

**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 14 December 1994

**Case Number:** T 0491/92 - 3.2.2

**Application Number:** 80302755.6

**Publication Number:** 0030781

**IPC:** F01L 1/24

**Language of the proceedings:** EN

**Title of invention:**

Hydraulic tappet for direct-acting valve gear

**Patentee:**

EATON CORPORATION

**Opponent:**

Precision Engine Products Corporation  
General Motors Corporation

**Headword:**

-

**Relevant legal provisions:**

EPC Art. 54, 56, 107  
EPC R. 71(2)

**Keyword:**

"Novelty (yes)"  
"Closest state of the art"  
"Inventive step (yes)"  
"Public prior use (no)"

**Decisions cited:**

T 0073/86, T 0204/83, T 0073/88, G 0004/93, T 0300/86

**Catchword:**

-



Case Number: T 0491/92 - 3.2.2

**D E C I S I O N**  
of the Technical Board of Appeal 3.2.2  
of 14 December 1994

**Appellant:**  
(Proprietor of the patent) EATON CORPORATION  
Eaton Center, 1111 Superior Avenue  
Cleveland  
Ohio 44114 (US)

**Representative:**  
Wright, Peter David John  
R.G.C. Jenkins & Co.  
26 Caxton Street  
London SW1H 0RJ (GB)

**Respondent:**  
(Opponent 01) Precision Engine Products Corporation  
2919 Commonwealth Boulevard  
Tallahassee, Florida (US)

**Representative:**  
Patentanwälte Grünecker, Kinkeldey,  
Stockmair & Partner  
Maximilianstrasse 58  
D-80538 München (DE)

**Respondent:**  
(Opponent 02) General Motors Corporation  
New Center One Bldg.  
3031 W. Grand Blvd.  
Detroit, Michigan 48 202 (US)

**Representative:**  
Dipl.-Phys. Dr. Manitz  
Dipl.-Ing. Finsterwald  
Dipl.-Ing. Grämkow Dipl.-Chem. Dr. Heyn  
Dipl.-Phys. Rotermund  
Morgan, B.Sc. (Phys)  
Postfach 22 16 11  
D-80506 München (DE)

**Decision under appeal:** Decision of the Opposition Division of the  
European Patent Office dispatched on 19 February  
1992 revoking European patent No. 0 030 781  
pursuant to Article 102(1) EPC.

**Composition of the Board:**

**Chairman:** W. D. Weiß  
**Members:** M. G. Hatherly  
M. K. S. Aúz Castro

### Summary of Facts and Submissions

I. The decision of the Opposition Division to revoke European patent No. 0 030 781 (resulting from application No. 80 302 755.6) was dispatched on 19 February 1992. On 16 April 1992 the Appellant (Proprietor) filed an appeal against this decision, the appeal fee was paid on the same day and the Statement of Grounds of Appeal was received on 25 June 1992.

The patent had been granted with two versions of Claim 1 for the Contracting States Italy and Germany respectively following the previous Board of Appeal decision T 73/86 in the appeal against the refusal of the patent application.

II. Claim 1 of the patent as granted for the Contracting State Italy reads:

"A bucket tappet (10) for use in the valve gear of an internal combustion engine which is capable of operating at speeds in excess of 5000 RPM, which valve gear is of the direct acting type wherein one end of the tappet (10) is contacted by an engine cam (16) and the other end is in direct contact with a stem (22) of a combustion chamber valve (20), the tappet (10) comprising:

- a tubular outer wall (42; 102; 122; 141),
- a top (18; 107; 142), extending transversely of the outer wall at the top end of the tappet, and adapted to contact the engine cam,
- a plunger (49; 108; 132) located within and slidable axially relative to said outer wall, the plunger having at its lower end an end wall (52) contacting the valve stem,

- an annular first portion (83) of a fluid reservoir located radially in between the tubular outer wall (42; 102; 122; 141) and said plunger (49; 108; 132) and axially between said top (18; 107; 142) and a web (44; 104; 124; 146) which forms the bottom of said annular portion of reservoir, the radial extent of said first portion being substantially the same as that of the web,

- passage means (84) for supplying fluid to said annular portion of reservoir,

- a central second portion (85) of reservoir in continuous fluid communication with said first portion,

- a fluid pressure chamber (86) within the plunger, which chamber is located near or below the lowest level of said two portions of reservoir,

- a one-way valve (72, 74) operable to permit a flow of fluid therethrough from said central second portion (85) of reservoir into said fluid pressure chamber (86) upon movement of said plunger (49; 108; 132) in a direction tending to expand said chamber (86) and to prevent reverse flow of fluid therethrough from said fluid pressure chamber (86) upon movement of said plunger (49; 108; 132) in a direction tending to diminish said fluid pressure chamber,

characterised in that a piston (64) unsecured to the top (18; 107; 142) is slidably received in said plunger (49; 108; 132) and cooperates with said plunger to define said fluid pressure chamber (86), biasing means (82) being arranged between said plunger and said piston for biasing said plunger and said piston in a direction away from one another, in that said piston (64) fits within said plunger (49; 108; 132) in a manner adapted to provide controlled leakdown from said fluid pressure chamber (86) upon the application of an axial load on said piston (64) tending to urge said piston (64) in a direction to compress fluid in said fluid pressure chamber (86), in that said central portion of reservoir

is located within the piston (64), between the piston and said top (18; 107; 142), and in that the plunger is received in a generally tubular hub (46; 106; 126; 148) supported within the outer wall and extending generally parallel thereto, said hub being maintained in fixed relation to the top (18; 107; 142), but with its upper end axially separated from said top, by means of said web which extends between the hub and the tubular outer wall and connects the hub to the tubular outer wall so as to form the sole structural support for the hub."

Claim 1 of the patent as granted for the Contracting State Germany differs from that for Italy merely by two added words so that:

- column 12, lines 37 and 38 read "plunger having at its lower end an end wall (52) **for** contacting the valve stem" (emphasis added); and
- column 12, lines 50 to 52 read "a central second portion (85) of reservoir in **continuous** fluid communication with said first portion" (emphasis added).

The dependent Claims 2 to 14 are identical for the two Contracting States.

III. Oral proceedings on 14 December 1994 were attended by the Appellant and Respondent I (Opponent I).

Respondent II (Opponent II) was duly summoned for the oral proceedings scheduled for 15 November 1994 but informed the Board by letter of 6 April 1994 that it would not attend. The oral proceedings were rescheduled for 14 December 1994 and Respondent II was again duly

summoned but did not appear. The proceedings were continued in Respondent II's absence in accordance with Rule 71(2) EPC.

IV. The following publications play a part in the appeal proceedings:

D1: US-A-3 509 858

D3: GB-A-1 533 654

D4: DE-A-1 808 000

D5: DE-A-1 914 693

D15: Book of the Car, published by Drive Publications Limited for the Automobile Association, London, Second Edition 1970, page 57 (filed with the Notice of Opposition of Respondent II dated 13 September 1990)

D116: EP-A-0 030 780

D117: Webster's Third New International Dictionary 1976, definitions of the words "sheet" and "stamp" (filed during the oral proceedings of 14 December 1994)

Moreover the Respondents made a plurality of allegations of public prior use in the opposition proceedings, including three allegations originally made during the examination proceedings by a third party who took no part in the subsequent opposition proceedings.

The following drawings, report and affidavits are relevant in the present appeal proceedings, in particular for those prior use allegations still relied upon in said proceedings:

D2: Eaton Corporation drawing No. SPL-1885-A (filed with the Notice of Opposition of Respondent I dated 11 September 1990)

D13: Chevrolet drawing No. 5233055 of the Vega tappet, (filed with the Notice of Opposition of Respondent II dated 13 September 1990)

D13(A): Affidavit of Mr Robert F. Wheaton, dated 31 August 1990 (filed with the Notice of Opposition of Respondent II dated 13 September 1990)

D14: Affidavit of Mr Dan B. Kuiper, dated 6 September 1990 (filed with the Notice of Opposition of Respondent II dated 13 September 1990)

D16: Affidavit of Mr John J. Krieg, dated 31 August 1990 (filed with the Notice of Opposition of Respondent II dated 13 September 1990)

D21: Audi Customer Contact Report by John J. Krieg on 26 April 1979 (filed with the Notice of Opposition of Respondent II dated 13 September 1990)

D22: Drawing No. X-53540 of the Diesel Equipment Division of General Motors Corporation (filed with the Notice of Opposition of Respondent II dated 13 September 1990)

D118: Affidavit of Mr Giovanni M. Conti dated  
30 November 1994 (filed during the oral  
proceedings of 14 December 1994)

D119: Affidavit of Mr Martin Uitvlugt dated  
8 December 1994 (filed during the oral  
proceedings of 14 December 1994)

V. The Opposition Division decided that the claimed subject-matter lacked an inventive step over the closest state of the art represented by document D1 used either alone or in combination with document D3. It decided that the other cited documents were either less relevant than document D1 or were not pre-published.

The Appellant argued in the appeal proceedings that document D1 was not the closest prior art and that its combination with the teaching of document D3 would not be obvious. Document D4 represented the state of the art closest to the invention and the claimed subject-matter was inventive thereover. The commercial success of the invention pointed to its inventivity.

Respondent I argued in the appeal proceedings that either the tappet according to document D1 or the prior used tappet according to drawing D13 was the closest prior art and indeed each of these tappets was novelty destroying. Document D3 would be relevant for inventive step. It alleged public prior use based on drawing D2 and tappets made thereto. It considered that there was not a long-felt need for the invention and that the commercial success of parts developed by other firms before the priority date of a patent could not support inventivity.

In the appeal proceedings Respondent II submitted requests but no arguments.



VI. The Appellant requests that the decision under appeal be set aside and that the patent be maintained as granted.

Each of Respondents I and II requests that the appeal be dismissed.

### Reasons for the Decision

1. The appeal is admissible.

2. *Article 123 EPC*

The Opposition Division found in its decision that the omission of the feature "the outer periphery (50) thereof adapted to be received in sliding engagement with a guide surface provided in the engine" contained in the originally filed claims following the feature "body means (40)" from both Claims 1 as granted did not justify the allegation that the patent in its granted form contravened Article 123 EPC because it was implicit from the term "bucket tappet" that the tubular outer wall was to be received in sliding engagement with a guide surface provided in the engine. This correct finding has not been challenged by either Respondent in the appeal proceedings and the Board prima facie sees no other reason to object under Article 123 EPC to the patent as granted.

3. *State of the art*

3.1 Various allegations of public prior use made in the opposition proceedings had in part already been made as third party observations during the examination proceedings. In decision T 73/86 in the appeal against the Examining Division's decision to refuse the

application it was found that it had not been established that these alleged prior uses were public, insufficient proof that the drawings were not for internal use only, that the tests were not conducted inside their own factories and that the tappets given as samples were not given only to company employees bound to secrecy deriving from commercial relationships.

- 3.2 These allegations were carried over into the opposition proceedings and other allegations added. In sections 4, 4.3 and 5 of its decision the Opposition Division found that the documents on which the allegations were based did not provide a closer teaching than document D1 and/or were not prepublished prior art documents (e.g. the drawing D22).
- 3.3 Except concerning the alleged public prior use with regard to drawing D2, the Opposition Division's findings were not questioned in the appeal by either Respondent and moreover seem reasonable to the Board. The present Board also agrees with the findings of the first Board in decision T 73/86 in this respect.
- 3.4 In the appeal proceedings Respondent I alleges once again prior public use of a tappet according to drawing D2. The Appellant objects to discussing the alleged public prior use concerning this drawing, maintaining that prior use allegations are not the subject of the appeal. The Appellant argues, relying in particular on decision G 4/93, that the appeal should not be allowed to result in an adverse effect for the Appellant and that the non-appealing parties (i.e. Respondents I and II) should not be given the unrestricted right to alter the extent of the proceedings.

- 3.5 Decision G 4/93 concerns the situation of a patent being amended by an interlocutory decision of the Opposition Division so that the patentee and opponent(s) are each adversely affected with the consequence that each party could appeal. The decision discusses what happens when one party does not appeal.
- 3.6 The present case, however, is an appeal against a decision revoking the patent so that Opponents I and II were not adversely affected and were not allowed to appeal (Article 107 EPC), even against a part of the decision they might have considered unfavourable to them. In the appeal proceedings, Respondent I can contend that a particular issue in the decision, namely the evaluation of drawing D2, was wrongly decided (compare decision T 73/88, reasons 1.3, OJ EPO 1992, 557).
- 3.7 Respondent I relies in particular on Affidavit D118 from Mr Giovanni M. Conti which states that he, Mr Conti, in 1977 and at that time as sales manager of Eaton Corporation, handed drawing D2 and samples manufactured thereto to Audi and Porsche prior to the priority date of the present patent. He states that he refrained from asking Audi and Porsche to keep the drawing and samples secret since he had been informed by Martin Uitgluft (sic), then technical director of Eaton Corporation, that Eaton Corporation did not regard any feature of the tappet as being patentable.
- 3.8 Respondent I adds that Audi paid 20 US dollars for each of the samples and argues that this shows that the transfer was part of the sales programme of the finished tappets. It argues that it would have been unusual for a firm to pay for test samples for development purposes,

that Mr Conti's visit was part of a promotional tour and not part of a development programme, and that there was neither a written nor an implied secrecy agreement.

3.9 Affidavit D119 from Mr Martin Uitvlugt states that it was Eaton Corporation's policy to keep details of development work confidential to maximise the opportunity of maintaining a market lead over competitors. Drawings for products in development were marked with a notice stating that the contents were proprietary and confidential. Although formal confidentiality agreements were uncommon, it was obvious to everyone involved that disclosures to other companies as part of a development programme were intended to be kept confidential. He does not recall telling Mr Conti that no feature of drawing D2 was regarded as patentable but, even if he had, he would not have intended to imply that drawing D2 was non-confidential.

3.10 The Appellant considers that Audi probably did pay for the samples and that it is possible that Mr Conti refrained from asking Audi to keep the details secret. However it denies that the samples could have been production samples since the prefix SPL to the drawing number SPL-1885-A (drawing D2) signifies an experimental drawing, since the price for production samples would have only been 1 to 3 US dollars and since Audi had at that time no production engine in which to install the tappets.

3.11 The opening paragraph of Customer Contact Report D21 dated 26 April 1979 states that "Audi has made the decision to start production of direct-acting hydraulic lifters in their 4-cylinder engines in the middle of 1981" and "Currently, three suppliers are involved in the Audi program including ... Eaton". Page 2 states

that "Eaton is in a redesign program to reduce the weight of their initial proposals" and "D.E.D. will supply 50 prototype parts for testing at Audi".

From all this the impression is well founded that a development programme was still running in 1979 and that the samples to drawing D2 handed over by Eaton Corporation in 1977 were not production samples but intended for internal test purposes only.

- 3.12 The Board sees no reason to doubt either of the Affidavits D118 and D119 which tend to confirm rather than contradict each other. Mr Conti refrained from **asking** Audi to keep the details secret but this does not mean that there was no implied secrecy agreement. Drawing D2 carries both a notice that it "is issued in confidence for engineering information only and may not be reproduced or used to manufacture anything shown or referred to hereon without direct permission from Eaton" and a notice that the customer is Audi. This points to the intention of Eaton not to have the drawing's information made public. Audi would also have had an interest in keeping its development programme secret from other vehicle manufacturers and the Eaton tappet was part of this development programme. Even though another vehicle manufacturer, namely Porsche, also had access to drawing D2 this does not mean that all vehicle and tappet manufacturers would have been permitted to see the drawing (following section 2.5 of decision T 300/86).

Under the circumstances described above it has not been disproved that the exchange of money for tappets was a sharing of costs rather than a sale from which Audi would derive the right to publicise the details of the tappets.

3.13 Consequently neither drawing D2 nor tappets made thereto have been proved to have been made publicly available prior to the priority date of the patent. Accordingly the drawing does not belong to the state of the art and its degree of technical relevance need not be examined.

4. *Versions of Claim 1*

The two versions of Claim 1 as granted, one for Italy and one for Germany, differ only as set out in section II above and will usually be referred to in sections 5 to 9 below simply as Claim 1.

5. *Novelty*

5.1 The dispute about the comparison of the disclosure of **document D1** with the subject-matter of Claim 1 centres on the following points:

5.1.1 Tubular outer wall

The outer wall of the tappet shown in Figure 2 of document D1 is that part of the tappet which runs downwardly from the inner surface of the closed end against which the piston 20 (document D1 calls this the plunger) presses. This outer wall is certainly not tubular in the narrowest sense of the word but then neither is the present tappet's outer wall since its wall thickness varies.

Contrary to the view of the Appellant, there is no clear distinction in Claim 1 over the disclosure of document D1 in this respect.

### 5.1.2 Operating speed

Claim 1 specifies that the bucket tappet 13 is for use in the valve gear of an internal combustion engine capable of operating at speeds in excess of 5000 rpm. While this lower speed limit is stated in terms of the engine it nevertheless imposes a lower speed limit on, and thus a functional restriction on, the tappet itself.

Document D1, filed in 1968, does not mention a specific speed value. The Board considers the reference in column 3, lines 15 and 16 to "high speed" to be a reference to a high speed within the engine's regular range of operating speeds, the engine having e.g. a high speed and a low speed without values therefor being disclosed. Even if the engine were specifically stated to be a high speed engine this would need to be seen in the light of what was considered to be high speed in the USA in 1968.

According to Affidavit D13(A), whose content is not in dispute, the production tappet shown in drawing D13 was installed in Chevrolet Vega engines having a recommended maximum operating speed of 5200 rpm. The production tappet would seem to be the practical realisation or development of the design shown in patent document D1 and, in view of the closeness of 5200 rpm given for the Vega engine to the claimed lower limit of 5000 rpm, it cannot be assumed that the tappet according to patent document D1 would be suitable for engines having an operating speed of over 5000 rpm. To attempt to deduce the operating speed of the latter tappet by comparing the sizes of the two tappets entails scaling or measuring the Figures of document D1 which is impermissible since they are patent drawings and, unlike the engineering drawing D13, are not necessarily to scale, see decision T 204/83 (OJ EPO 1985, 310). To

equate maximum speeds under test (to show weak points in the engine and accepting more or less good results) with operating speeds (giving reliable functioning and a long engine life) is unrealistic.

Therefore it is not proven that the tappet according to document D1 would be suitable for use in an engine regularly operating at speeds in excess of 5000 rpm.

#### 5.1.3 Annular first portion of a fluid reservoir

Claim 1 specifies an annular first portion of a fluid reservoir. The primary purpose of the unnumbered space between the port 24 and the fluid reservoir chamber 30 in Figure 2 of document D1 is obviously to enable fluid to travel at all times from port 24 into reservoir chamber 30. This space is however not large enough to replenish reservoir chamber 30 since it would be even smaller when the plunger 16 is in its upper position.

Although taking the wording of Claim 1 literally, the space disclosed by document D1 could perhaps be said to be an annular portion of the fluid reservoir consisting of the combination of the unnumbered space and the reservoir chamber 30, the said space of the known tappet does not have the function which the annular portion of the patent in suit has. This function is implied by the wording "annular first portion of a fluid reservoir", namely the replenishment of the central reservoir swiftly without needing to wait for oil flow through the oil inlet passage (port 24 on Figure 2 of document D1).

#### 5.1.4 Web

A web is a thin portion joining two thicker portions e.g. the central portion of an I-beam is a web. The part between the land 34 of the outer member and the outer



radial limit of the unnumbered passageway shown in Figure 2 of document D1 is not a web according to this definition because it is too thick and does not join two other portions together (compare e.g. the present patent's Figure 3 where web 44 joins wall 42 and hub 46).

Neither does the co-pending patent application D116 (by the same applicant as that of the present European patent) place doubt on the scope of the term "web" because it uses this term for parts which indeed are webs, see Claim 1, (a) (iv) and Figure 2 (web 78), Figure 3 (web 44), Figure 4 (web 98) and Figure 8 (web 136).

The part between the land 34 of the outer member and the outer radial limit of the unnumbered passageway in Figure 2 of document D1 will hereinafter be referred to as the part terminating in the land and not as a web.

#### 5.1.5 Location of the annular first portion of the reservoir

As specified in Claim 1, the annular first portion of the reservoir of the tappet shown in Figure 2 of document D1 is located radially in between the outer wall and the plunger (cup-shaped cylinder member) 16, and axially between the top (closed end) 19 and the part which forms the bottom of the annular portion of reservoir, the radial extent of the annular portion being substantially the same as that of the part terminating in the land 34.

#### 5.1.6 Generally tubular hub

Claim 1 specifies that the plunger is received in a generally tubular hub and that the hub is solely supported by means of the web which extends between the hub and the tubular outer wall.

Figure 2 of document D1 shows neither a hub (let alone a **tubular** hub - the term "tubular" implying a tube having a certain wall thickness), nor a web, see section 5.1.4 above. Even if the part terminating in the land 34 were to be held to be a web, there would still not be an additional part which could be held to be a hub.

#### 5.1.7 Sheet metal stamping

Column 3, lines 41 to 53 of document D1 outlines possible changes to the preferred embodiment of the tappet shown in Figure 2. According to column 2, line 37 onwards the inner cylinder member (plunger 16) is to some extent centred on the valve by the undercut 33. Lines 41 to 43 and 47 to 50 speak of means for **additionally** centring the inner cylinder member (plunger 16) as well as blocking drainage of oil which might take the form of a resilient diaphragm or sheet metal stamping slidably bridging the annular distance between the inner and outer cylinder members 16 and 18 but which in Figure 2 is provided by forming the inner wall of the outer member with the land 34.

In the technical context of document D1, the above might be understood to mean that the part terminating in the land 34 could be replaced by a sheet metal stamping bridging the annular distance between the inner and outer cylinder members. Although the broad encyclopedic definitions of "sheet" and "stamp" in dictionary D117 may encompass embodiments of sheet metal stampings which

have upturned or downturned parts, the Board cannot see that the rather vague statements in column 3, lines 41 to 53 of document D1 and the deductions drawn therefrom constitute a specific disclosure of a web and generally tubular hub.

Respondent I further argues that the replacement of the part terminating in the land 34 by a sheet metal stamping would mean that the large bore in the lower half of the interior of outer member would be continued upwards to the closed end 19, the stamping then bridging the gap between the tubular skirt and the inner member 16.

It would indeed seem that if the land 34 is to be replaced by the sheet metal stamping then the inner wall of the outer member at this height must be moved radially outwards so that it is no longer in contact with the inner cylinder member 16. However while this might be by an amount to bring it into line with the outer radial limit of the unnumbered passageway, there is no indication of a removal of material above the part terminating in the land 34, i.e. to enlarge the unnumbered passageway (and this construction would also contradict the requirement of Claim 1 of document D1 in column 4, lines 28 and 29 for a smaller concentric bore above the lower bore). Thus the passageway would not be transformed into the required fluid reservoir (see section 5.1.3 above).

- 5.2 The subject-matter defined in Claim 1 thus differs from the disclosure of document D1 in various ways and not merely one way as found by the Opposition Division.

5.3 It is undisputed that tappets according to the **drawing D13** are part of the state of the art. However, for reasons similar to those given in sections 5.1.4 and 5.1.6 above, they do not have a web or a generally tubular hub.

5.4 Section 4.3 of the Opposition Division's decision states that none of the **remaining documents** on file appears to be prejudicial to the novelty of the subject-matter of Claim 1 as granted.

The Board sees no reason to doubt this finding which moreover has not been questioned by either Respondent in the appeal proceedings.

5.5 For the reasons in sections 5.1 to 5.4 above, the subject-matter of Claim 1 as granted for Italy and of Claim 1 as granted for Germany is thus to be considered as novel within the meaning of Article 54 EPC.

6. *Closest prior art*

6.1 It is clear that attempts were being made in the industry before the present priority date to develop a tappet suitable for European engines to run at higher speeds and to have less space for the tappets than American engines, see e.g. section 2 of Affidavit D16 and Customer Contact Report D21. It is moreover not in dispute in the appeal proceedings that higher tappet speed capability goes hand in hand with lower tappet weight. Indeed paragraph 4 of Customer Contact Report D21 states that for an engine speed of 7000 rpm the tappet weight would have to be reduced to 75 grams.

6.2 According to Affidavit D14, attempts had been made to increase the limiting speed of the Vega tappet shown in drawing D13 by reducing its weight. However the top

right hand graph of Exhibit B accompanying the Affidavit shows that thereby the weight could be reduced only to about 150 grams. The skilled person wishing to achieve a markedly lower tappet weight (of the order of the 75 grams set out in Report D21) would have been deterred from taking the Vega tappet shown in drawing D13 (which is in principle based on document D1) because of the disappointingly low reduction in weight.

6.3 Therefore the skilled person seeking to satisfy European requirements would rather have looked at tappets of European design which were specifically designed for higher limiting speeds, e.g. those shown in document D4. This document, as well as depicting tappets which give the immediate impression of being lighter than that of document D1, states that it concerns the provision of a reliable tappet for the high speeds achieved by modern engines (page 2, lines 16 to 19), with an oil reservoir which is annular and located between the outer wall and the cylindrical piston so that the height of the valve driving gear is not increased (page 3, lines 4 to 12). The oil reservoir is large enough to always fill the pressure chamber especially on engine starting (page 3, lines 19 to 23). The use of thin materials gives a lighter construction to fulfil the requirement for the smallest possible moving masses set by high speed engines (see page 4, lines 2 to 10).

6.4 Thus the disclosure of document D4 is considerably further advanced in the search for a light high speed tappet than either the document D1 or the Vega tappet shown in drawing D13. Accordingly the Board cannot see any reason why the skilled person would choose either document D1 or drawing D13 as his starting point.

Following the above considerations, of all the documents cited, only the tappet according to Figure 2 of document D4 remains as a reasonable starting point for the judgement of the present invention. This prior art tappet is low and light, has two reservoirs for supplying the pressure chamber which are large enough to fill the pressure chamber on start up and moreover has the features set out in the pre-characterising portion of Claim 1 in common with the invention.

- 6.5 The Opposition Division found in sections 7 to 9 of its decision that document D1 represented the closest state of the art in part because it disclosed all the features of Claim 1 except for a generally tubular hub.

However, as set out in the above sections 5.1.2, 5.1.3 and 5.1.4, there are more differences between Claim 1 and document D1 than just the generally tubular hub.

- 6.6 Another reason given in section 13 of said decision for document D1 being closest to the invention was that it provided a part of the solution of the problem set out in column 3, lines 18 to 23 of the patent as granted, namely "manufacturing the tappet without having to weld or otherwise fix components near the centre of the top of the tappet".

However the formulation of the problem in the patent specification was arrived at by starting from document D4 as the closest prior art. By accepting this formulation of the problem, one implicitly accepted that document D4 indeed was the closest prior art. If document D1 was to be considered to be the closest prior art, then the objective problem would have had to be reformulated on the basis of the differences between Claim 1 and the disclosure of document D1.

7. *Problem and solution*

7.1 In the tappet shown in Figure 2 of document D4 the tubular extension 3a (Ansatz) is connected to the bucket top 4a. Since the word "Ansatz" used in the German document D4 for the tubular extension signifies that it is one with the bucket top 4a, the allegation of Respondent I in the appeal proceedings that the tubular extension 3a is not secured to the bucket top 4a of the finished tappet has no sound basis.

When constructing this prior art tappet the tubular extension 3a (Ansatz) would be formed separately from the bucket top 4a and then fixed thereto such as by welding. Since however the bucket top needs to be hardened for wear resistance, welding the tubular extension thereto is difficult and has a technically undesirable effect.

The bottom of the annular fluid reservoir 14a takes the form of a plate 7a and sealing ring 25 which seem to the Board to have merely a sealing function and not a guiding function, the latter being provided by the plunger 2a sliding on the tubular extension 3a.

7.2 When starting from this prior art tappet, the problem is to simplify the tappet, to reduce scrap losses and to avoid weakening the stressed region of the top of the bucket.

7.3 In the tappet defined in Claim 1, the tubular extension 3a of the prior art tappet is replaced by a piston which by being unsecured to the bucket top avoids weakening the latter.

The piston is guided by being slidably received in the plunger with a fit allowing controlled leakdown from the pressure chamber. The plunger is in turn received in a generally tubular hub whose upper end is supported axially separated from the bucket top so that the volume of the annular fluid reservoir is not reduced. The hub is supported solely by the web which extends between the hub and the tubular outer wall, thus constituting the bottom of the annular fluid reservoir.

7.4 Consequently the features of the Claims 1 as granted, and in particular the features of their characterising portions, solve the problem presented by the tappet shown in Figure 2 of document D4.

8. *Inventive step*

8.1 Starting from the high speed tappet shown in Figure 2 of document D4, the skilled person could be expected to look at other high speed tappet designs i.e those designs having low moving mass and a large oil reservoir. Thus document D5 and Figure 1 of document D4 would be of interest. However, while the skilled person could be expected to be familiar with document D1, the Board does not consider that he would make use of it since the disadvantages of this heavier tappet with a smaller fluid reservoir have in part already been overcome by the tappets of documents D4 and D5.

8.2 If nevertheless he were to replace the tubular extension of Figure 2 of document D4 by the unsecured piston of document D1 then he would need to guide the plunger in some other way. The way set out in Claim 1, namely the web and a generally tubular hub, is not disclosed by either document D4 or document D1.



8.3 While a web and hub are present in the tappet shown in Figure 1 of document D3, this tappet is of a basically different type providing a varying amount of valve lift instead of a constant valve lift. The statement in page 3, lines 5 to 8 of document D3 that "tappet adjustment will not normally be necessary as the assembly acts, in this respect, as a conventional hydraulic tappet" has to be seen as a whole, meaning that the tappet is not in fact conventional but acts as a conventional tappet in just the one respect. It would not be obvious for the skilled person, having gone to the trouble of providing the complicated parts necessary for providing a varying amount, to then decide not to use them.

There is therefore no reason other than hindsight for the skilled person to consult this document. Even if he did, he would be looking for a solution to his problem and document D3 gives no indication of providing a solution to this problem. He would not be specifically looking for a web and a hub. The argument that it was obvious to select just these two features from the disclosure and combine them with the combination of the teachings from documents D4 and D1 is the result of an ex post facto analysis.

8.4 When starting from document D4 as the closest prior art, the teaching of any of the other prior art documents in the appeal proceedings would not lead the skilled person to perform such modifications as would be necessary to arrive at the tappet defined in Claim 1.

9. *Inventive step - starting from document D1 or drawing D13*

9.1 For the sake of completeness, the question of inventive step will now be considered assuming - as does the Opposition Division - that the skilled person would start from document D1.

9.2 The first line of argument of the Opposition Division is that the only difference specified by Claim 1 over the disclosure of document D1 is a generally tubular hub, that document D1 suggests that replacement solutions to the land 34 of the preferred embodiment can be considered, and that the web-hub construction disclosed by document D3 is an obvious, technically equivalent solution.

The proposed changes to the preferred tappet of Figure 2 of document D1 have been discussed in section 5.1.7 above, concluding that these result in neither a web, nor a generally tubular hub, nor enlargement of the unnumbered passageway to make it into an annular reservoir portion. Moreover, basically the same reasons as those given in section 8.3 stand against it being obvious for the skilled person to use the web and hub construction known from document D3.

9.3 The Opposition Division's second line of argument is that the problem of reducing weight of moving parts is obvious (and indeed known from document D15), that it is obvious to reduce weight by removing material from the tappet according to document D1 in various ways, one being to hollow out the lower part of the web on which guiding surface 34 is provided.

It is true that the skilled person can be expected to try to reduce the weight of moving parts but this would not necessarily lead him to lighten the **tappet** because page 57 of document D15, although stating that designers strive to reduce the weight of valve operating gear, goes on to say that overhead camshafts are used to do this.

If the skilled person did decide to try to reduce the weight of the tappet according to document D1, he could do so in several ways which however would not yield the presently claimed structure. Even after the Opposition Division's modification of hollowing out the lower part of the web 34 (which is however not a web) and turning it into a web and a tubular hub arrangement, the volume of the unnumbered passageway above the newly produced web would remain the same, i.e. the required fluid reservoir would not be obtained.

- 9.4 The argument of Respondent I concerning continuing the large bore in the lower half of the interior of outer member upwards to the closed end 19 with the stamping bridging the gap between the tubular skirt and the inner member 16 has been discussed in section 5.1.7 for novelty purposes. Now considering inventive step, there is no hint in the document D1 to lead the skilled person to carry out this modification.
- 9.5 The skilled person would need to pick, from the many possible ways of reducing the weight of the tappet of document D1, just the way necessary to arrive at the present invention, with its advantages over the tappet of document D1. To argue that this is obvious has to be seen as the result of an ex post facto analysis.

- 9.6 Except for the lack of disclosure of a sheet metal stamping, the teaching of drawing D13 is similar to that of document D1. Accordingly the arguments in sections 9.1 to 9.5 above generally apply.
10. Since the novelty and inventive step arguments are unconvincing and the prior use allegations have not been proven to be public, the subject-matter of the two Claims 1 as granted for the Contracting States Italy and Germany respectively is patentable in the meaning of Articles 52, 54 and 56 EPC.

A discussion of the commercial value or otherwise of the present invention is thus unnecessary.

11. The patent is to be maintained as granted with the respective independent Claim 1 for each Contracting State and the respective sets of dependent Claims 2 to 14 concerning preferred embodiments of the tappets according to the respective Claim 1.

## Order

**For these reasons it is decided that:**

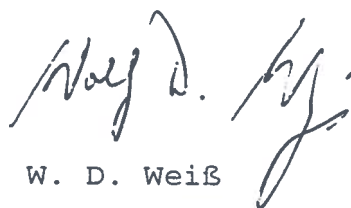
1. The decision under appeal is set aside.
2. The patent is maintained as granted.

The Registrar:



S. Fabiani

The Chairman:



W. D. Weiß