

Internal distribution code:

- (A) [] Publication in OJ
(B) [] To Chairmen and Members
(C) [X] To Chairmen

D E C I S I O N
of 13 March 1996

Case Number: T 0836/93 - 3.3.4

Application Number: 87301966.5

Publication Number: 0271173

IPC: A01N 59/02

Language of the proceedings: EN

Title of invention:
Methods for facilitating the harvest of food crops

Applicant:
UNION OIL COMPANY OF CALIFORNIA

Opponent:
-

Headword:
Harvest of food crops/UNION OIL COMPANY OF CALIFORNIA

Relevant legal provisions:
EPC Art. 56

Keyword:
"Inventive step - (yes) "

Decisions cited:
-

Catchword:
-



Case Number: T 0836/93 - 3.3.4

D E C I S I O N
of the Technical Board of Appeal 3.3.4.
of 13 March 1996

Appellant:

UNION OIL COMPANY OF CALIFORNIA
461 South Boylston Street
Los Angeles, CA 90017 (US)

Representative:

Jack, Bruce James
FORRESTER & BOEHMERT
Franz-Joseph-Strasse 38
D-80801 München (DE)

Decision under appeal:

Decision of the Examining Division of the European Patent Office posted 4 May 1993 refusing European patent application No. 87 301 966.5 pursuant to Article 97(1) EPC.

Composition of the Board:

Chairman: U. M. Kinkeldey
Members: F. L. Davison-Brunel
J.-C. Saisset

Summary of Facts and Submissions

- I. European application No. 87 301 966.5 published under No. 0 271 173 was refused by the Examining Division.

The decision was taken on the basis of fourteen claims filed by letter dated 26 September 1990.

Claim 1 read as follows:

"A method for facilitating the harvest of crops selected from the group consisting of squash, melons, potatoes and combinations thereof, which comprises applying to the foliage of said crops prior to harvest an amount of an aqueous solution comprising the monourea adduct of sulphuric acid sufficient to substantially reduce interference of said foliage with harvest of said crops."

Independent claim 2 and dependent claims 3 to 14 specified further embodiments, in particular the composition of the monourea adduct solution, the dosage rate and spraying conditions to be used.

- II. The Examining Division refused the application under Article 97(1) EPC on the grounds that the subject-matter of claims 1 to 14 lacked inventive step within the meaning of Article 56 EPC, having regard to the following documents:

- (1) US-A-4 522 644
- (2) US-A-4 445 925
- (3) Neil H. Phillips: New Weed Management Practices in Orchards; Proceedings 36. Annual California Weed Conference (1984), page 129
- (4) DD-A-224 480

The main reason given for the decision was that "Since the claimed adduct and sulphuric acid were both known as herbicides and since the claimed adduct could be advantageously used as a safe substitute for sulphuric acid, it appeared to be obvious for the skilled man to replace the known hazardous desiccant sulphuric acid with the corresponding environmentally safe adduct which had not only proven its activity as a selective desiccant on the foliage of vine crops (document D1) but also as a herbicide." (see page 5, 3rd paragraph of the decision).

III. The Appellant lodged an appeal against this decision and paid the appeal fee and filed a statement of ground for the appeal.

IV. The Appellant's arguments were essentially that:

- While herbicides may exert their action by desiccating the plants, they were sprayed upon, they would not necessarily be of use as desiccants. Desiccants dried out undesired parts of crops so that the desired parts could be harvested without interference from the undesired parts of the crop. Thus, there were many more constraints a material must satisfy before it could be a desiccant as opposed to an herbicide.

- The monourea adduct was a distinct chemical species from sulphuric acid and urea and it had completely different properties. In particular, it did not have oxidizing and dehydrating capabilities which were the two properties which made sulphuric acid a desiccant. Thus, the person skilled in the art would not have inferred that the adduct could have been an effective desiccant from the fact that sulphuric acid could be used as a desiccant.

- Document (1) taught that the monourea adduct of sulphuric acid was effective as an herbicide. But there was no way to accurately predict from document (1) whether the adduct would affect the desirable part of the crop as well as the foliage. In the same manner, the result that it was efficient in small quantities to destroy plant suckers did not suggest its use on crop vines because of the tremendous increase in amounts which would have been perceived as needed for the required desiccation.

- V. The Appellant requests that "the impugned decision be set aside and the patent be granted on the application-in-suit with the claims subject to the impugned decision (MAIN REQUEST) or with such amended claims as Appeal Board may consider to be patentable (AUXILIARY REQUEST)."

In the event that Appeal Board was not disposed to accede to the Applicant's MAIN REQUEST, it was requested that oral proceedings be appointed.

Reasons for the Decision

1. The appeal is admissible.
2. The only issue to be decided in this appeal is inventive step.

Inventive step

The closest prior art

3. Document (1) has been identified by the Examining Division as the closest prior art. It discloses a method for the **herbicidal control** of parasitic plant suckers from desired vegetation, which comprises contacting the foliage of the plant suckers with an aqueous solution of the monourea adduct of sulphuric acid. The plant suckers are said to be more effectively killed than by sulphuric acid which is also an approved contact herbicide in spite of its toxic properties.

4. On the other hand, document (4) discloses a process for the **desiccation** of the upper parts of plants which involves spraying on the plants a composition of matter comprising sulphuric acid. The potassium permanganate which is also contained in the composition helps the acid to penetrate the foliage, by chemically perforating the cuticle. When applied to crop plants (potato vines), the desiccation process results in their **defoliation**. Since no specific measures seem to have been taken to eliminate the harmful effects of sulphuric acid, it is, however, to be expected that the composition of matter will be very corrosive and potentially dangerous to the environment.

5. In the Board's view, the closest prior art is the art which is concerned with a process to the same avail as that of the claimed invention.

6. Document (1) does not describe a process for the desiccation of foliage but rather for the total **destruction** of the plant suckers. Document (4), on the contrary, explicitly discloses a **defoliating** process of crop plants (potato vines). Document (4), thus, constitutes the closest prior art, although it is not concerned with the same chemical product as in the patent application.

The problem to be solved and its solution

7. In light of this closest prior art, the problem to be solved can be seen as devising an alternative, non toxic, fast acting process that rapidly desiccates living food crop foliage sufficiently to facilitate harvest.
8. The solution is provided by claim 1 and consists in applying the monourea adduct of sulphuric acid to the crops.

Assessment of inventive step

9. The question to ask with regard to inventive step is whether the combined teachings of document (4) and document (1) that sulphuric acid has herbicidal and desiccating properties and the monourea adduct can be substituted for sulphuric acid in its role as an herbicide for plant suckers would make it obvious to the person skilled in the art that the adduct can equally be used as a desiccant.
10. While attempting to answer this question, the Examining Division has failed to appreciate the difference between herbicides and desiccants which the Appellant took great care in explaining.

11. Herbicides kill plants, which means that they affect the metabolism of the plants in such a manner that they die. The killing action may, for example, occur by desiccation of the foliage. The deterioration of the plants as a whole occurs simultaneously with the desiccation.
12. Desiccants also destroy foliage. However, to be an effective dessicant, a material must be able to promote rapid moisture loss from the undesirable parts of the crop plants by breaking down the walls of the plant cells while not damaging or otherwise deleteriously affecting the edible or other desirable part of the crop.
13. For the person skilled in the art, this important difference means that whereas it might be obvious to investigate whether an herbicide might work as a desiccant, there can be no reasonable expectation that it will necessarily do so. A knowledge of the herbicide mode of action at the molecular level might, however, provide useful hints as to its suitability as desiccant.
14. Document (1) provides a comparison of how sulphuric acid and the monourea adduct of sulphuric acid perform their tasks as **herbicides**. Sulphuric acid exerts its herbicidal action while being consumed by chemical reaction with plant foliage by oxidation. On the contrary, the monourea adduct is not a powerful oxidant. Moreover, in contrast to sulphuric acid, it is quite effective in very dilute aqueous solutions.
15. Thus, Document (1) leads the skilled person away from thinking that the monourea adduct exerts its herbicidal action in the same manner as sulphuric acid. Sulphuric acid, on the other hand, exerts its desiccating action by the same mechanism as its herbicidal action. No

implication can, therefore, be drawn from document (1) that the monourea adduct may act as a desiccant.

16. The Board also accepts the two further arguments put forward by the Appellant in favour of inventive step.
17. Document (1) does not provide any evidence as to the potential effect, the monourea adduct might have on other parts of the plants than the foliage. Indeed, the monourea adduct is used to destroy plant suckers which stand away from the remainder of the vegetation. It was, thus, unexpected that the adduct would be harmless to the desired parts of the plants.
18. Furthermore, the herbicidal action of the monourea adduct on plant suckers, i.e. in a situation where relatively little foliage has to be desiccated, would not have suggested to the person skilled in the art that it would be useful for effective desiccation of the amount of foliage carried by crops, which might be 30 to 60 times greater (see Affidavit Dr Donald Young of 13 August 1993, point 13).
19. Document (2) discloses a chemical process for making concentrated solutions containing mono- and/or diurea sulphates. It provides interesting background knowledge without being of direct relevance to the invention. As for document (3), it is concerned with the herbicidal effect of the monourea adduct, emphasizing its non-corrosive properties which are also described in document (1).
20. In view of the above, the Board is of the opinion that the combined teachings of documents (4) and (1) do not make it obvious that the monourea could act as a desiccant. The subject-matter of all claims fulfils the requirements of Article 56 EPC.

Order

For these reasons it is decided that:

1. The impugned decision is set aside

2. The case is remitted to the first instance with the order to grant a patent on the basis of the claims filed with the letter dated 26 September 1990, the description being amended to take into account the restrictions which have been introduced into the claims.

The Registrar:


L. McGarry

The Chairwoman:


U. M. Kinkeldey