PATENT SPECIFICATION (11) 1 567 649

1 567 649

(21) Application No. 41324/76 (22) Filed 5 Oct. 1976
(31) Convention Application No. 2 605 532 (32) Filed 12 Feb. 1976 in
(33) Fed. Rep. of Germany (DE)
(44) Complete Specification published 21 May 1980
(51) INT. CL.³ F15B 15/14
(52) Index at acceptance
F1D 152 180 246 A3
F2E 2N2A1 2N2A2B 2N2C1B 2N2C2A 2N2C2B 2N2D2B 2N2D6B 2N2K1 DF

(19)

(54) IMPROVEMENTS IN FRICTION-RING DISC BRAKES

(71) I, HERMANN KLAUE, a German citizen of Tour D'Ivoire 24e, Montreux, Switzerland, do hereby declare the invention for which I pray that a Patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to friction-ring disc brakes.

Friction-ring disc brakes for motor vehicles have been proposed in which friction rings with friction linings are disposed on a stationary brake support in a rotating brake housing with external radial ribs so as to be axially freely movable but fixed in the circumferential direction. Hydraulic ring actuating means comprising two or three parts are disposed between the friction rings, one part causing the friction ring on one side and the second or the second and third part causing the friction ring of the opposite side to bear upon the rotating brake housing in the course of the braking operation.

Friction-ring disc brakes for two-wheeled vehicles have also been proposed in which two friction rings co-rotate with the wheel or with the hub and are joined to each other by connecting members which extend through the hub or through the wheel and brake discs with brake linings are provided on both sides of the wheel, hydraulic ring actuating means operating the said brake discs to effect the braking operation.

The object of the invention is to provide hydraulic actuating means for friction ring disc brakes of simple construction and which is small in width so that it will occupy only a relatively small portion of the overall axial length of the brake.

According to the invention, there is provided a friction ring disc brake having hydraulic actuating means, said actuating means comprising an outer ring and an inner ring each said ring having an annular recess extending inwardly from one side, said recesses being complementary in cross-section, the annular recess of the outer ring having a radially outer surface extending parallel to the ring axis and a radially inner surface sloping inwardly at an angle to the ring axis, the annular recess of the inner ring having a radially inner surface extending parallel to the ring axis and a radially outer surface sloping inwardly at an angle to the ring axis, the two rings being disposed concentrically with one another and in overlapping engagement so that the sloping radial surface of the recess of the inner ring surrounds the sloping radial surface of the outer ring, the radially outer parallel surface of the recess of the outer ring surrounds the outer periphery of the inner ring and the inner peripheral surface of the outer ring surrounds the radially inner parallel surface of the recess of the inner ring said surfaces providing between them an annular chamber of Z form in cross-section to receive hydraulic liquid for operating the actuating means, an outer ring seal provided between the radially outer parallel surface of the recess of the outer ring and the outer periphery of the inner ring and an inner ring seal between the radially inner parallel surface of the recess of the inner ring and the inner periphery of the outer ring said ring seals providing sealing means for said annular chamber and adjusting means to compensate for wear in the brake.

Advantageously the outer ring seal is disposed in an annular groove provided in the radially outer parallel surface of the recess of the outer ring the inner ring seal being disposed in an annular groove provided in the radially inner parallel surface of the recess of the inner ring.

The drawings show embodiments of the

invention.

Figure 1 shows the top half of a vehicle brake in longitudinal section;

Figure 2 is a partial cylinder section through the brake along the line A-B shown in Figure 1;

Figures 3 and 4 illustrate a brake for two-wheeled vehicles, Figure 3 is a longitudinal section and Figure 4 is a partial longitudinal section through the ring cylinder actuating means when the linings are worn.

The numeral 1 in Figures 1 and 2 refers to the wheel which is mounted by means of wheel studs 2 on the hub 3. The two-part brake housing 4, 5 mounted on the hub 3 by means of extensions not shown, supports the two friction rings 6 and 7 with friction linings 8 and 9 on brake support arms which surround the brake housing but have been omitted from the drawing in the interests of clarity, so that the said friction rings are axially freely movable but are fixed in the circumferential direction.

The hydraulic actuating means is carried by the brake support and is disposed between the friction rings 6 and 7 and comprises an outer ring 10 and an inner ring 11. Each said ring has an annular recess extending inwardly from one side, said recesses being complimentary in cross-section. The annular recess of the outer ring 10 has a radially outer surface which extends parallel to the ring axis and a radially inner surface 10_2 which slopes inwardly at an angle to the ring axis. The annular recess of the inner ring 11 has a radially inner surface which extends parallel to the ring axis and a radially outer surface 11_2 which slopes inwardly at an angle to the ring axis. The rings 10 and 11 are disposed concentrically with one another and in overlapping engagement so that the sloping radial surface 11_2 of the recess of the inner ring 11 surrounds the sloping radial surface 10_2 of the recess of the outer ring 10, the radially outer parallel surface of the recess of the outer ring surrounds the outer periphery 11_1 of the inner ring 11 and the inner peripheral surface 10_1 of the outer ring 10 surrounds the radially inner parallel surface of the recess of the inner ring. The said surfaces provide between them an annular chamber 14 of Z form in cross-section which receives hydraulic liquid for operating the actuating means, the chamber being closed by an outer ring seal 12 and an inner ring seal 13. The outer ring seal 12 is disposed in an annular groove provided in the radially outer parallel surface of the recess of the outer ring 10 and provides a seal between this surface and the outer periphery 11_1 of the inner ring 11, the inner ring seal 13 being disposed in an annular groove provided in the radially inner parallel surface of the recess of the inner ring 11 and provides a seal between this surface and the inner periphery 10_1 of the outer ring 10.

The ring seals 12 and 13 also provide means for effecting automatically, adjustment of the actuating means to compensate for wear in the brake. To ensure adequate wear take-up travel, the axial lengths of the portions of the surfaces 10_1 and 11_1 on which the ring seals slide must be at least twice the permissible wear thickness of a brake lining.

Both the inner and outer rings transmit their axial thrust through annular extensions 10_3 and 11_3 which are situated opposite each other and concentric with the radial length of the sloping portion of the chamber 14.

Sealing against the ingress of dirt is effected by two gaiters 15 and 16 which interconnect the inner and outer rings.

The numeral 17 in Figures 3 and 4 refers to the shaft journal of the front wheel fork comprising the two tubes 18 and 19. The hub 21 runs on bearings 20 and is provided with the co-rotating friction rings 23 and 24 through tubular members 22 which are uniformly distributed over the circumference. To effect braking, the two brake discs 25 and 26 with brake lining are thrust against the friction discs, the thrust being absorbed on one side by the radially ribbed backing ring 27 to be transferred to the journal shaft 17. The brake actuating means is disposed at one side of the brake, the inner ring 28 of the hydraulic actuating means bearing upon the shaft 17, the outer ring being indicated by 29. The Z-shaped hydraulic chamber is indicated by reference 30, and is sealed by the two ring seals 31 and 32. The torque is absorbed by the fork tubes 18 and 19 through radius arms 33 and 34 which are suspended on extensions 25_1 or 26_1 of the brake discs 25 and 26. Figure 4 shows the provision of the outer ring 29 as a partial section when the brake lining is worn on both sides. The numeral 28_1 refers to the outer peripheral surface of the inner ring 28 and the numeral 29_1 refers to the radially inner peripheral surface of the outer ring 29.

WHAT I CLAIM IS:—

1. A friction ring disc brake having hydraulic actuating means, said actuating means comprising an outer ring and an inner ring each said ring having an annular recess extending inwardly from one side, said recesses being complementary in cross-section, the annular recess of the outer ring having a radially outer surface extending parallel to the ring axis and a radially inner surface sloping inwardly at an angle to the ring axis, the annular recess of the inner ring having a radially inner surface extending parallel to

the ring axis and a radially outer surface sloping inwardly at an angle to the ring axis, the two rings being disposed concentrically with one another and in overlapping engagement so that the sloping radial surface of the recess of the inner ring surrounds the sloping radial surface of the outer ring, the radially outer parallel surface of the recess of the outer ring surrounds the outer periphery of the inner ring and the inner peripheral surface of the outer ring surrounds the radially inner parallel surface of the recess of the inner ring said surfaces providing between them an annular chamber of Z form in cross-section to receive hydraulic liquid for operating the actuating means, an outer ring seal provided between the radially outer parallel surface of the recess of the outer ring and the outer periphery of the inner ring and an inner ring seal between the radially inner parallel surface of the recess of the inner ring and the inner periphery of the outer ring said ring seals providing sealing means for said annular chamber and adjusting means to compensate for wear in the brake.

2. A friction ring disc brake as claimed in Claim 1, wherein the outer ring seal is disposed in an annular groove provided in the radially outer parallel surface of the recess of the outer ring the inner ring seal being disposed in an annular groove provided in the radially inner parallel surface of the recess of the inner ring.

3. A friction ring disc brake as claimed in Claim 4 as herein described with reference to and as shown in Figures 1 and 2 or Figures 3 and 4 of the accompanying drawings.

For the Applicant:
F. J. CLEVELAND & COMPANY,
Chartered Patent Agents,
40-43 Chancery Lane,
London WC2A 1JQ.

Printed for Her Majesty's Stationery Office by The Tweeddale Press Ltd., Berwick-upon-Tweed, 1980
Published at the Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from which copies may be obtained

1567649 COMPLETE SPECIFICATION
2 SHEETS This drawing is a reproduction of the Original on a reduced scale
Sheet 1

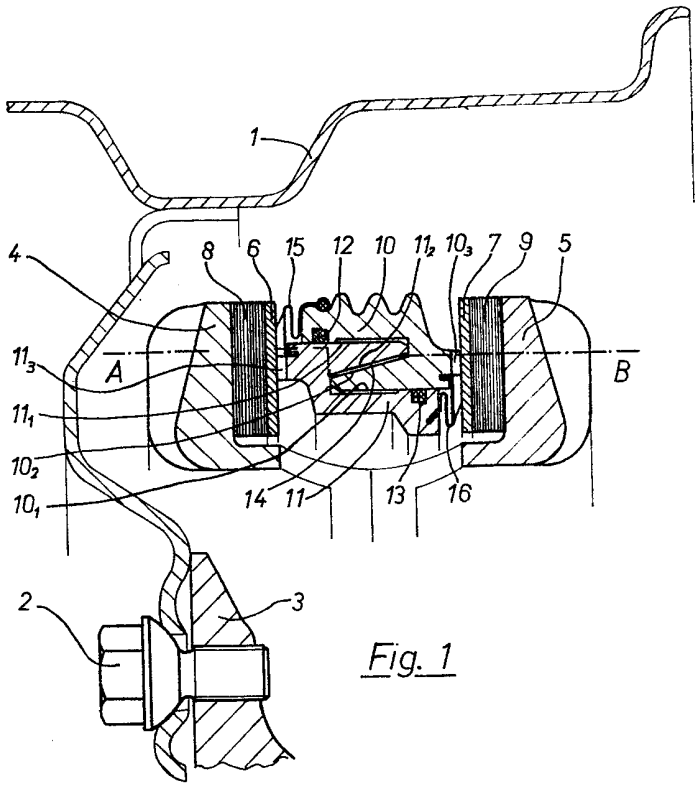

Fig. 1

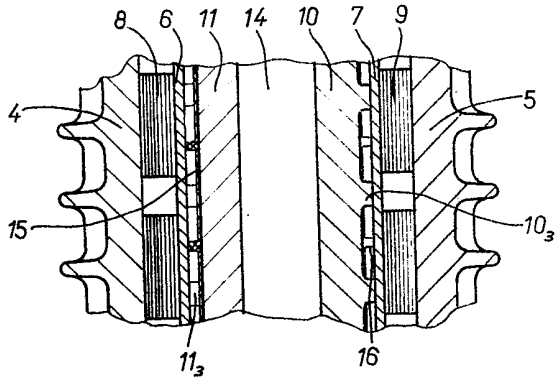

Fig. 2 (A-B)

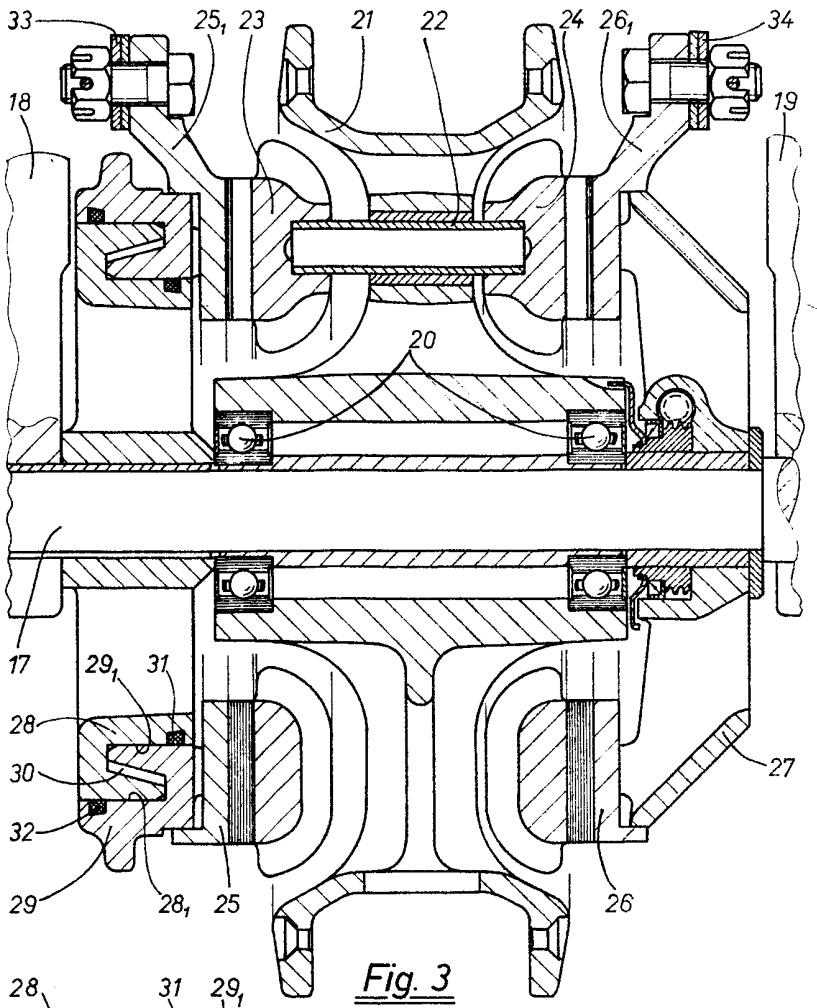
33
25₁
23
21
22
24
26₁
34
18
19
20
17
29₁
31
28
30
32
29
28₁
25
26
27

Fig. 3

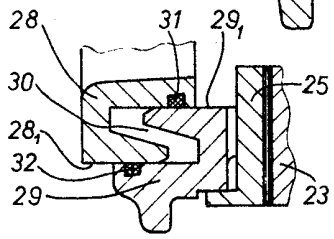
28
31
29₁
30
25
28₁
32
29
23

Fig. 4