

**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 26 October 2000**

**Case Number:** T 0470/99 - 3.2.1

**Application Number:** 92908363.2

**Publication Number:** 0580675

**IPC:** B60T 13/52; B60T 8/48

**Language of the proceedings:** EN

**Title of invention:**  
Brake Servo Booster

**Patentee:**  
Lucas Industries Limited

**Opponent:**  
Continental Teves AG & Co. oHG

**Headword:**  
-

**Relevant legal provisions:**  
EPC Art. 54, 56  
EPC R. 57a

**Keyword:**  
"Amendment occasioned by a ground for opposition (no)"  
"Novelty (yes)"  
"Inventive step (yes)"

**Decisions cited:**  
-

**Catchword:**  
-



Case Number: T 0470/99 - 3.2.1

**D E C I S I O N**  
of the Technical Board of Appeal 3.2.1  
of 26 October 2000

**Appellant:** Lucas Industries Limited  
(Proprietor of the patent) 46 Park Street  
London W1Y 4DJ (GB)

**Representative:** Beyer, Andreas, Dr.  
Wuesthoff & Wuesthoff  
Patent- und Rechtsanwälte  
Schweigerstrasse 2  
D-81541 München (DE)

**Respondent:** Continental Teves AG & Co. oHG  
(Opponent) Guerickestr. 7  
D-60488 Frankfurt/Main (DE)

**Representative:** Dusil, Vladimir, Dipl.-Ing.  
Guerickestr. 7  
D-60488 Frankfurt/Main (DE)

**Decision under appeal:** Decision of the Opposition Division of the  
European Patent Office posted 22 February 1999  
revoking European patent No. 0 580 675 pursuant  
to Article 102(1) EPC.

**Composition of the Board:**

**Chairman:** F. A. Gumbel  
**Members:** J. Osborne  
J. H. P. Willems

## Summary of Facts and Submissions

I. The patent proprietor's appeal is against the decision of the Opposition Division to revoke European patent 0 580 675.

II. The patent had been opposed on the grounds that the subject-matter of Claim 1 extended beyond the content of the application as filed (Article 100(c) EPC), that the subject-matter of the claims lacked novelty and/or inventive step (Article 100(a) EPC) and that the patent did not disclose the subject-matter of dependent Claim 3 in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art (Article 100(b) EPC). The following evidence was taken into account during the opposition proceedings:

D1: EP-A-0 417 945

D2: US-A-3 719 123

D3: WO-A-90/00127

D4: GB-A-2 089 453.

III. The Opposition Division was of the opinion that the ground for opposition according to Article 100(c) EPC did not prejudice maintenance of the patent as granted but that the subject-matter of Claim 1 as granted was not novel in the light of the disclosure of D1. The written decision of the Opposition Division was posted on 22 February 1999. Notice of appeal together with payment of the appeal fee was received on 20 April 1999. The statement of grounds of appeal was received on 11 June 1999.

- IV. In an oral proceedings held on 26 October 2000 the appellant upheld a main request to maintain the patent in an amended form filed with the grounds for appeal, a first auxiliary request to maintain the patent as granted and a second auxiliary request to maintain the patent in amended form filed with the grounds for appeal. The respondent requested that the decision to revoke the patent be upheld and that the appeal be dismissed. Only the grounds for opposition according to Article 100(a) EPC were pursued during the appeal procedure.
- V. In addition to Claim 1, the patent as granted contains dependent Claims 2 to 6 which define preferred embodiments of the subject-matter of Claim 1.

Claim 1 as granted reads:

"A brake servo booster for use in a vehicle hydraulic braking system comprising a servo piston (500) which is connected to an output member (800) and to which a supply of air is controlled by a valve mechanism (2A, 3A, 7) which includes a reciprocable valve element (3) connected to a force input member (5) actuated by a driver-operated control device, the force input member including two parts (12, 11) of which a first one (12) is connected, in use, to the driver-operated control device and the second one (11) to the valve element (3), the arrangement being such that operating force applied to the control device is transmitted through both of said first and second parts (12, 11) of the input member to the valve element (3), whilst operation of the booster in the traction control mode is permitted by the second part (11) of the force input member moving relative to the first part (12),

characterised by a direct mechanical connection between the first and second parts (12, 11) of the force input member through which operating force from the control device is transmitted from the first part (12) to the second part (11)."

Claim 1 according to the appellant's main request differs from that as granted essentially in that the final feature of the preamble ("operation of the booster...first part (12)") is transferred to the characterising portion.

VI. The arguments of the appellant can be summarised as follows:

The amendment of Claim 1 according to the main request corrects the two-part form of Claim 1 in the light of the disclosures of D1, D3 with the aim of clarifying the claim.

The subject-matter of Claim 1 as granted is novel in the light of D1 in as far as the pin which connects the clevis on the force input member with the brake pedal arm does not form part of the brake booster. In respect of inventive step, the two-piece force input rod allows the possibility that the brake pedal can be located in its optimum inoperative position by means of a single stop provided on the brake booster. D2 discloses a two-piece force input member in combination with a booster which is not adapted for use in a traction control system and which does not offer the advantage achievable with the subject-matter of Claim 1. No other cited document discloses a two-piece force input member for use with a traction control system. Particularly, D4 discloses a one-piece force input member in

combination with a concentrically arranged valve control rod for automatic operation.

- VII. The respondent essentially reasoned in respect of the first auxiliary request that the subject-matter of Claim 1 lacks novelty with respect to D1. D1 does not disclose whether the connecting pin of D1 is part of the booster or of the pedal lever but it nevertheless satisfies the requirement of Claim 1 of the patent that the first part of the force input member is connected to the pedal arm. In respect of inventive step, D4 discloses a booster which is suitable for use in a traction control system, which comprises a two-piece force input member which permits operation of the booster in the traction control mode by relative movement of the two pieces of the force input member.

### **Reasons for the Decision**

1. The appeal is admissible.

#### *Main request*

2. *Amendment*

- 2.1 Claim 1 as granted is presented in the two-part form according to Rule 29(1) EPC and the sole amendment according to the appellant's main request is to amend the division of features between the two parts. However, none of the grounds for opposition set out in Article 100 EPC relates either to the two-part form of a claim or to clarity, which the appellant seeks to improve with the amendment. It follows that the amendment requested by the appellant is not occasioned

by a ground for opposition and therefore is not allowable in accordance with Rule 57a EPC.

*First auxiliary request*

3. *Novelty*

3.1 D1 relates to a brake servo booster for use in a vehicle hydraulic braking system, comprising a servo piston 9 which is connected to an output member 13 and to which a supply of air is controlled by a valve mechanism 17 which includes a reciprocable valve element 23 connected by a ball-in-socket arrangement to a force input member (without reference) having a slot at its right-hand end as viewed in Figure 1. The force input member is actuated by and, in use, connected to a driver-operated control device (pedal arm) 15 by a connecting member (also without reference) located in the slot. In the inoperative position of the pedal shown in Figure 1 the connecting member is located at the left-hand end of the slot and it is implicit that force applied to the pedal would result in movement toward the left of the force input member and the valve element 23 substantially without play. During operation in the traction control mode the force input member and the valve element would undergo similar movement whilst the connecting member and the pedal would remain stationary by virtue of the slot.

3.1.1 The general technical knowledge of the skilled person is that it is usual that the brake booster would be manufactured as a unit and mounted to the front side of the vehicle bulkhead with the force input member passing through to the rear side. The pedal arm then would be a separate unit mounted to the rear of the

bulkhead and the connecting member would connect the force input member to the pedal arm. The construction of the pedal arm, of the force input member and of the connecting member is not described in the text. D1 contains no teaching that, with the exception of the presence of the slot, the arrangement for connection of the force input member to the pedal arm differs from the usual arrangement. In the absence of any explicit teaching and in the knowledge of the usual arrangement discussed above, the skilled person would not derive from D1 that the connecting member forms part of the booster. The Board therefore is of the opinion that D1 fails to disclose the feature of Claim 1 under appeal that "the force input member includes two parts... whilst operation of the booster in the traction control mode is permitted by the second part of the force input member moving relative to the first part...".

- 3.2 D4 relates to a manual braking system with additionally two levels of automatic operation initiated in response to radar sensing distance of an obstacle. The brake servo booster comprises a force input member 39 which has a longitudinal bore 39c at the right hand side as viewed in Figures 2, 3 whilst the left hand end is solid and has a spherical head 39a connected to a reaction rod 37. The end of the force input member having the bore is connected to a driver-operated control device (pedal lever 64) by means of a yoke 72 and a pin 73. A control rod 41 for automatic operation is located in the bore of the force input member and carries at one end a cross pin 40 for engaging the valve member 50 whilst the other end contacts an arm 22 which is movable by solenoids 11, 13 independently of the pedal lever. During manual braking movement of the pedal lever is transferred via the yoke to the force



input member which in turn transmits it through a ring 43 and a sleeve 42 to the valve member. During automatic braking the solenoid acts on the arm 22 and thereby moves the control rod, the cross pin and the valve member.

3.2.1 The control rod serves no purpose in the transmission of operating force from the pedal lever to the valve element. The force input member consists of a single part which at one end is connected by the yoke to the pedal arm and at the other end to the reaction rod. It follows that the features of Claim 1 under appeal that "operation of the booster in the traction control mode is permitted by the second part of the force input member moving relative to the first part" are not known from D4.

3.3 D2 relates to a brake servo booster for use in a vehicle hydraulic system, having an operating arrangement in which two levels of effort may be transmitted from the pedal to the booster (see particularly column 4, line 52 - column 5, line 9). There is no disclosure of any automatic operation of the booster. An upper force input member 18 and a lower force input member 22 operate in a sequential arrangement to provide the two levels of force. The upper force input member 18 includes a first part 32 connected, in use, to the driver-operated control device 14 and a second part 26 connected to a valve element 44. During light application of the brakes the braking effort is transmitted through the lower force input member and the second part of the upper force input member is moved away from the first part. Force is transmitted through both of the first and second parts only during more severe braking. This arrangement

therefore differs from the subject-matter of Claim 1 under appeal which, implicitly, relates to function of the booster during manual braking irrespective of the level of force applied to the pedal. Moreover, the booster is not adapted for operation in a traction control mode or a similar mode of automatic operation of the brakes.

3.4 D3 discloses a brake servo booster adapted for use with ABS, in which a force input member includes two parts 3, 4 which are coupled hydraulically during brake operation. During ABS operation the part 3 connected to the pedal is decoupled from the movement of the part 4 connected to the valve element. There is no direct mechanical connection between these two parts.

3.5 It follows from the above that the subject-matter of Claim 1 and therefore also of Claims 2 to 6 is novel in comparison with the cited prior art (Article 54(1), (2) EPC).

4. *Inventive step*

4.1 The problem addressed in the patent under appeal relates to isolation of the brake pedal from the movement of the valve element during automatic operation of the booster as part of a traction control system (column 1, lines 13 to 18). In the opinion of the Board the closest prior art is disclosed by D1 since that is the only document which already discloses a solution to this problem. D1 discloses the features discussed under section 3.1 above.

4.2 It follows that the subject-matter of Claim 1 differs from that of D1 by:

"the force input member including two parts of which a first one is connected, in use, to the driver-operated control device and the second one to the valve element, the arrangement being such that operating force applied to the control device is transmitted through both of said first and second parts of the input member to the valve element, whilst operation of the booster in the traction control mode is permitted by the second part of the force input member moving relative to the first part... a direct mechanical connection provided between the first and second parts of the force input member through which operating force from the control device is transmitted from the first part to the second part."

- 4.3 D1 is silent regarding both the effect of the slot and the arrangement to locate the pedal in the position shown. However, the Board considers it implicit to the skilled person that the pedal arm would be provided with a spring to return the pedal arm to its inoperative position after the release of force applied to the pedal and a stop to define the inoperative position. Installation in a vehicle would require adjustment of the pedal stop to prevent it from inhibiting the booster valve from returning to its position corresponding to full release of the brakes (set by stop 21 - see column 3, lines 8 to 18) whilst avoiding play between the connecting member and the end of the slot in the force input member. By comparison, the booster according to Claim 1 allows the possibility of using a stop on the booster to control the position of the pedal arm (see the patent specification column 2, lines 33 to 36). The objectively assessed problem which is solved by the subject-matter of Claim 1 therefore is to provide a booster which isolates the pedal from movement of the valve element

during automatic operation as part of a traction control system whilst offering the possibility of simplified adjustment upon its installation in a vehicle.

4.4 None of the remainder of the cited prior art relates to the problem of isolation of the pedal from movement of the valve element during automatic operation as part of a traction control system. The two-piece construction of the upper force input member in D2 does permit the valve element to move relative to the part 32 of the force input member which is connected to the pedal arm but this occurs during manual application of the brakes (column 4, lines 13 to 19). In the opinion of the Board the skilled person would not recognise the possibility of using such a two-piece force input member in the booster of D1 in order to solve the stated problem. D3 also discloses a two-piece force input member but not having a direct mechanical connection between the two pieces. Moreover D3 relates to the isolation of the pedal from the movements of the valve element during operation of ABS. The initial movement of the valve element during operation of ABS is, however, towards the pedal and so opposed to the relative movement with which Claim 1 under appeal is concerned. As discussed in section 3.2, D4 does not disclose a two-piece force input member.

4.5 On the basis of the foregoing the Board comes to the conclusion that the subject-matter of Claim 1 and therefore also of Claims 2 to 6 is not rendered obvious by the cited prior art and so involves an inventive step (Article 56 EPC).

**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:

The Chairman:

S. Fabiani

F. Gumbel