Internal distribution code:

(A) [-] Publication in OJ
(B) [-] To Chairmen and Members
(C) [-] To Chairmen
(D) [X] No distribution

Datasheet for the decision of 19 October 2021

Case Number: T 0203/19 - 3.3.10

Application Number: 15171481.3

Publication Number: 2944332

IPC: A61L29/16, A61L29/18

Language of the proceedings: EN

Title of invention:
USE OF NANOCRYSTALS FOR A DRUG DELIVERY BALLOON

Patent Proprietor:
Boston Scientific Scimed, Inc.

Opponents:
BIOTRONIK AG
Terumo Kabushiki Kaisha
Cook Medical Technologies LLC

Headword:
USE OF NANOCRYSTALS FOR A DRUG DELIVERY BALLOON/ Boston Scientific Scimed

Relevant legal provisions:
EPC Art. 56

Keyword:
Inventive step - (no)

Decisions cited:

Catchword:

Europäisches Patentamt
European Patent Office
Office européen des brevets

Beschwerdekammern

Boards of Appeal

Chambres de recours

Boards of Appeal of the
European Patent Office
Richard-Reitzner-Allee 8
85540 Haar
GERMANY
Tel. +49 (0)89 2399-0
Fax +49 (0)89 2399-4465

Case Number: T 0203/19 - 3.3.10

D E C I S I O N
of Technical Board of Appeal 3.3.10
of 19 October 2021

Appellant I: (Opponent 1)	BIOTRONIK AG Ackerstrasse 6 8180 Bülach (CH)
Representative:	Keil & Schaafhausen Patentanwälte PartGmbB Friedrichstraße 2-6 60323 Frankfurt am Main (DE)
Appellant II: (Opponent 2)	Terumo Kabushiki Kaisha 44-1, Hatagaya 2-Chome Shibuya-ku Tokyo 151-0072 (JP)
Representative:	Prüfer & Partner mbB Patentanwälte · Rechtsanwälte Sohnckestraße 12 81479 München (DE)
Appellant III: (Opponent 3)	Cook Medical Technologies LLC 750 North Daniels Way Bloomington, IN 47404 (US)
Representative:	Williams Powell 11 Staple Inn London WC1V 7QH (GB)
Respondent: (Patent Proprietor)	Boston Scientific Scimed, Inc. One Scimed Place Maple Grove, MN 55311 (US)
Representative:	Peterreins Schley Patent- und Rechtsanwälte PartG mbB Hermann-Sack-Strasse 3 80331 München (DE)

Decision under appeal: **Decision of the Opposition Division of the European Patent Office posted on 20 November 2018 rejecting the opposition filed against European patent No. 2944332 pursuant to Article 101(2) EPC.**

Composition of the Board:

Chairman P. Gryczka
Members: J.-C. Schmid
T. Bokor

Summary of Facts and Submissions

I. Appellants I, II and III (opponents 1, 2 and 3, respectively) lodged an appeal against the decision of the Opposition Division rejecting their opposition against European patent No. 2 944 332, independent claim 1 thereof reading as follows:

"1. A drug delivery balloon adapted for delivery of a drug to a site in a body passageway, the balloon comprising a balloon wall with an outer surface and the balloon having a drug disposed on the outer surface, wherein the drug is provided on the balloon as crystalline particles of said drug in a size distribution in the range of from 0.01 ppm to 2 ppm,

wherein said crystalline drug particles comprise paclitaxel, and

wherein the crystalline drug particles are present in mixture with a water soluble excipient material."

II. The Appellants requested in their notice of opposition the revocation of the patent in its entirety on the grounds of lack of novelty and inventive step (Article 100(a) EPC), insufficient disclosure (Article 100(b) EPC) and extension of the subject-matter beyond the content of the parent application as filed (Articles 76(1) and 100(c) EPC).

Inter alia the following documents were submitted in the opposition proceedings:

(7) EP-A-1 810 665 and
(8) WO-A-2009/018816.

III. According to the opposition division, claims 1 and 5 met the requirements of Article 76(1) EPC. The subject-matter of claim 1 of the patent as granted was disclosed in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art. The subject-matter of claim 1 was novel over the cited documents.

Example 9 of document (8) represented the closest prior art to the invention. It was plausible that a balloon coated with nano-sized paclitaxel crystals provided expected advantages, as for example reduced undesired particle loss and well-defined release kinetic. The problem to be solved by the invention was therefore regarded as the provision of an improved paclitaxel coated balloon. The proposed solution was a balloon coated with paclitaxel crystals characterized in that the particle size distribution was in the range of 0.01 µm to 2 µm.

Document (8) related to the formation of paclitaxel crystals on the surface of a balloon by applying a paclitaxel solution. The *in situ* crystallisation of paclitaxel on the surface carried out according to document (8) provided crystals up to 200 µm.

In order to arrive at the claimed balloons starting from document (8), the skilled person would therefore have had to develop a new method to arrive at the claimed distribution size. However, there was no incentive to disregard the teaching of document (8) using paclitaxel solutions providing large crystals. The subject-matter of claim 1 of the patent as granted involved therefore an inventive step.

IV. The Appellants contested the decision of the opposition division with respect to the issues of added subject-matter, sufficiency of disclosure of the invention, novelty and inventive step.

V. During the oral proceedings held before the Board on 19 October 2021, the respondent defended the patent on the basis of the main request (patent as granted), auxiliary requests 1 to 6, auxiliary requests 1A to 6A and auxiliary request 7.

Claim 1 of auxiliary request 1 differs from claim 1 of the main request in that it defines that "the excipient facilitates adhesion to the balloon".

Claim 1 of auxiliary request 2 differs from claim 1 of the main request in that it defines that "the excipient material binds the particles to the balloon or to each other".

Claim 1 of auxiliary request 3 differs from claim 1 of the main request in that it requests that "the excipient facilitates adhesion to the balloon and is a member of the group consisting of sugars, citrate esters, and pharmaceutically acceptable salts".

Claim 1 of auxiliary request 4 differs from claim 1 of the main request in that it defines that "the excipient material binds the particles to the balloon or to each other and is a member of the group consisting of sugars, citrate esters, and pharmaceutically acceptable salts".

Claim 1 of auxiliary request 5 differs from claim 1 of auxiliary request 3 in that the drug has a size distribution in the range of from 0.01 µm to 0.5 µm.

Claim 1 of auxiliary request 6 differs from claim 1 of auxiliary request 4 in that the drug has a size distribution in the range of from 0.01 µm to 0.5 µm.

In auxiliary requests 1A to 6A, the word "facilitates" or the word "binds" is replaced by the wording "is configured to facilitate" or "is configured to bind", respectively.

Auxiliary request 7 differs from the main request only in that dependant claim 5 is removed.

VI. Appellants I, II and III (opponents 1, 2 and 3) requested that the decision under appeal be set aside and the patent be revoked.

The respondent (patent proprietor) requested that the appeal be dismissed (main request), or subsidiarily, that the patent be maintained on the basis of one of auxiliary requests 1 to 6, filed on 12 August 2019 with the reply to the grounds of appeal, or on the basis of one of the auxiliary requests 1A to 6A and 7 filed with letter dated 20 September 2021.

VII. At the end of the oral proceedings the decision of the Board was announced.

Reasons for the Decision

Main request (patent as granted) - Inventive step

1. *Closest prior art*

Document (8) discloses balloons coated with paclitaxel. In the examples the balloons are coated by dipping or spraying with a solution comprising paclitaxel.

Balloons coated with paclitaxel crystals are described on page 23, line 23 - page 24, line 30; claims 17-20), however without indication of the particle size.

More specifically, example 9 of document (8) discloses a balloon coated by using an aqueous solution comprising urea (water soluble excipient) and paclitaxel (page 35, lines 16 to 22).

This example represents the closest state of the art to the invention for the assessment of inventive step.

2. The appellants argued that, given the physical properties of paclitaxel, the skilled person will immediately recognise that paclitaxel crystals are inevitably formed on the surface of a balloon prepared according to the process of example 9 of document (8). This was disputed by the respondent.

Since the Board comes to the conclusion that the subject-matter of claim 1 is not inventive even if the position of the respondent with respect to the disclosure of example 9 of document (8) is followed, it is assumed in favour of the respondent that the difference between the balloon of example 9 of document (8) and the balloon of claim 1 is the presence of paclitaxel in crystalline form **and** the size of the paclitaxel particles.

3. Technical problem

During the oral proceedings before the Board, the respondent relied on various improvements due to the combination of the water soluble excipient and the crystalline particles defined in claim 1, in particular the formation of a thin layer excipient containing the

drug, which allowed the folded balloon to have a small volume. The respondent submitted therefore that the technical problem to be solved was the provision of an improved balloon that can be small while providing good adhesion of the drug to the surface, a homogenous and more predictable dosage of the drug to the tissue at the deployment site, and generally good overall properties.

However, the respondent has not demonstrated any of these alleged improvements with respect to the balloon prepared according to the process of example 9 of document (8), in particular no comparative report has been provided showing the alleged improvements.

Therefore, the technical problem effectively solved must be reformulated in the provision of a further drug delivery balloon.

4. *Solution*

The proposed solution is a balloon coated with paclitaxel according to claim 1 of the main request characterized in that paclitaxel is provided in the form of crystals and particle size distribution of the paclitaxel crystals being in the range of 0.01 µm to 2 µm.

5. *Obviousness*

5.1 Document (7) relates to polymeric compositions that can be used for sustained and controlled drug delivery. Preferably the drug is crystalline (see column 2, paragraph [0009]). The polymeric composition is applied to an implantable medical device, *inter alia*, a balloon (page 5, line 38). The drug includes paclitaxel

(claim 5). The average size of the crystalline particles ranges preferably between 50 nm and 50 µm, most preferably between 100 nm (0.1 µm) and 200 nm (0.2 µm) (see paragraph [0027].

Thus, the person skilled in the art faced with the problem of providing an alternative drug delivery balloon allowing sustained and controlled drug delivery would find in document (7) the solution of coating the balloon with polymeric compositions comprising crystalline paclitaxel particles having an average particle size of 0.1 µm to 0.2 µm and thus arrive at the subject matter of claim 1 without exercising inventive skill.

5.2 According to the respondent, document (7) had a very general teaching on medical devices and drugs. This document did not specifically relate to balloons and paclitaxel. Thus the claimed specific combination of features was not suggested by document (7).

However, the closest prior art illustrated by document (8) already discloses balloons coated with paclitaxel. Document (7) teaches that drugs can be applied to drug delivery medical devices in the form of crystalline nano particles in order to provide sustained and controlled drug delivery. Starting from document (8), this additional teaching of document (7) is sufficient to arrive at the subject-matter of claim 1 and thus to deprive it of any inventive ingenuity.

5.3 According to the respondent, individual advantages of each features of the coating might have been known individually, but the patent provided for the first time their combination.

However, the respondent has not shown that the combination of the features provides an unexpected effect. Therefore, this argument is devoid of merit.

5.4 The respondent argued that document (7) disclose that the **average** particle size of the drug should be preferentially in the range of 0.1 µm to 0.2 µm, whereas claim 1 required that the particles are in a size **distribution** in the range of from 0.01 µm to 2 µm.

However, an obvious and logical way to provide particles having an average size of 0.1 µm to 0.2 µm as required by document (7) is to use particles having a size distribution in the range of from 0.01 µm to 2 µm. This argument also cannot convince the Board on the presence of inventive step.

5.5 The respondent argued that document (7) did not show an homogenous release of the drug.

However, the aim of document (7) is to provide polymeric compositions that can be used for sustained and controlled drug delivery, which includes homogenous release of the drug (see paragraph [0001]).

This argument should also be rejected.

6. The Board therefore comes to the conclusion that the subject-matter of claim 1 of the main request is rendered obvious by the combination of document (8) with document (7). Accordingly, the main request is not allowable for lack of inventive step.

Auxiliary requests 1, 1A, 2, 2A, 3, 3A, 4, 4A

7. According to the respondent, claim 1 of these requests made it clear that the excipient facilitates adhesion to the balloon or that the excipient binds the particles to the balloon or to each other.

However, there is no proof that the excipients listed in the contested patent improve the adhesion of paclitaxel to the balloon when compared to the excipient used in example 9 of document (8), namely urea. Furthermore, the excipients listed on page 13, lines 17-24 of document (8) include sugar, which is an excipient according to the contested patent, and which facilitates drug adhesion to the balloon or binds the particles to the balloons or each other (see claim 2 of auxiliary requests 1, 1A, 2, 2A, claim 1 of auxiliary requests 3, 3A, 4 and 4A.

Consequently, these requests should also be rejected for lack of inventive step.

Auxiliary requests 5, 5A, 6 and 6A

8. In these requests, the size distribution of the crystalline drug particles is limited to the range of 0.01 µm to 0,5 µm.

9. However, the preferable drug average particles size disclosed in document (7) is in the range of 0.1 µm to 0.2 µm, i.e. well inside the restricted range required by claim 1 of auxiliary requests 5, 5A, 6 and 6A. This restriction also does not add anything inventive to the subject-matter of claim 1.

Accordingly, these requests should also be rejected for lack of inventive step.

Auxiliary request 7

10. Claim 1 of auxiliary request 7 is identical to claim 1 of the main request, the subject-matter of which is devoid of inventive step.

Consequently, auxiliary request 7 is rejected for the same reason as the main request.

11. As the patent is revoked for lack of inventive step, it is not necessary to consider the appellants' other objections relating to subject matter extending beyond the earlier application as filed, insufficient disclosure of the invention and lack of novelty.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.
2. The patent is revoked

The Registrar: The Chairman:

C. Rodríguez Rodríguez P. Gryczka

Decision electronically authenticated