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D E C I S I O N
of 15 September 1995

Case Number: T 0133/93 - 3.2.5

Application Number: 87108995.9

Publication Number: 0255596

IPC: B29C 43/48

Language of the proceedings: EN

Title of invention:
Continuous press machine

Patentee:
MITSUBISHI RAYON ENGINEERING CO., LTD.

Opponent:
Hymmen GmbH Maschinen- und Anlagenbau

Headword:
-

Relevant legal provisions:
EPC Art. 56

Keyword:
Inventive step - no

Decisions cited:
-

Catchword:
-



Case Number: T 0133/93 - 3.2.5

DECISION
of the Technical Board of Appeal 3.2.5
of 15 September 1995

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Decision under appeal: Decision of the Opposition Division of the
European Patent Office announced orally on
1 October 1992 and posted on 8 December 1992
revoking European patent No. 0 255 596 pursuant to
Article 102(1) EPC.

Composition of the Board:

Chairman: C. V. Payraudeau
Members: W. D. Weiß
A. Burkhart

Summary of Facts and Submissions

- I. An opposition was filed against the grant of the European patent No. 0 255 596 on the grounds that the subject-matter of the European patent was not patentable within the terms of Articles 52 to 57 EPC (Article 100(a) EPC).
- II. The patent was revoked pursuant to Article 102(1) EPC. In its decision the Opposition Division held that the grounds for opposition mentioned in Article 100 EPC prejudiced the maintenance of the patent. In particular, the Opposition Division decided that the claims according to the main and second auxiliary request, respectively, did not involve an inventive step having regard to document EP-A-0 166 886 (E1), and that the claims according to the first auxiliary request contained subject-matter which extended beyond the content of the application as filed (Article 100(c) EPC).
- III. The appellant (proprietor of the patent) lodged an appeal against this decision of the Opposition Division and requested that the decision under appeal be set aside and that the patent be maintained on the basis of the main request as submitted during the opposition proceedings. Oral proceedings were requested on an auxiliary basis.
- IV. In a communication pursuant to Article 110(2) EPC accompanying the summons to oral proceedings the board expressed the provisional opinion that the claims according to the present (sole) request appeared to violate the provisions of Article 123(2) EPC.

- V. On 3 August 1995 the appellant filed two sets of new claims, denoted main request and auxiliary request, respectively.
- VI. Oral proceedings were held on 15 September 1995.
- (i) The appellant requested as a main request that the decision under appeal be set aside and that the patent be maintained on the basis of the description and the drawings as granted, and the set of claims denoted main request filed on 3 August 1995, and requested as an auxiliary request that the decision under appeal be set aside and the patent be maintained on the basis of the amended documents filed during the oral proceedings.
 - (ii) The respondent (opponent) requested that the appeal be dismissed.
- VII. Claim 1 according to the main request filed on 3 August 1995 reads as follows:
- "1. A continuous press machine including:
- (a) a pair of opposed endless belts (12) each operable to move along a looped path, said pair of opposed endless belts (12) having respective inner sides disposed in parallel opposed relation to each other, said inner sides of said endless belts (12) being adapted to hold a sheet-like material (16) therebetween so as to compress and advance the sheet-like material (16) when said pair of opposed endless belts (12) move,

(b) pressure applying means for urging each of said pair of opposed endless belts (12) toward the sheet-like material (16), each of said pressure applying means including:

(i) a stationary housing (18) mounted within said looped path of the corresponding one of said pair of opposed endless belts (12), said stationary housing (18) defining a pressure chamber (28) and having a peripheral edge (32, 32a) facing a back side surface of the inner side of the corresponding one of said pair of opposed endless belts (12), said peripheral edge (32, 32a) defining an opening of said pressure chamber (28) disposed in opposite relation to the back side surface of the inner side of the corresponding one of said pair of endless belts (12), said peripheral edge including transverse portions (36; 36d) disposed transversely to a path of travel of the sheet-like material (16), and

(ii) means for supplying a pressurized urging fluid (F1) to said pressure chamber (28), so that the pressure in said pressure chamber (28) is applied to the back side surface of the inner side of the corresponding one of said pair of endless belts (12) so as to urge the inner side of the corresponding one of said pair of endless belts (12) against the sheet-like material (16), and

(c) seal means for sealing a gap (G) between said peripheral edge of each one of said stationary housings (18) and the back side surface of the inner side of the corresponding one of said pair of opposed endless belts (12) so as to prevent the pressurized urging fluid (F1) in the corresponding one of said pressure chambers (28) from flowing

through said gap (G), said seal means being provided completely along said peripheral edge (32; 32a) of each one of said stationary housings (18), said continuous press machine characterized in that

said peripheral edge (32a) of each one of said stationary housings is spaced slightly from the back side surface of the inner side of the corresponding one of said pair of opposed endless belts (12) by a gap of 0.1 μm to 0.3 mm, and

that said seal means comprises fluid seal means for continuously applying a pressurized sealing fluid (F2) from said peripheral edge (32; 32a) toward the back side surface of the inner side of the corresponding one of said pair of opposed endless belts (12)

so as to provide a fluid seal and fluid friction at least between said transverse portions (36; 36d) of said peripheral edge (32; 32a) and the back side surface of the inner side of the corresponding one of said pair of opposed endless belts (12)."

Claim 1 according to the auxiliary request reads as follows:

"1. A continuous press machine including:

- (a) a pair of opposed endless belts (12) each operable to move along a looped path and having respective inner sides disposed in parallel opposed relation to each other, said inner sides being adapted to hold a sheet-like material (16) therebetween so as to compress and advance the sheet-like material (16) when said pair of opposed endless belts (12) move,

(b) pressure applying means for urging each of said pair of opposed endless belts (12) toward the sheet-like material (16), each of said pressure applying means including:

(i) a stationary housing (18) mounted within said looped path of the corresponding one of said pair of opposed endless belts (12), said stationary housing (18) defining a pressure chamber (28) and having a peripheral edge (32a) facing a back side surface of the inner side of the corresponding one of said pair of opposed endless belts (12), said peripheral edge (32a) defining an opening of said pressure chamber (28) facing the back side surface of the inner side of the corresponding one of said pair of endless belts (12), said peripheral edge including transverse portions disposed transversely to a path of travel of the sheet-like material (16), and

(ii) means for supplying a pressurized urging fluid (F1) to said pressure chamber (28), so that the pressure in said pressure chamber (28) is applied to the back side surface of the inner side of the corresponding one of said pair of endless belts (12) so as to urge the inner side of the corresponding one of said pair of endless belts (12) against the sheet-like material (16), and

(c) seal means for sealing a gap (G) between said peripheral edge of each one of said stationary housings (18) and the back side surface of the inner side of the corresponding one of said pair of opposed endless belts (12) so as to prevent the pressurized urging fluid (F1) in the corresponding one of said pressure chambers (28) from flowing

through said gap (G), said seal means being provided completely along said peripheral edge (32a) of each one of said stationary housings (18), said seal means comprising fluid seal means for continuously applying a pressurized sealing fluid (F2) from said peripheral edge (32a) towards the back side surface of the inner side of the corresponding one of said pair of opposed endless belts (12), wherein

- (d) said peripheral edge (32a) of each housing (18) has one or more grooves (36a) formed at least at said transverse portions thereof, said one or more grooves (36a) opening toward the back side surface of the inner side of the corresponding one of said pair of opposed endless belts (12);
- (e) said peripheral edge (32a) of each housing (18) further includes elongated floating members (46) received in said one or more grooves for sliding movement toward and away from the back side surface of the inner side of the corresponding one of said pair of opposed endless belts (12),
- (f) a pressurized fluid (F3) as an urging means (62) is provided within a space (56) defined by said one or more grooves (36a) and said floating members (46) so as to urge said floating members toward the back side surface of the inner side of the corresponding one of said pair of opposed endless belts (12);
- (g) each one of said floating members (46) has a passageway (50) to which the pressurized sealing fluid (F2) is supplied; and

- (h) each of said passageways (50) has an outlet opening (54) facing the back side surface of the inner side of the corresponding one of said pair of opposed endless belts (12) so as to discharge the pressurized sealing fluid (F2) from the corresponding one of said outlet (54) openings toward the back side surface of the inner side of the corresponding one of said pair of opposed endless belts (12), so that the corresponding one of said floating members (46) is slidably moved in said one or more grooves away from said back side surface against the bias of said pressurized fluid, characterized in that

- (i) said peripheral edge (32a) of each one of said stationary housings is spaced slightly from the back side surface of the inner side of the corresponding one of said pair of opposed endless belts (12) by a gap of 0.1 μ m to 0.3 mm so as to provide a fluid seal and a fluid friction in the gap (G) at least between said floating member (46) of said peripheral edge (32; 32a) and the back side surface of the inner side of the corresponding one of said pair of opposed endless belts (12); and

- (k) first and second holes (40, 42) are formed through an outer wall (44) of the peripheral edge (32a) so as to lead into the interior of the groove (36a); and (1) said second hole (42) communicates with an aperture (52) formed in the floating member (46) and extending between one side face thereof and the passageway (50)."

VIII. In support of his requests the appellant submitted essentially the following arguments:

The object of the present invention was to provide a continuous press machine having an improved seal means as compared to prior art presses such as known from e.g. document E1. In the press according to the invention, the friction between the endless belt and the peripheral flange of the housing (or the transverse edge of the floating member), which were separated by a gap denoted (G), was fluid friction. There was no contact between the seal members and the belt. In contrast thereto, the seal members in document E1 were held in sliding contact with the belt, notwithstanding the fact that the contact area was lubricated. The width of the gap was specified to be in the range of 0.1 μm to 0.3 mm so as to adjust the fluid friction between the belt and the flange of the housing, whereas document E1 was silent about the width of the gap between the seal members and the belt. The subject-matter of claim 1 according to the main request was therefore not obvious in view of the prior art represented by the document E1. In any case, the subject-matter of the claims according to the auxiliary request was limited to the specific embodiment as shown in Figure 3, and was not suggested by document E1.

IX. The above submissions were contested by the respondent who argued essentially as follows:

In the press according to document E1 a film of lubrication fluid was established between the sealing strips and the belt, which thickness was exactly adjustable in order to decrease the friction. The friction between the sealing strips and the belt was therefore reduced to a level of fluid friction, just as in the patent in suit. Since the thickness of such a fluid film was generally in the range of 0.1 μm to 0.3

mm, the subject-matter of claim 1 according to the main request would not be new. The press according to claim 1 of the auxiliary request was also substantially known from the embodiments according to Figures 9 and 10 of document E1.

Reasons for the Decision

1. Admissibility of the new claims with respect to Article 123(2) and (3) EPC.

1.1 Claim 1 according to the main request differs from claim 1 as granted in that the phrase "so as to provide a fluid seal .." in the characterizing part of the claim is replaced by the phrase "so as to provide a fluid seal and fluid friction ..". The dependent claims 2 to 13 of the main request are identical to the corresponding claims of the patent as granted.

The additional feature "so as to provide a fluid friction" is disclosed on page 9, lines 16 to 24, and on page 19, lines 20 to 27, of the application documents as filed (cf. page 4, lines 4 to 7, and page 6, lines 57 to 59, of the patent specification, respectively).

1.2 Claim 1 according to the auxiliary request is limited to the embodiment shown in Figure 3 of the patent. The features (a) through (i) of this claim substantially correspond to a combination of the features of claim 1 and 3 as originally filed (claims 1 and 4 as granted), with the following additions: the feature "so as to provide a fluid friction" is included in the characterizing part of the claim (cf. Section 1.1 above); the term "urging means (62)" in feature (f) is specified as "a pressurized fluid (F3)" (cf. Fig. 3 as filed); and the gap (G) between the peripheral edge of

housing and the back side surface of the endless belt is further specified in feature (i) as "the gap between the floating member (46) and the back side surface of the endless belt" (cf. Figure 3 as filed).

A basis for the newly added features (k) and (l) can be found in Figure 3 and on page 11, lines 18 to 20, in combination with page 12, line 24 to 29, of the specification as originally filed (cf. page 4, lines 39 to 41, and lines 61 to 64, of the patent specification, respectively).

The dependent claims 2 to 8 of the auxiliary request correspond to claims 7 to 13 of the patent as granted.

- 1.3 The admissibility of the new claims with respect to Article 123 EPC was not contested by the respondent. Hence there is no need for further substantiation of this matter.

The amendments to the claims therefore do not infringe the provisions of Articles 123(2) and (3) EPC.

2. *Novelty - main and auxiliary request*

- 2.1 Document E1, which is referred to in the description of the patent in suit on page 2, lines 4 to 9, is the sole document upon which the opponent (now respondent) relied in attacking the patent. It is not disputed by the parties that this document represents the nearest state of the art.

- 2.2 The Board agrees with the parties that document E1 discloses (see page 3, line 9, to page 5, line 10) a continuous press machine with all the features of the preamble of claim 1 according to the main request. Moreover, agreement was found during the oral

proceedings that the characterising feature stating that "said seal means comprises fluid seal means for continuously applying a pressurized sealing fluid (F2) from said peripheral edge toward the back side surface of the inner side of the corresponding one of said pair of opposed endless belts" (henceforth denoted by (c')) is also known from document E1 (see in particular Figure 10). This fact is undisputed by the appellant and has been acknowledged by introducing this feature in the preamble of claim 1 of the auxiliary request (see the last sentence of feature (c)).

2.3 Pointing to E1 (the paragraph bridging pages 1 and 2), it was argued that the state of the art concerned a "(lubricated) contact friction" only and aimed at improving the lubrication at the (frictional) contact area between the seal members and the endless belts, the sealing elements resting on the endless belts. In contrast thereto, the endless belts according to the invention moved without solid contact with respect to the peripheral flanges of the housing only fluid friction existing in the permanently maintained gap between the peripheral flanges and the moving belts.

This argument, however, disregards that document E1 (page 2, second paragraph) clearly states that by varying the pressure load the width of the layer of lubricating fluid - which defines a gap - between the sealing element and the belt can be exactly adjusted. According to normal technical understanding a fluid layer having an exactly defined width implies that solid friction has been replaced by fluid friction.

In this context, it has to be considered that the gap according to the patent in suit need not necessarily be a permanently verifiable constructional feature. On the contrary, there is clearly stated in connection with the

embodiment displayed in Figure 3 of the patent in suit (page 5, lines 11 to 16): "When the apparatus is in its inoperative condition, the upper floating members are held against the back side surface of the inner side of the upper endless belt ...", i.e. a gap having an exactly adjusted width is only maintained during the operation of the continuous press. This coincides with what is said in E1 about the prior art machine.

2.4. Consequently, the subject-matter of claim 1 according to the main request differs from the continuous press machine according to document E1 only by the feature that the gap which separates the peripheral edge of each one of the stationary housings from the back side surface of the inner side of the corresponding one of the pair of opposed endless belts has a width of 0.1 μm to 0.3 mm. This range is not explicitly disclosed in document E1.

2.5 The above considerations equally apply to the subject-matter of claim 1 according to the auxiliary request, since in that claim the width of the gap is also specified to be in the range of 0.1 μm to 0.3 mm.

2.6 The subject-matter of claim 1 according to the main and auxiliary request, respectively, is therefore, at least formally, new within the meaning of Article 54 EPC.

3. *Inventive step - main request*

3.1 The upper bound of the claimed range being 3000 times as high as the lower bound of the range, the person skilled in the art who wants to execute the invention is left with a considerable degree of freedom. The specified range covers, in fact, the whole range in which a sensible operation of the continuous press machine is possible.

The appellant, in his grounds of appeal, has referred to experiments (see pages 5 and 6) according to which the endless belt stopped whenever the width of the gap fell short of 0.1 μm . This result, however, cannot be a surprise for a person skilled in the art, because 0.1 μm is generally known to be the level of roughness depth of mirror-finished surfaces. Consequently, at a width of less than 0.1 μm it makes no sense defining parameters like a gap and a width of the layer of lubricating or sealing fluid. The upper bound of the gap width, on the other hand, is determined by the requirement that the loss of the lubricating fluid needed to warrant the sealing function must remain within the limits of economy. In summary, the wide range for the width of the gap indicated in claim 1 is not even the result of an optimisation but covers the whole range in which a sensitive operation of the continuous press is possible.

Consequently, a skilled person, who wants to operate the continuous press disclosed in document E1 (e.g. Figure 10) and, according to the instructions given in this document (page 2, second paragraph), and to adjust the width of the layer of lubrication fluid, will after some routine experiments indispensably arrive at a width positioned in the range of 0.1 μm to 0.3 mm and thus at the subject-matter of claim 1.

3.2 The subject-matter of claim 1 according to the main request does therefore not involve an inventive step within the meaning of Article 56 EPC.

4. *Inventive step - auxiliary request*

4.1 The features of the preamble of claim 1 according to the auxiliary request are known from document E1. The embodiment of the seal member according to Figure 10 of document E1 comprises a first hole (passageway 54)

formed through an outer wall of the peripheral edge of the housing leading into the interior of the groove. It also comprises a second passageway (50) formed in the floating member and containing the pressurized sealing fluid. Figure 10 does not show the conduit leading to the second passageway.

4.2 The subject-matter of claim 1 according to the auxiliary request differs therefore from what is disclosed in document E1 in that

(i) the gap is specified as being between 0.1 μm to 0.3 mm (cf. feature (i)), and

(ii) the second hole is formed through an outer wall of the peripheral edge and extends between one side face of the floating member and the passageway containing the pressurized sealing fluid (cf. features (k) and (l)).

For the reasons laid out in Section 3 above, no positive contribution can be seen in the first distinguishing feature. The second distinguishing feature offers a slight constructional change in the pressing device according to document E1 which comes within the scope of the customary practice followed by persons skilled in the art, especially as the advantages thus achieved can be readily contemplated in advance.

4.3 Consequently, the subject-matter of claim 1 according to the auxiliary request also lacks an inventive step within the meaning of Article 56 EPC.

5. Since neither the main request nor the auxiliary request of the appellant can be allowed the patent is to be revoked.

Order

For these reasons it is decided that:

The appeal is dismissed

The Registrar:



A. Townend

The Chairman:



C. Payraudeau

