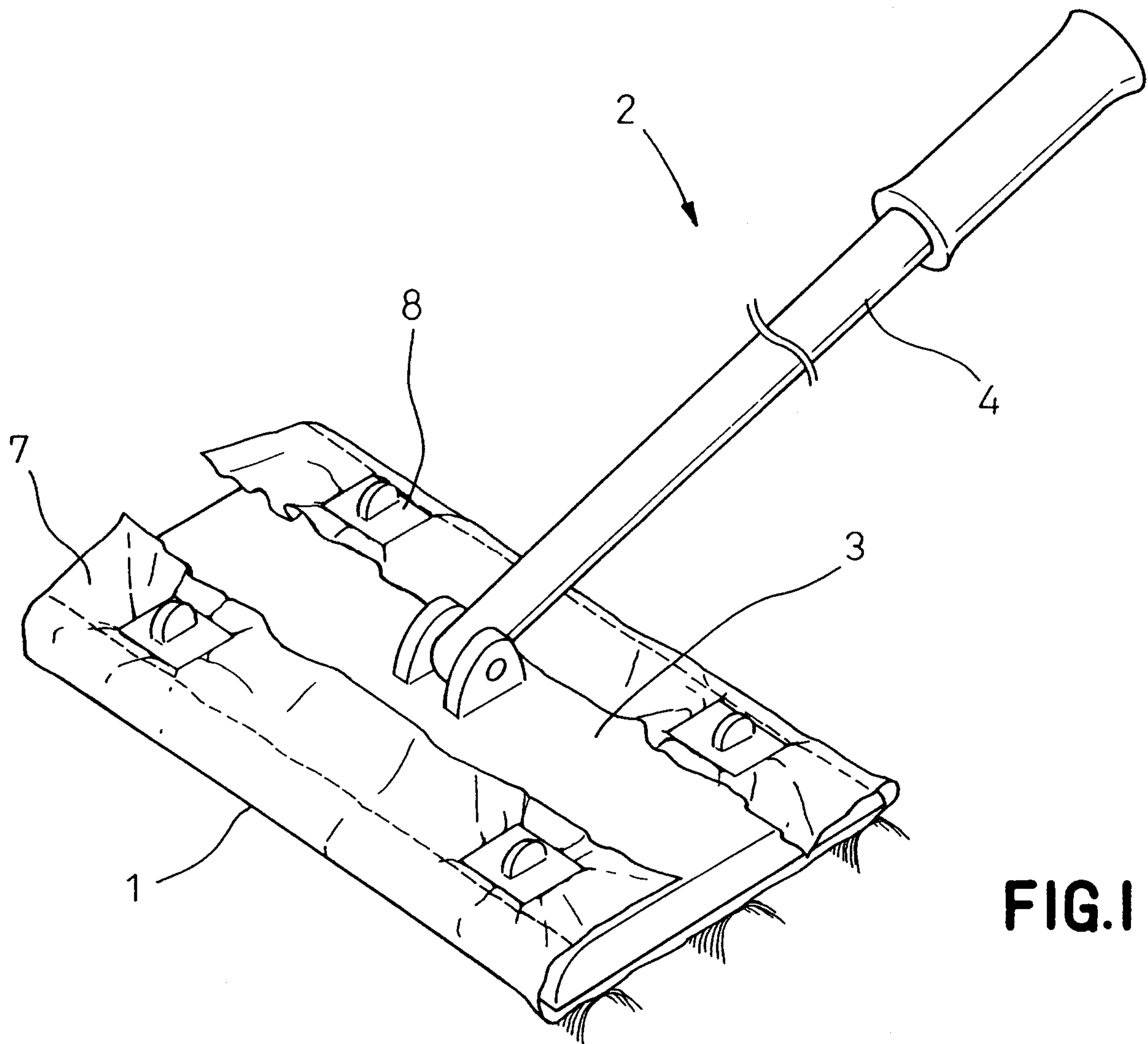


FIG.1

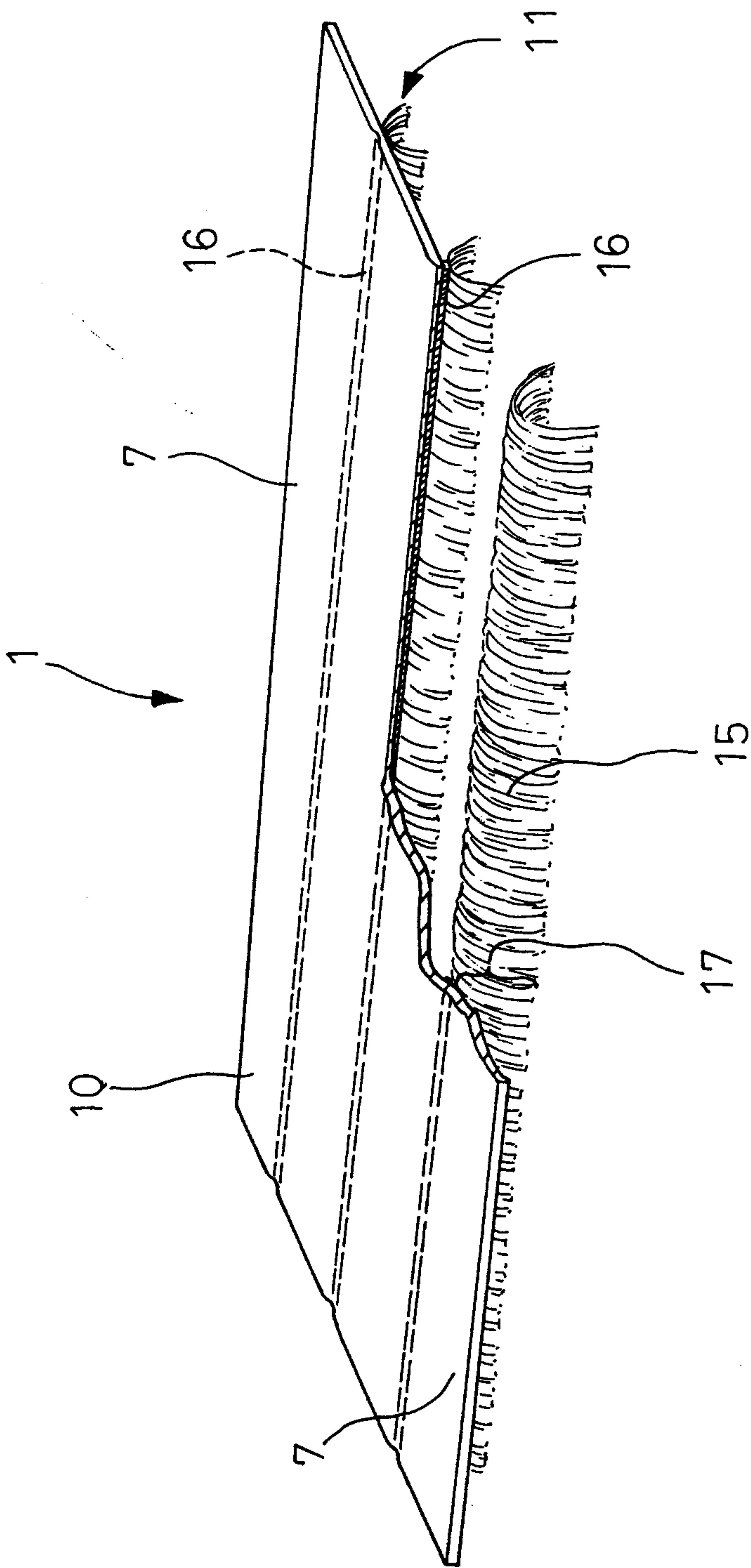


FIG.2

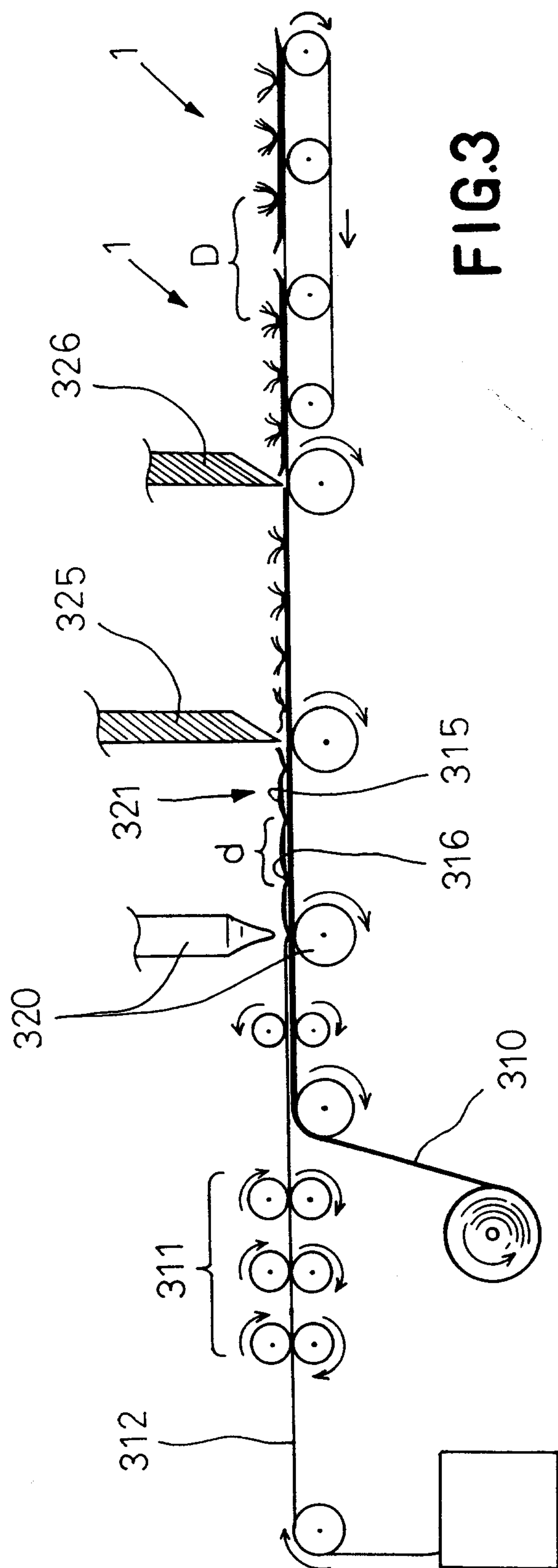


FIG. 3

