Europäisches Patentamt | European Patent Office | Office européen des brevets

Beschwerdekammern | Boards of Appeal | Chambres de recours

T 105

Case Number: T 10 / 83

DECISION

of the Technical Board of Appeal 3.3.1

of 21 October 1983

Appellant: Bexford Limited
Imperial Chemical House
Millbank
London SW1P 3JF
England

Representative: Taylor, Michael
Imperial Chemical Industries PLC
Legal Department: Patents
Thames House North
Millbank
London SW1P 4QG

Decision under appeal: Decision of Examining Division 034 of the European Patent Office dated 8 July 1982 refusing European patent application No 79302486.0 pursuant to Article 97(1) EPC

Composition of the Board:

Chairman: D. Cadman
Member: G. Szabo
Member: L. Gotti Porcinari

Summary of Facts and Submissions

I. European patent application 79 302 486.0 filed on 6 November 1979 and published on 25 June 1980 with publication number 12 507 claiming the priority of the prior application of 11 December 1978 (GB-4 795 278), was refused by the decision of the Examining Division 034 of the European Patent Office dated 8 July 1982. The decision was based on claims 1 to 8. The main claim was worded as follows:

1. A copying process which comprises recording an image of an original material upon a light-sensitive vesicular imaging material by reflex exposure to imaging light, said light-sensitive vesicular imaging material having an imaging layer comprising a polymeric vehicle which is softenable upon heating above ambient temperature to permit the formation of a recorded image in the form of light-scattering or reflecting gas vesicles in those areas struck by imaging light, wherein a screen is interposed between the source of imaging light and the light-sensitive vesicular imaging material, said screen transmitting the light incident from the source of imaging light in separate bundles of light rays, the light-sensitive vesicular imaging material is reflex imaged by means of the bundles of light rays transmitted through the light-sensitive vesicular imaging material and reflected from the original material, and the light-sensitive vesicular imaging material is heated to soften the polymeric vehicle to permit the formation of a recorded image in the form of gas vesicles.

II. The reason given for the refusal was that the subject matter of the claims did not involve an inventive step. The cited publication GB-A-1 330 537 (1) discloses all the essential features of the claimed copying process, except the use of a screen. US-A-2 026 292 (2) also relates to a reflex copying process and describes the use of a screen between the light source and the light sensitive imaging material, the latter being a diazo-type material. Both processes are based on the same principle, i.e. the decomposition of an evenly disposed compound by radiation, and it was obvious to the person skilled in the art to improve the contrast of copies by combining the features of the cited processes. There was no prejudice against using the screen in combination with the process of obtaining vesicular images in the absence of an express teaching not to do what is now claimed.

III. The applicants lodged an appeal againt the decision on 13 August 1982, received on 20 August 1982 with payment of the fee, and filed a statement setting out the grounds of appeal on 25 October 1982.

IV. The grounds of the appeal are essentially as follows: The composition of the layer containing the diazonium compound is different from that disclosed in reference (1) and the method whereby the image is developed is substantially different from that used in the cited art, which teaches that the vesicles must be formed during the prolonged exposure stage. Such conditions would hinder and eventually prevent the effective passage of the intensive light through the narrow "bundles" provided by the screen and the so developed vesicles would

scatter the same. The suggested combination of the conditions recommended in (1) with a screen according to (2) would not have been successful.

The latter technique employing screens has been used to some extent in commercial practice, but unsatisfactory images resulted with low visual contrast, which could only be improved by excessive exposure. Instead of the mottled effect of normal exposure with this technique, the present invention provides solid images with good contrast. The visualisation of images are based on different, i.e. chemical and physical mechanisms, which should render claimed invention non-obvious.

V. In reply to a communication from the Board of Appeal the appellants submitted further explanations, and the following amended main claim:

1. A copying process which comprises recording an image of an original material upon a light-sensitive vesicular imaging material by reflex exposure to imaging light, said light-sensitive vesicular imaging material having an imaging layer comprising a hydrophobic polymeric vehicle which is softenable upon heating above ambient temperature to permit the formation of light-scattering or reflecting gas vesicles in those areas struck by imaging light, and heating the exposed light-sensitive vesicular imaging material to soften the polymeric vehicle to form a recorded image in the form of gas vesicles, characterised in that a screen is interposed between the sorce of imaging light and the light-sensitive vesicular imaging material, said screen transmitting the light incident from the source of imaging light in separate bundles of light rays and the light-sensi-

tive vesicular imaging materal is reflex imaged by means of the bundles of light rays transmitted through the light-sensitive vesicular imaging material and reflected from the original material.

The appellants requested that the decision refusing the application be set aside and that the patent be granted on the basis of amended claims. A refund of the appeal fee under Rule 67 was also requested on grounds that the Examining Division acted precipitately.

Reasons for the Decision

1. The appeal complies with Articles 106 to 108 and Rule 64 EPC, and is, therefore, admissible.

2. There can be no formal objection to the current version of the claims, since these are adequately supported by the disclosure in the specification as originally filed. The reference to a hydrophobic polymeric vehicle in the preamble of the main claim represents materials well known and so characterised in the relevant state of the art cited in the specification (cf. for instance GB-850 954, referred to in line 25, page 3).

3. The problem with which the claimed process was concerned was to provide copies, which have high projection densities and, in particular, satisfactory contrast, from non-transparent originals with a relatively short exposure in a reflex copying method. This is achieved by using a light-sensitive vesicular imaging material carried by a hydrophobic polymer in combination with a screen, and heating the material to develop the vesicles after exposure.

4. Acording to the search report and the Examining Division the closest state of the art is represented by FR-A-2 098 849 (1) (equivalent to GB-A-1 330 537) which describes a vesicular imaging system with a light sensitive diazonium compound which forms gas vesicles upon exposure to aclinic light. The question arises whether or not this particular reflex copying method would have been expected to benefit from the additional use of screens which were also known to be employed in a non-vesicular copying technique described in US-A-2 026 292 (2).

5. It appears that the particular hydrophillic thermoplastic materials recommended in (1) were those which enabled instant vesicle formation during exposure. This system required the removal of the most effective wave lengths from the aclinic radiation so as to reduce too much reside formation in the first pass of the light towards the image to be copied and to enable thereby the second, reflected pass to exort its differentiating effect. Additional measures, such as heating before or during the exposure were also recommended to speed up the growth of vesicules. Any combination of such system with the use of screens would have meant that the light required for exposure would only proceed in narrow bundles at selected points in the first pass and should therefore be very intensive indeed. Unfortunately the consequent immediate and very substantial formation of vesicles would have acted as a barrier to further exposure as well as a source for lateral scattering. In view of this the skilled person would not have considered the combination of the new techniques as an obvious step in the right direction, neither would the combined features of the two documents provide all the necessary

conditions for the present invention, nor suggest the necessary additional modifications to make the idea successful.

6. The Board has, however, to consider also the further question whether or not the combination of the screen with other available reflex copying processes based on hydrophobic thermplastics would have been obvious to the skilled person. It was commonly known that vesicular images could also be formed with diazonium compounds embedded in such materials. On exposure, only a latent image is formed which is then subsequently developed by the action of heat so that the invisible micro-bubbles are presumably magnified into full size light-scattering vesicles. Such compositions were also recommended for reflex copying, but it was also apparent that the consequences of the double pass of light could not be avoided. A very close control was required not to overexpose the material and thereby increase the "fogging" due to the first pass nor to underexpose the same, and thus leave no developable latent image in the sensitive layer.

7. In view of such difficulties inherent in the double pass reflex method, a selective desentisation of the layer adjacent to dark areas was recommended by means of preliminary irradiation with infra-red rays (US-A-3 194 659). Nevertheless, it has been submitted by the appellant that all techniques with hydrophobic vesicular carriers give copies with poor quality. Any use of a screen for such technique in order to reduce the area of the undesirable first pass, would have introduced the problem of the spurious image of the screen grid instead of that of an overall fogging. Apart from this, any combination of such kind would, it seems, have had some unpredictable consequences.

8. In order to reduce the spurious image in size, the intensity or time of exposure had to be increased. The full consequences of the maximal vesicle formation in the path of the bundles could not have been foreseen on the basis of the earlier state of the art using screens, since the latter only develops the unexposed areas by coupling only in order to produce a dye so as to provide a positive image, leaving the areas of the bundles unaffected. The present invention, on the other hand develops the exposed areas into negative images, and this involves the active participation of the vesicles in the bundle channels in the final step of the process. The actual permeability characteristics of the thermoplastic vehicle and consequent diffusivity of the gas and the vesicles can substantially influence the result (cf. US-A-3 032 414), and this may determine the nature and tolerability of the spurious image. Whilst some kind of copy might obviously been expected for the combination, in view of the general teaching in (2), the quality of the result could not be readily assessed on the basis of information available in the state of the art.

9. Whether or not it would have, nevertheless, been obvious to consider the combination worthy of a trial also depends on the character of the screen technique available in the literature. Although the method according to reference (2) was already in commercial use, and thereby became commonly known, the quality was poor, particularly in comparison with that of normal transmission copying. The copies were apparently yellow or brown and had low maximum projection densities. The present invention provides better quality in more than one respect which cannot be attributed to the obvious consequences of the modifications which were required to turn the method de-

scribed in (2) into one according to that claimed in the present application. There was no sufficient reason therefore to contemplate the trial, in the absence of a good chance for success as regards substantial improvement in any respect.

10. The advantageous effects of the process are not merely and inevitably in consequence of measures which the expert could unquestionably and directly envisage as providing such or different but nevertheless significant improvements of the device known in the art. Thus the skilled man, being free to consider obvious modifications of the known device would not have found himself in a "one-way street" inevitably leading to the invention by expecting otherwise known improvements through his routine activity anyway, without other choices to consider or explore. Conversely, it is hardly conceivable that the skilled person would have sought the answer to the problem of providing high projection densities and good contrast by turning to the feature in the state of the art which was not associated with such results. It is relevant in this respect, that the use of screens was virtually abandoned by those who sought an improvement for reflex copying, in spite of, or rather more likely because of, the knowledge existing about screens, in view of the limited character of their success in use. Whilst this technique may have looked an interesting development and therefore a possible source of further progress when it was published 50 years ago, its relevance must have been declining in the long period of its availability in consequence of experience and of its failure to be incorporated in any new attempt to advance the art of reflex copying. That, in spite of the long standing awareness of the problems associated with reflex techniques. It must therefore be concluded that the combination of a particular vesicular imaging material with the use of a screen involves an inventive step.

11. Since the explanation submitted during prosecution before the Examining Division had given insufficient basis to refute the serious presumption of obviousness, and the Examining Division could therefore see no grant even on the basis of amendments, the issuance of the refusal was justified (cf. also the decision of the Technical Board of Appeal, T 84/82, to be published). In any case, the refund of the appeal fee can only be entertained when there has been a substantial procedural violation, which is, in the opinion of the Board, inapplicable to the issues of the present appeal.

Order

1. The decision of the Examining Division 001 of the European Patent Office dated 8 July 1982, is set aside.

2. The case is remitted to the first instance with the order to grant a European patent on the basis of the following documents:

   (1) Description:
   Pages 1, 4 to 13 of the published patent application;
   Pages 2 and 3, as amended with letter of 21 September 1983, received on 26 September 1982.

   (2) Claims:
   Nos. 1 to 8, as amended with letter of 21 September 1983, received on 26 September.

   (3) Drawings:
   Pages 1/4 to 4/4 of the published patent application.

3. The request for reimbursement of the appeal fee is dismissed.

Registrar: Chairman: