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D E C I S I O N
of 10 February 1998

Case Number: T 0066/96 - 3.2.3

Application Number: 88121762.4

Publication Number: 0324170

IPC: B05C 5/04, B05C 5/02

Language of the proceedings: EN

Title of invention:
Spray head attachment for metering gear head

Patentee:
Nordson Corporation

Opponent:
ITW Dynatec GmbH Klebetechnik

Headword:
-

Relevant legal provisions:
EPC Art. 56

Keyword:
"Inventive step - non-obvious combination of known features"

Decisions cited:
-

Catchword:
-

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Case Number: T 0066/96 - 3.2.3

D E C I S I O N
of the Technical Board of Appeal 3.2.3
of 10 February 1998

Appellant: (Opponent)
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Decision under appeal: Interlocutory decision of the Opposition Division of the European Patent Office dated 11 October 1995, posted on 23 November 1995, concerning maintenance of European patent No. 0 324 170 in amended form.

Composition of the Board:

Chairman: C. T. Wilson
Members: F. Brösamle
M. Aúz Castro

Summary of Facts and Submissions

I. With its decision of 11 October 1995, posted on 23 November 1995 the opposition division upheld European patent No. 0 324 170 in amended form.

II. In the light of

(D1) EP-A-0 237 746,

(D3) EP-A-0 225 624 and

(D4) US-A-3 911 173

the opposition division came to the result that the subject-matter of the amended claims was novel and based on an inventive step.

III. With telefax of 19 January 1996 the opponent - appellant in the following - filed an appeal against the above decision paying the appeal fee on 22 January 1996 and filing the statement of grounds of appeal on 25 March 1996 (Telefax).

IV. The appellant requested to set aside the impugned decision and to revoke the patent.

V. Following the board's communication pursuant to Article 11(2) RPBA of 12 May 1997 the proprietor - respondent in the following - filed new claims 1, 2 and 9 on 13 January 1998 and requested that the appeal be dismissed with the proviso that the patent be maintained on the basis of these claims 1, 2 and 9 and on claims 3 to 6 and 10 as granted and claims 7 and 8 filed on 11 October 1995.

VI. Above claims 1, 2 and 9 read as follows:

"1. Apparatus for spraying hot melt adhesive onto the backing sheet (16) of a hygienic article, comprising:
a flow metering device (12) formed with adhesive outlets, said flow metering device having means (28a-d) for pumping a metered quantity of hot melt adhesive through each of said adhesive outlets; and
a manifold (38) for receiving hot melt adhesive from said flow metering device (12), said manifold comprising means (40) for discharging the hot melt adhesive in a plurality of separate adhesive beads (104);
characterised in that
said manifold (38) is mounted to said flow metering device (12) so as to receive the hot melt adhesive from each of said adhesive outlets thereof, and further includes passageways (52) for supplying pressurized air for impacting said adhesive beads (104) with jets of pressurized air directed substantially tangent to the outer periphery of said adhesive beads (104) to form elongated adhesive fibers and to impart a twisting motion to said elongated adhesive fibers for deposition in a spiral spray pattern onto the backing sheet (16) of a hygienic article, said passageways (52) being adapted to connect to an external source of pressurized air."

"2. A spray head attachment (14) adapted for use with a flow metering device (12) for spraying hot melt adhesive onto the backing sheet (16) of a hygienic article, comprising:
a manifold (38) formed with adhesive connector passageways (40) adapted to connect to the flow metering device (12);

characterised in that
said manifold (38) is mounted to the flow metering device (12) and adapted to connect to adhesive discharge outlets formed in therein;
said manifold (38) is further formed with air connector passageways (52) adapted to connect to a source of pressurized air and recirculation passageways (62), each of said adhesive connector passageways (40) and said air connector passageways (52) having an outlet (43, 54) formed on a discharge surface (45) of said manifold (38) and each of said recirculation passageways (62) having an inlet (64) formed on said discharge surface (45) of said manifold (38), said outlets (43, 54) and inlets (64) being arranged in arrays wherein an outlet (43) of one adhesive connector passageway (40), an outlet (54) of one air connector passageway (52) and an inlet (64) of one recirculation passageway (62) are located proximate one another;
a nozzle (66) is mounted to said discharge surface (45) of said manifold (38) over one of said arrays of an adhesive connector passageway outlet (43), an air connector passageway outlet (54) and a recirculation passageway inlet (64), said nozzle (66) being formed with an adhesive discharge passageway (76) connected to said outlet (43) of said adhesive connector passageway (40) and an air discharge passageway (84) connected to said outlet (54) of said air connector passageway (52); and
a nozzle attachment (74) is mounted to said nozzle (66), said nozzle attachment being formed with a throughbore (96) connected to said adhesive discharge passageway (76) of said nozzle (66) for ejecting a bead (104) of adhesive, said nozzle attachment being formed with air jet bores (100) connected to said air discharge passageway (84) of said nozzle (66) for directing pressurized air substantially tangent to the

outer periphery of said bead (104) of adhesive to form elongated adhesive fibers and to impart a twisting motion to said elongated adhesive fibers for deposition in a spiral spray pattern on the backing sheet (16) of a hygienic article."

"9. The method of discharging hot melt adhesive onto the backing sheet of a hygienic article, comprising the step of:
pumping a metered quantity of hot melt adhesive from a flow metering device to each of a number of adhesive outlets formed on the discharge surface of a manifold;
characterized by the further steps of:
transmitting pressurized air to air outlets formed on said discharge surface of said manifold;
discharging hot melt adhesive from one of said adhesive outlets into a nozzle mounted to said discharge surface of said manifold, and discharging pressurized air from one of said air outlets into said nozzle;
ejecting a bead of adhesive from said first nozzle and impacting said bead of adhesive with jets of air from said nozzle directed tangentially relative to said bead of adhesive to form elongated adhesive fibers and to impart a twisting motion to said elongated fibers for deposition in a spiral spray pattern onto the backing sheet of a hygienic article;
discharging hot melt adhesive from one other of said adhesive outlets into at least one second nozzle mounted to said discharge surface of said manifold, and blocking the flow of pressurized air from one other of said air outlets of said manifold through said second nozzle; and
ejecting a thin bead of adhesive from said second nozzle onto the backing sheet of a hygienic article."

VII. The arguments of the parties in support of their above requests essentially can be summarized as follows:

(a) appellant:

- the subject-matter of claim 1 is not based on an inventive step with respect to the combination of (D1), (D3) and (D4) and also with respect to the prior art dealt with in column 3, lines 6 ff of EP-B1-0 324 170;

- with respect to (D1) the skilled person is aware of the fact that the adhesive beads cause problems when thinner and thinner backing sheets are used in hygienic articles since the specific heat of the adhesive beads can burn through the backing sheet or at least distort the material and produce an unacceptable product;

- from (D3) and (D4) a skilled person is aware that applying either a stream of adhesive particles or applying adhesive beads in spiral form can solve the above problems with respect to the backing sheet; (D3) and (D4) both make use of additional air streams for influencing the adhesive ejected from the nozzle of the apparatus for spraying hot melt adhesive on an article;

- the combination of (D1) with (D3) or (D4) already solves the basic problem of the specific heat of the adhesive applied to the article to be coated and the provision of a manifold for overcoming the problem of too many individual conduits for adhesive and pressurized air is seen as an obvious step for a skilled person since manifolds are frequently used in hydraulics systems;

- to provide spiral beads of adhesive is moreover admitted to be known in EP-B1-0 324 170 itself, see column 3, lines 6 ff, so that the features of claim 1 relating to the provision of pumps, manifolds are nothing else than constructional measurements readily available to a skilled person;

- claims 2 and 9 are also not based on an inventive step since they are closely related to the teaching of claim 1 and since their additional features such as a manifold and its specific passageways for pumped/recirculated adhesive and pressurized air and the provision of a pattern of nozzles for achieving any wished configuration of adhesive beads respectively are also obvious for a person skilled in the art;

- summarizing, the impugned decision should be set aside and the patent be revoked.

(b) respondent:

- it is accepted that the problems encountered with adhesive beads in combination with a backing sheet of a hygienic article are known to a skilled person;

- the solution to the objectively remaining problem to be solved by the claimed invention is nevertheless seen as an invention within the meaning of Articles 56 and 100(a) EPC since (D3) and (D4) fail to provide an obvious contribution to the problem to be solved, namely, firstly to avoid damage to the backing sheet when adhesive is

applied thereto and secondly to create a spray head apparatus which can be retrofitted on commercial production lines, see EP-B1-0 324 170, column 3, last paragraph;

- (D3) does not disclose the application of beads but clearly is based on a "curtain" of adhesive particles which are moreover not existent on the article to be coated in a spiral form but in an elliptic spray pattern; in (D3) it is clearly set out that in contrast to claim 1 a continuous stream of adhesive should be avoided;

- (D4) is restricted to one filament only so that a skilled person would not turn to this document from a distant technical field - production of shoes - where thin backing sheets are unknown and where heat - see preheating the article to be coated - does not play a crucial role; even if considered, however, (D4) is silent about the possibility of compacting a great number of nozzles in one spray head thereby using a manifold even for the pressurized air; the second aspect of the problem to be solved by the invention, namely the possibility of retrofitting commercial spray heads, is not to be derived from (D4);

- even if (D1), (D3) and (D4) were seen in combination a skilled person could not arrive at the spray head defined in claim 1 since different technological backgrounds would have to be combined and since the multiplication of the number of nozzles for adhesive and pressurized air would have to be solved by the skilled person for the first time without an existing model in the prior art;

- claims 2 and 9 contain further features not to be directly derivable from the prior art so that these claims are also allowable.

Reasons for the Decision

1. The appeal is admissible.

2. *Amendments*

2.1 While the two-part form of claims 1, 2 and 9 has been changed with respect to the claims underlying the impugned decision to more correctly reflect the prior art disclosed in (D1) the remaining claims, the description and the drawings have been kept in the form underlying the impugned decision. Additionally, reference signs have been inserted into claims 1 and 2.

2.2 Due to the nature of the above amendments claims 1, 2 and 9 are not amended in a form violating the provisions of Articles 123(2) and (3) EPC so that they are formally allowable.

3. *Novelty*

The issue of novelty was not challenged by the opponent/appellant or the board so that this issue was not discussed in the oral proceedings before the board and needs therefore no further arguments in the decision.

4. *Inventive step*

4.1 Claim 1

The crucial issue to be decided in the present case is inventive step in the light of (D1), (D3) and (D4).

4.2 Nearest prior art is (D1) in which document parallel rows of adhesive beads are disclosed which can cause problems in respect of their specific heat, when applied to the backing sheet, the rows of adhesive beads can burn through the backing sheet or at least cause its distortion and an unacceptable appearance thereof. It was not disputed by the respondent that this problem is known in the art.

4.3 Starting from (D1) the objectively remaining technical problem to be solved by the invention has therefore to be seen in avoiding damage to the backing sheet of the article to be coated with adhesive and in the possibility of retrofitting commercially available spray heads in production lines for hygienic articles, (see also EP-B1-0 324 170, column 3 last paragraph, from which the above technical problem to be solved inter alia can be seen).

4.4 The solution of the above problem according to claim 1 essentially is characterized by the provision of a manifold receiving pressurized adhesive and air in specific passageways, whereby the jets of pressurized air are directed substantially tangent to the outer periphery of adhesive beads escaping from the spray nozzles to form elongated fibers and imparting a twisting motion to the elongated fibers for deposition in a spiral spray pattern onto the backing sheet of a hygienic article.

4.5 What would be obvious for a skilled person confronted with the solution of the above problems is the provision of smaller adhesive beads to reduce the heat impact of the adhesive on the backing sheet.

It is obvious, however, that for reasons of maintaining the application of a specific amount of adhesive to the backing sheet in this case the **number** of adhesive beads has to be increased, so that a spray head with more nozzles per head would result from this idea. Seeing, however, the existing problems in compacting the nozzle arrangements in a spray head, the provision of still further nozzles could not be easily technically solved by the skilled person, so that the approach of compensating for the smaller adhesive beads by increasing their number per spray head cannot be considered to lead to a convincing result.

4.6 What could also be envisaged by a skilled person is the provision of curved or sinusoidal beads for reducing the heat impact on the backing sheet but this possibility is not claimed in claim 1 and therefore irrelevant when assessing inventive step of its subject-matter.

4.7 A further solution of the above problem is realized in (D3) which document discloses a **curtain** of adhesive particles sprayed in **elliptic** patterns on the article to be coated, (see Figures 8 and 9 in particular). It is clear that the elliptic spray pattern cannot be compared to the spiral spray pattern of claim 1 and that a curtain of **individual** adhesive particles cannot be seen as an elongated adhesive bead as in claim 1. The situation in (D3) is therefore not to be compared to the apparatus for spraying according to claim 1 even if in (D3) additional air jets are used for influencing the adhesive escaping from the nozzle of the spray head.

4.8 From the foregoing observations it is clear that a skilled person is not directed to the apparatus according to claim 1 since either the structural members such as a manifold are not taught in the prior art or the technology for spraying is not as claimed - see for instance (D3) and its "curtain" and its adhesive application over a complete area of the article to be coated - or the solutions which would result from the endeavour of a skilled person confronted with the problem underlying the present invention are not as claimed in claim 1 and do not produce the results of the claimed features.

4.9 From a distant technical field, namely production of shoes where heat impact obviously can be tolerated when adhesive beads have to be applied, (D4) is known to a skilled person.

4.10 It is doubtful whether a skilled person would at all consider (D4) more closely under the above circumstances, namely heat resistant materials and a **single** nozzle arrangement in (D4) and heat sensitive materials in claim 1, i.e. a thin foil.

4.11 However, even if the skilled person were to take (D4) into consideration it would not render obvious the spray head of claim 1 for the following reasons:

4.12 (D4) obviously is prima facie not suitable for a high number of nozzles per spray head since the **external** conduits "52, 52" for pressurized air do not allow a **compact** arrangement of nozzles needed in a production line for hygienic articles.

4.13 (D4) is silent about miniaturization of a spray head comprising for instance 32 nozzles so that a skilled reader of (D4) is in a situation where he is taught to use an arrangement producing adhesive beads in spiral form but is completely without any model of how a spray head has to be carried out with a high number of nozzles.

4.14 **In the knowledge of the claimed invention**, it might appear at first to be a one-way-situation to provide for a **manifold** as the means to concentrate all passageways of adhesive and air in one block only and to enable nearly all external conduits to be superfluous. **Not knowing**, however, the claimed invention the provision of a manifold for adhesive and air is an essential step for achieving the apparatus according to claim 1 even if a skilled person may be aware of the existence of manifolds per se, i.e. in hydraulics, since in the claimed manifold "38" **two different media** are handled.

4.15 What has to be considered when a **single** nozzle apparatus according to (D4) is **to be combined** with a multi-nozzle apparatus according to (D1) with respect to the provision of tangent air jets and imparting a twisting motion to the adhesive streams is not derivable from (D1) or (D4) so that a skilled person had to decide how such an arrangement has to be carried out to be able to be assembled or retrofitted in an existing production line.

4.16 It is not clear whether or not the adhesive fibers in (D4) are indeed stretched or attenuated in the nozzle since in (D4) it is not at all problematic to only apply a **small amount** of adhesive to the article to be coated.

4.17 In the absence from the citation of any restrictions in the application of heat to the article to be coated the board is of the opinion that (D4) is only relevant **when knowing** the claimed configuration according to claim 1.

4.18 Summarizing, the board is convinced that starting from (D1) inventive endeavour was necessary to achieve the apparatus of claim 1 even if a skilled person might have been familiar with the facts that the backing sheet is heat-sensitive and that the heat impact of the adhesive has to be kept at a minimum although a specific amount of adhesive on the article to be coated is a must.

4.19 Claim 1 defines therefore non-obvious subject-matter in the meaning of Articles 56 and 100(a) and is to be allowed.

4.20 Appellant's second line of argumentation to arrive at the subject-matter of claim 1 is not more convincing than appellant's first way with respect to inventive step:

The argumentation that a skilled person starting from the prior art according to EP-B1-0 324 170, column 3, lines 6 ff, to arrive at the claimed apparatus for spraying is based on pure speculation. No evidence has been brought forward by the appellant in this respect. **Knowing the invention**, i.e. ex post facto analysis, is not the right approach for the assessment of inventive step so that appellant's findings that the specific arrangements of pumps, manifolds etc. are only constructional measurements readily available to a skilled person confronted with the above problem to be solved is not to be followed.

4.21 Claims 2 and 9

These claims are closely related to claim 1 since both claims are based on the essential features thereof, namely the provision of a manifold for pressurized adhesive and air and to jets of air substantially tangent to the outer periphery of the adhesive beads and imparting a twisting motion to them.

4.22 Claim 2 contains as further features the passageways for adhesive and air in a manifold and claim 9 includes over and above claim 1, different nozzle-types to achieve any wished spray pattern on the backing sheet of a hygienic article.

4.23 Claims 2 and 9 are therefore further distinguished from the prior art to be considered and likewise based on an inventive step within the meaning of Articles 56 and 100(a) EPC so that they are also valid.

5. In combination with claims 1, 2 and 9, dependent claims 3 to 8 and 10, which are directed to preferred embodiments of the present invention, are also valid.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the first instance with the order to maintain the patent as amended on the basis of the following documents:

   - claims 1, 2 and 9, filed on 13 January 1998,

   - claims 3 to 6 and 10 as granted,

   - claims 7 and 8, filed on 11 October 1995,

   - the description and drawing according to the patent specification.

The Registrar: The Chairman:

N. Maslin C. T. Wilson