PATENT SPECIFICATION (11) 1 589 719

1 589 719

(21) Application No. 44096/76 (22) Filed 23 Oct. 1976

(23) Complete Specification filed 11 Oct. 1977

(44) Complete Specification published 20 May 1981

(51) INT. CL.³ H02K 11/00

(52) Index at acceptance
H2A TN

(72) Inventors MAURICE JAMES ALLPORT
HERBERT JOHN THOMAS COTTON

(54) RECTIFIER AND BRUSH ASSEMBLY FOR AN ALTERNATOR

(71) We, LUCAS INDUSTRIES LIMITED, a British Company of Great King Street, Birmingham B19 2XF England, do hereby declare this invention for which we pray that a Patent may be granted to us, and the method by which it is to be performed to be particularly described in and by the following statement:–

This invention relates to a rectifier and brush assembly for an alternator and to an alternator including such an assembly.

According to one aspect of the present invention, there is provided a rectifier and brush assembly for an alternator, in which assembly field diodes in the rectifier have terminals interconnected by a common electrical connector, the common electrical connector has an integral apertured flange which is secured in electrical connection with an electrically conductive plate by means of a fixing screw which passes through the electrically conductive plate, and said electrically conductive plate is mounted on an electrically insulating brush housing in electrical connection with one of the brushes and serves as an abutment for a spring biasing said one of said brushes.

Preferably, the fixing screw is engaged in a bore in the brush housing.

According to another aspect of the present invention, there is provided an alternator including a rectifier and brush assembly as defined in any one of the last two preceding paragraphs.

An embodiment of the present invention will now be described by way of example, with reference to the accompanying drawings, in which:–

Fig. 1 is an end view of an alternator including one example of a rectifier and brush assembly according to the present invention,

Fig. 2 is a view in the direction of arrow II of part of the rectifier and brush assembly illustrated in Fig. 1,

Fig. 3 is a longitudinal sectional view of a brush housing forming part of the rectifier and brush assembly illustrated in Fig. 1,

Fig. 4 is a plan view in the direction of arrow IV in Fig. 2 and additionally showing a flange of the rectifier.

Referring first to Fig. 1, the alternator comprises a housing 10 including an integral end bracket 11 housing a rotor (not shown) and a stator (also not shown) having terminals 12 projecting through the end bracket 11. Mounted on the end bracket 11 externally of the housing 10 are a rectifier 13 and an electrically insulating brush housing 14. A voltage regulator 15 is mounted on the brush housing 14.

The rectifier 13 has first and second phase plates 16 mounted in stacked relationship on the end bracket 11. First and second sets of diodes 17 (only the diodes 17 associated with the second or uppermost phase plates 16 are shown). Terminals 18 of the first and second sets of diodes 17 are electrically interconnected by configurated metal plate connectors 19. The terminals 12 of the stator of the alternator are soldered to respective connectors 19. The rectifier 13 also includes a set of field diodes 20. Each field diode 20 has a terminal 21 connected with a respective one of the connectors 19 and a terminal 22 which is connected with a common electrical connector plate 23 so that the terminals 22 are electrically interconnected. Most preferably, the field diodes and common connector for the terminals 22 are of the type described in our co-pending British Patent Application No. 44041/76 (Serial No. 1 589 717) entitled "Multiphase fullwave rectifier assembly". The connector plate 23 has an integral, apertured flange 24 which overlies a relatively rigid electrically conductive plate 25 mounted on the brush housing 14. A screw 26 (see Fig. 1) passes through apertures in the flange 24 and the plate 25 to engage in a bore in the brush housing 14 so as to secure the flange 24 against the plate 25. The screw 26 also serves to secure a connector 27 in electrical contact with the flange 24, said connector 27 having crimped thereto a lead 28 from the voltage regulator 15.

The brush housing 14 houses a pair of brushes 29 and 30 which are biased by respective springs 31 and 32. The brush 30 is connected with a plate 33 by means of a

flexible electrical conductor 34. The plate 33 is connected with the voltage regulator 15 in a manner which will not be described in any further detail herein. The preferred manner of connection of the plate 33 with the voltage regulator 15 is as described in our co-pending British Patent Application No. 44097/76 (Serial No. 1 589 720) entitled "A Voltage Regulator and Brush Assembly". The brush 29 is electrically connected with a portion 25*a* of the plate 25 by means of a flexible conductor 35. The portion 25*a* of the plate 25 provide an abutment for the spring 31 and a screw 36 engaging in the brush housing 14 serves, as well as the screw 26, to mount the plate 25 on the brush housing 14. The plate 25 further includes an integral terminal 36 which is connected with a surge protection diode 37 *via* a lead 38 (see Fig. 1).

Thus, the connector plate 23, which includes the apertured flange 24, is directly secured to the plate 25 mounted on the brush housing 14. It is this plate 25 which has the portion 25*a* serving to provide the electrical connection with the brush 29. The portion 25*a* of the plate 25 also serves as an abutment for the spring 31. This arrangement reduces the overall number of connections to be made between the rectifier and the brush compared with the case where a separate electrical connector interconnecting the connector plate 23 and the plate 25 is provided. This reduces costs by reducing the overall number of parts required and by reducing the amount of labour involved in assembly as well as ensuring a good electrical connection between the rectifier 13 and the brush 29.

WHAT WE CLAIM IS:–

1. A rectifier and brush assembly for an alternator, in which assembly field diodes in the rectifier have terminals interconnected by a common electrical connector, the common electrical connector has an integral apertured flange which is secured in electrical connection with an electrically conductive plate by means of a fixing screw which passes through the electrically conductive plate, and said electrically conductive plate is mounted on an electrically insulating brush housing in electrical connection with one of the brushes and serves as an abutment for a spring biasing said one of said brushes.

2. An assembly as claimed in claim 1, wherein the fixing screw is engaged in a bore in the brush housing.

3. An assembly as claimed in claim 1 or 2, wherein the fixing screw also serves to secure a connector in electrical connection with the electrically conductive member, said connector having a lead secured thereto, said lead extending from a voltage regulator mounted on the brush housing.

4. An assembly as claimed in claim 1, 2 or 3, wherein the electrically conductive member includes an integral terminal which is electrically connected with a surge protection diode.

5. An alternator including a rectifier and brush assembly as claimed in any preceding claim.

6. A rectifier and brush assembly substantially as hereinbefore described with reference to the accompanying drawings.

7. A alternator substantially as hereinbefore described with reference to the accompanying drawings.

MARKS & CLERK,
Alpha Tower,
ATV Centre,
Birmingham B1 1TT.
Agents for the Applicants.

Printed for Her Majesty's Stationery Office by The Tweeddale Press Ltd., Berwick-upon-Tweed, 1981. Published at the Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from which copies may be obtained.

flexible electrical conductor 34. The plate 33 is connected with the voltage regulator 15 in a manner which will not be described in any further detail herein. The preferred manner of connection of the plate 33 with the voltage regulator 15 is as described in our co-pending British Patent Application No. 44097/76 (Serial No. 1 589 720) entitled "A Voltage Regulator and Brush Assembly". The brush 29 is electrically connected with a portion 25*a* of the plate 25 by means of a flexible conductor 35. The portion 25*a* of the plate 25 provide an abutment for the spring 31 and a screw 36 engaging in the brush housing 14 serves, as well as the screw 26, to mount the plate 25 on the brush housing 14. The plate 25 further includes an integral terminal 36 which is connected with a surge protection diode 37 *via* a lead 38 (see Fig. 1).

Thus, the connector plate 23, which includes the apertured flange 24, is directly secured to the plate 25 mounted on the brush housing 14. It is this plate 25 which has the portion 25*a* serving to provide the electrical connection with the brush 29. The portion 25*a* of the plate 25 also serves as an abutment for the spring 31. This arrangement reduces the overall number of connections to be made between the rectifier and the brush compared with the case where a separate electrical connector interconnecting the connector plate 23 and the plate 25 is provided. This reduces costs by reducing the overall number of parts required and by reducing the amount of labour involved in assembly as well as ensuring a good electrical connection between the rectifier 13 and the brush 29.

WHAT WE CLAIM IS:-

1. A rectifier and brush assembly for an alternator, in which assembly field diodes in the rectifier have terminals interconnected by a common electrical connector, the common electrical connector has an integral apertured flange which is secured in electrical connection with an electrically conductive plate by means of a fixing screw which passes through the electrically conductive plate, and said electrically conductive plate is mounted on an electrically insulating brush housing in electrical connection with one of the brushes and serves as an abutment for a spring biasing said one of said brushes.

2. An assembly as claimed in claim 1, wherein the fixing screw is engaged in a bore in the brush housing.

3. An assembly as claimed in claim 1 or 2, wherein the fixing screw also serves to secure a connector in electrical connection with the electrically conductive member, said connector having a lead secured thereto, said lead extending from a voltage regulator mounted on the brush housing.

4. An assembly as claimed in claim 1, 2 or 3, wherein the electrically conductive member includes an integral terminal which is electrically connected with a surge protection diode.

5. An alternator including a rectifier and brush assembly as claimed in any preceding claim.

6. A rectifier and brush assembly substantially as hereinbefore described with reference to the accompanying drawings.

7. A alternator substantially as hereinbefore described with reference to the accompanying drawings.

MARKS & CLERK,
Alpha Tower,
ATV Centre,
Birmingham B1 1TT.
Agents for the Applicants.

Printed for Her Majesty's Stationery Office by The Tweeddale Press Ltd., Berwick-upon-Tweed, 1981. Published at the Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from which copies may be obtained.