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(54) **A RADIATOR FOR A HEADLIGHT ASSEMBLY**

(57) A headlight assembly (2) includes a headlight (20), a radiator (21), a collar (22), a circuit board (23) and a lens (24). A cooling device (3) is connected to the back of the headlight (20) and includes a base (30), a fan (31) and cover (32). The base (30) has a receiving area (300) in which the fan (31) is located. The base (30) has multiple first ventilation holes (302) defined through which communicate with the receiving area (300). The cover (32) is connected to the base (30) and has multiple second ventilation holes (322). The fan (31) sends the high temperature air in the headlight (20) of the headlight assembly (2) from the ventilation holes (322) to quickly cool down the inside temperature of the headlight (20).

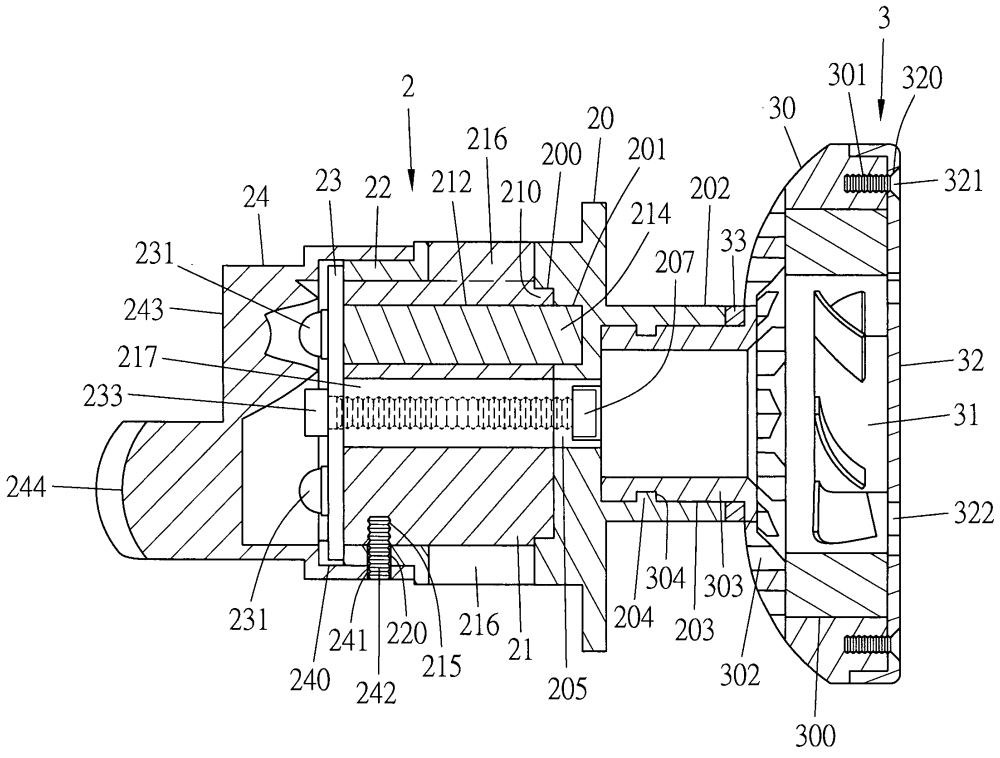

FIG.8

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Description

BACKGROUND OF THE INVENTION

1. Fields of the invention

[0001] The present invention relates to a headlight assembly, and more particularly, to a radiator is able to use a fan to radiate heat from a headlight assembly.

2. Descriptions of Related Art

[0002] The conventional headlight assembly 1 is discloses in Figs. 1 and 2, and generally comprises body 10 with a room 100 defined therein which has a curved reflection surface 101. A light source 11, such as a Tungsten filament, a Xenon lamp or a Light Emitting Diode (LED), is located in the room 100. A separation board 12 is located at the front end of the body 10 and has a hole 120. A connection member 13 is connected to the front end of the body 10 and has a barrier unit 14 located in the connection member 13. The barrier unit 14 has a solenoid valve 140 and a barrier board 141. A lens 15 is connected to the connection member 13 by a frame 16. The light emitted from the light source 11 is reflected by the reflection surface 101 and passes through the lens 15. The barrier unit 14 controls the range and angle of the light beams so as to form the high beam and the low beam. However, the light projected by the reflection surface 101 is scattered and brightness. Furthermore, the conventional headlight assembly does not have a radiator so that the high temperature from the light source 11 is trapped within the room 100 of the body 10, and the high temperature may quickly damage the light source and other related parts.

SUMMARY OF THE INVENTION

[0003] The present invention relates to a headlight assembly and comprises a headlight having a radiator connected to the first side thereof, and the radiator has multiple fins extending from the outer periphery thereof. A collar is mounted to the radiator, a circuit board connected to the end of the radiator and the collar. The circuit board which has at least two Light Emitting Diodes (LEDs), and a lens is connected to the radiator and the collar. The lens has a space locate the circuit board. The lens has a high-beam area and a low-beam area. At least one LED is located respectively corresponding to the high-beam area, and LED is located corresponding to the low-beam area.

[0004] A cooling device is connected to the second side of the headlight and has a base, a fan and a cover. The base has a receiving area defined in the first side thereof. The fan is located in the receiving area. Multiple first ventilation holes are defined through the base and communicate with the receiving area. The cover is connected to the second side of the base and has multiple second ventilation holes.

[0005] Preferably, a tubular portion extends from the second side of the headlight and has a room defined therein. A protrusion extends radially from the inner periphery of the room. The base of the cooling device has a tubular member extending from the second side thereof. The tubular member is inserted in the room of the tubular portion of the headlight. The tubular member has a slot defined in the outer surface thereof, and a notch extends from one end of the slot and communicates with the slot. The notch opens to the distal end of the tubular member such that the slot and the notch form an L-shaped engaging groove. A ridge is located between the slot and the notch. The protrusion is engaged with the slot via the notch to connect the tubular portion in the room.

[0006] Preferably, the tubular member of the base of the cooling device has a seal ring mounted thereto.

[0007] Preferably, the base of the cooling device has multiple threaded holes defined therein. The cover has multiple holes which are located corresponding to the threaded holes of the base. Multiple bolts extend through the holes of the cover and are threadedly connected to the threaded holes of the base.

[0008] The primary object of the present invention is to provide a cooling device connected to the back side of the headlight assembly. The cooling device has a base, a fan and cover. The fan sends the high temperature air in the headlight of the headlight assembly from the ventilation holes to quickly cool down the inside temperature of the headlight.

[0009] The present invention will become more obvious from the following description when taken in connection with the accompanying drawings which show, for purposes of illustration only, a preferred embodiment in accordance with the present invention.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010]

Fig. 1 shows that a conventional headlight assembly using the low beam;
Fig. 2 shows that a conventional headlight assembly using the high beam;
Fig. 3 is an exploded view of the headlight assembly and the cooling device of the present invention;
Fig. 4 is an exploded view of the headlight assembly and the cooling device of the present invention;
Fig. 5 is another exploded view of the headlight assembly and the cooling device of the present invention;
Fig. 6 is a perspective view to show the headlight assembly with the cooling device of the present invention;
Fig. 7 is another perspective view to show the headlight assembly with the cooling device of the present invention;

Fig. 8 is a cross sectional view of the headlight assembly with the cooling device of the present invention, and

Fig. 9 shows that the protrusion of the tubular portion of the body is engaged with the L-shaped engaging grove of the tubular member of the cooling device of the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0011] Referring to Figs. 3 to 5, the headlight assembly 2 of the present invention comprises a headlight 20 having a first side and a second side. The headlight 20 has a recessed area 200 defined in the first side thereof. Two positioning holes 201 and two holes 206 are defined in the inner end of the recessed area 200. A tubular portion 202 extends from the second side of the headlight 20 and has a room 203 defined therein. A protrusion 204 extends radially from the inner periphery of the room 203. A through hole 205 is defined centrally defined through the headlight 20. Two bolts 207 extend through the holes 206.

[0012] A radiator 21 has a first side and a second side, wherein a positioning rod 211 extending from the first side thereof. Two passages 212 and two threaded holes 213 are defined in the first side of the radiator 21. The radiator 21 has a positioning portion 210 on the second side thereof, the positioning portion 210 is connected to the recessed area 200 of the first side of the headlight 20. Two pins 214 extend through the passages 212. Two threaded holes 215 are defined radially in the outside of the radiator 21 and located close to the first side of the radiator 21. The radiator 21 has multiple fins 216 extending from the outer periphery thereof and located close to the second side of the radiator 21. A collar 22 is mounted to front side of the radiator 21 and has two side holes 220 which are located corresponding to the threaded holes 215 of the radiator 21. A circuit board 23 is connected to one end of the radiator 21 and the collar 22. The circuit board 23 has a hole 230 which is located corresponding to the positioning rod 211 on the radiator 21. At least two Light Emitting Diodes (LEDs) are connected to the circuit board 23. The circuit board 23 has two holes 232 which are located corresponding to the threaded holes 213 of the radiator 21. Two bolts 233 extend through the holes 232 of the circuit board 23 and are connected to the threaded holes 213 of the radiator 21 so as to connect the circuit board 23 and the radiator 21.

[0013] A lens 24 is connected to the radiator 21 and the collar 22. The leans 24 has a space 240 defined therein so that the circuit board 23 is located in the space 240. The lens 24 has holes 241 which are located corresponding to the two threaded holes 215 of the radiator 21 and the two side holes 220 of the collar 22. Bolts 242 extend through the two side holes 220 of the collar 22, the holes 241 of the lens 24 and are connected to the threaded holes 215 of the radiator 21. The lens 24 has a high-beam area 243 and a low-beam area 244. At least one LED 231 is located corresponding to the high-beam area 243, and at least one LED 231 is located corresponding to the low-beam area 244. A cooling device 3 is connected to the second side of the headlight 20 and has a base 30, a fan 31 and cover 32 and a seal ring 33. The base 30 has a polygonal receiving area 300 defined in the first side thereof. The fan 31 is located in the receiving area 300. Multiple first ventilation holes 302 are defined through the base 30 and communicate with the receiving area 300. The cover 32 is connected to the second side of the base 30 and has multiple second ventilation holes 322. The base 30 of the cooling device 3 has multiple threaded holes 301 defined therein. The cover 32 has multiple holes 320 which are located corresponding to the threaded holes 301 of the base 30. Multiple bolts 321 extend through the holes 320 of the cover 32 and are threadedly connected to the threaded holes 301 of the base 30. The baes 30 of the cooling device 3 has a tubular member 303 extending from the second side thereof. The tubular member 303 is inserted in the room 203 of the tubular portion 202 of the headlight 20. The tubular member 303 has a slot 304 defied in the outer surface thereof. A notch 305 extends from one end of the slot 304 and communicates with the slot 304. The notch 305 opens to the distal end of the tubular member 303. Therefore, the slot 304 and the notch 305 form a L-shaped engaging groove. A ridge 306 is located between the slot 304 and the notch 305. The tubular member 303 of the base 30 of the cooling device 3 has a seal ring 33 mounted thereto. The base 30 of the cooling device 3 has multiple threaded holes 301 defined therein. The cover 32 has multiple holes 320 which are located corresponding to the threaded holes 301 of the base 30. Multiple bolts 321 extend through the holes 320 of the cover 32 and are threadedly connected to the threaded holes 301 of the base 30.

[0014] Referring to Figs. 3 to 9, when assembling, the pins 214 extend through the passages 212 of the radiator 21, one end of each pin 214 extend beyond the positioning portion 210. The positioning portion 210 of the radiator 21 is inserted recessed area 200 of the headlight 20, and the ends of the two pins 214 are inserted into the positioning holes 201 of the headlight 20. The bolts 207 extend through the holes 206 of the headlight 20 and are threadedly connected to one end of the threaded holes 213 of the radiator 21 to connect the radiator 21 to the headlight 20. The collar 22 is mounted to the radiator 21 to align the side holes 220 with the threaded holes 215. The circuit board 23 is connected to the radiator 21 and the collar 22 to insert the positioning rod 211 of the radiator 21 into the hole 230 of the circuit board 23. The holes 232 of the circuit board 23 are located corresponding to the threaded holes 213 of the radiator 21. The bolts 233 extend through the holes 232 of the circuit board 23 are threadedly connected to the other end of the threaded holes 213 of the radiator 21 to connect the circuit board 23 to the radiator 21. The lens 24 is then connected to the radiator 21 and the collar 22. The holes 241 of the

lens 24 are located corresponding to the two threaded holes 215 of the radiator 21 and the two side holes 220 of the collar 22. The bolts 242 extend through the two side holes 220 of the collar 22, the holes 241 of the lens 24 and are connected to the threaded holes 215 of the radiator 21. The circuit board 23 is located in the space 240 of the lens 24. At least one LED 231 is located corresponding to the high-beam area 243, and at least one LED 231 is located corresponding to the low-beam area 244.

[0015] The fan 31 is located in the receiving area 300 of the base 30 and the cover 32 is connected to the base 30. The bolts 321 extend through the holes 320 of the cover 32 to position the fan 31 in the receiving area 300 of the base 30. The seal ring 33 is mounted to the tubular member 303 of the base 30. The tubular member 303 is inserted in the room 203 of the tubular portion 202 of the headlight 20. The protrusion 204 of the space 240 is engaged with the L-shaped engaging groove via the notch 305. The tubular member 303 is then rotated an angle to allow the protrusion 204 to move over the ridge 306 and is engaged with the slot 304 to connect the tubular member 303 to the headlight 20. The ridge 306 restricts the protrusion 204 from being disengaged from the L-shaped engaging groove.

[0016] As shown in Figs. 6 to 9, when using the high beam, the LEDs 231 on the circuit board 23 are all activated, while the LED 231 located corresponding to the high beam area 243 is activated to output the whole work, and the LEDs 231 located corresponding to the low beam area 244 are operated at their half work. The light beams from the LEDs 231 are respectively reflected by the reflection surface and pass through the high beam area 243 and the low beam area 244. The range and angle of the light beams are controlled by the curvature of the high beam area 243 and the low beam area 244. When using the low beam, the LED 231 located corresponding to the high beam area 243 is de-activated, and the LEDs 231 located corresponding to the low beam area 244 are operated to output their whole work. The present invention does not need barrier unit and convex lens. The range and angle of the light beams are controlled by the curvature of the high beam area 243 and the low beam area 244, and the light beams are even, and the cost for the barrier unit is saved.

[0017] The cooling device 3 located at the second side of the headlight 20 and the fan 31 sucks cool air from the second ventilation holes 322 of the cover 32, and blows the heat conducted from the fins 216 of the radiator 21 away from the headlight assembly 2 via the first ventilation holes 302 of the base 30. The fan 31 can also be rotated in opposite direction to sucks cool air from the first ventilation holes 302 of the base 30, and blows the heat conducted from the fins 216 of the radiator 21 away from the headlight assembly 2 via the second ventilation holes 322 of the cover 32.

[0018] While we have shown and described the embodiment in accordance with the present invention, it should be clear to those skilled in the art that further embodiments may be made without departing from the scope of the present invention.

Claims

1. A headlight assembly comprising:

a headlight (20) having a radiator (21) connected to a first side thereof, the radiator (21) having multiple fins extending from an outer periphery thereof;
a collar (22) mounted to the radiator (21);
a circuit board (23) connected to an end of the radiator (21) and the collar (22), the circuit board (23) having at least two Light Emitting Diodes (LEDs) (231);
a lens (24) connected to the radiator (21) and the collar (22), the leans (24) having a space (240) defined therein, the circuit board (23) located in the space (240), the lens (24) having a high-beam area (243) and a low-beam area (244), at least one LED (231) is located respectively corresponding to the high-beam area(243), and LED(231) is located corresponding to the low-beam area (244), and
in characterized that
a cooling device (3) connected to a second side of the headlight (20) and having a base (30), a fan (31) and cover (32), the base (30) having a receiving area (300) defined in a first side thereof, the fan (31) located in the receiving area (300), multiple first ventilation holes (302) defined through the base (30) and communicating with the receiving area (300), the cover (32) connected to a second side of the base (30) and having multiple second ventilation holes (322).

2. The headlight assembly (2) as claimed in claim 1, wherein a tubular portion (202) extends from the second side of the headlight (20) and has a room (203) defined therein, a protrusion (204) extends radially from an inner periphery of the room (203), the baes (30) of the cooling device (3) has a tubular member (303) extending from a second side thereof, the tubular member (303) is inserted in the room (203) of the tubular portion (202) of the headlight (20), the tubular member (303) has a slot (304) defied in an outer surface thereof, a notch (305) extending from one end of the slot and communicates with the slot (304), the notch (305) opens to a distal end of the tubular member (303), the slot (304) and the notch (305) form an L-shaped engaging groove, a ridge is located between the slot (304) and the notch (305).

3. The headlight assembly (2) as claimed in claim 2, wherein the tubular member (303) of the base (30)

of the cooling device (3) has a seal ring (33) mounted thereto.

4. The headlight assembly (2) as claimed in claim 1, wherein the base (30) of the cooling device (3) has multiple threaded holes (301) defined therein, the cover (32) has multiple holes (301) which are located corresponding to the threaded holes (301) of the base (30), multiple bolts (321) extend through the holes (320) of the cover (32) and are threadedly connected to the threaded holes (301) of the base (30).

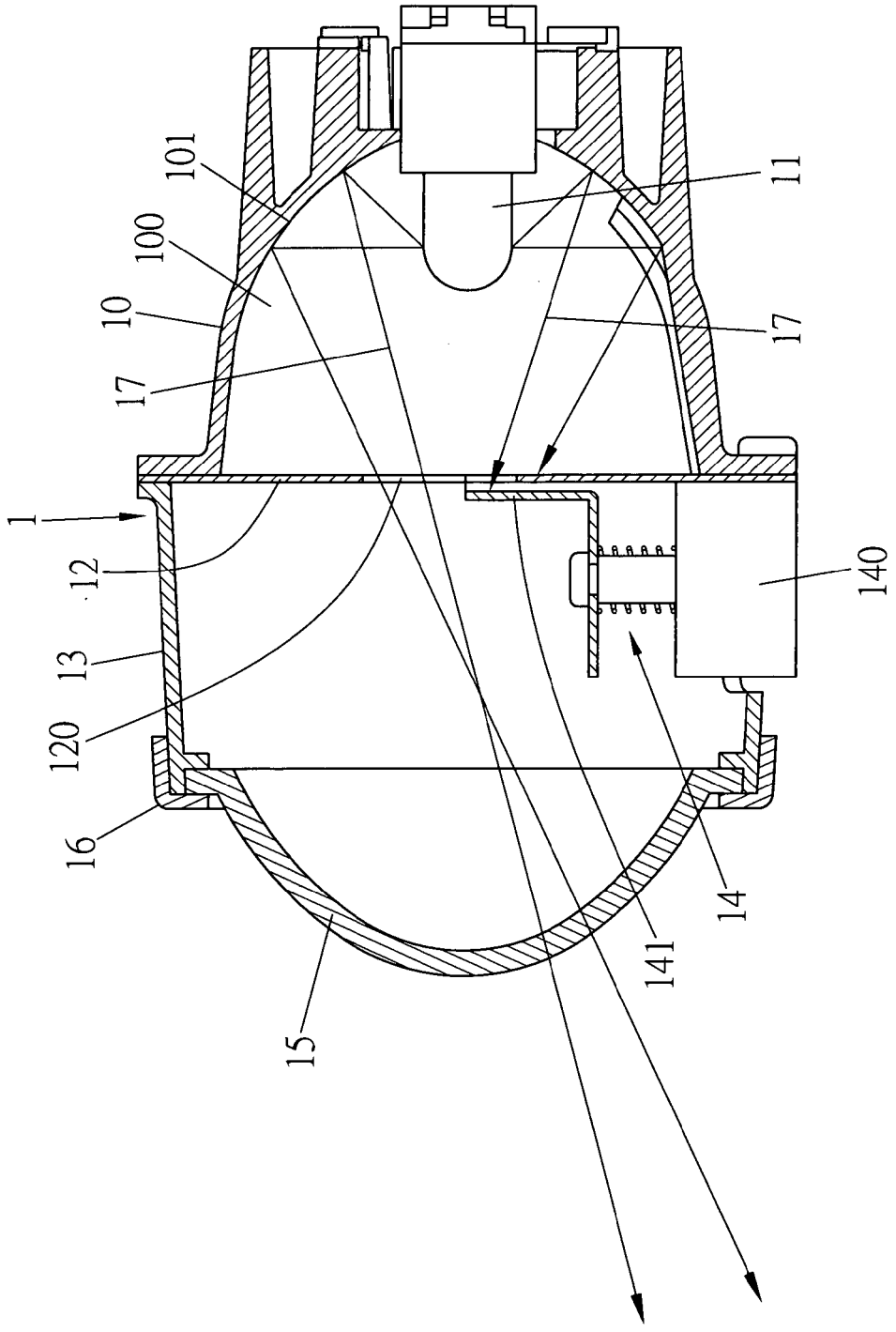

FIG.1
(PRIOR ART)

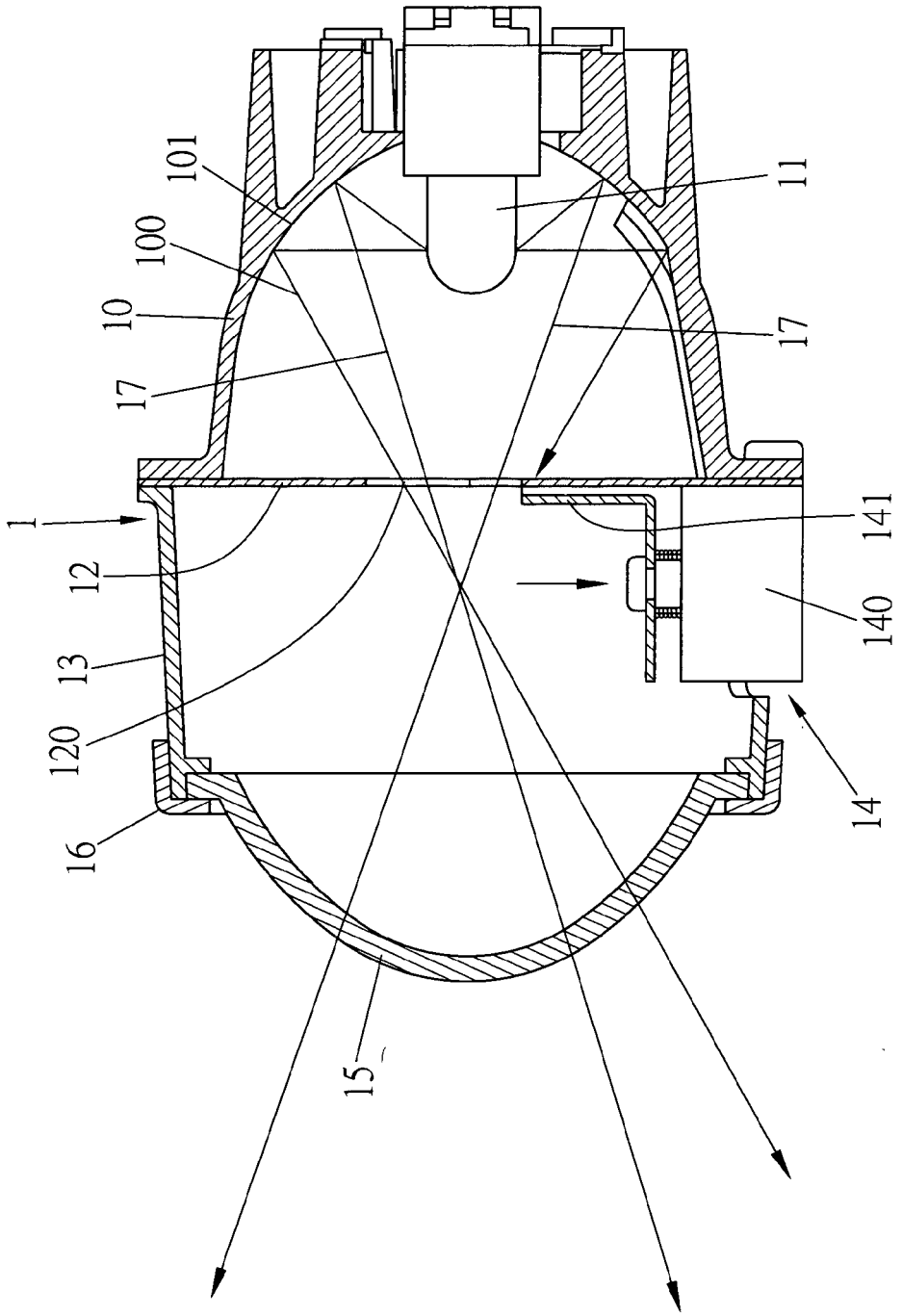

FIG.2
(PRIOR ART)

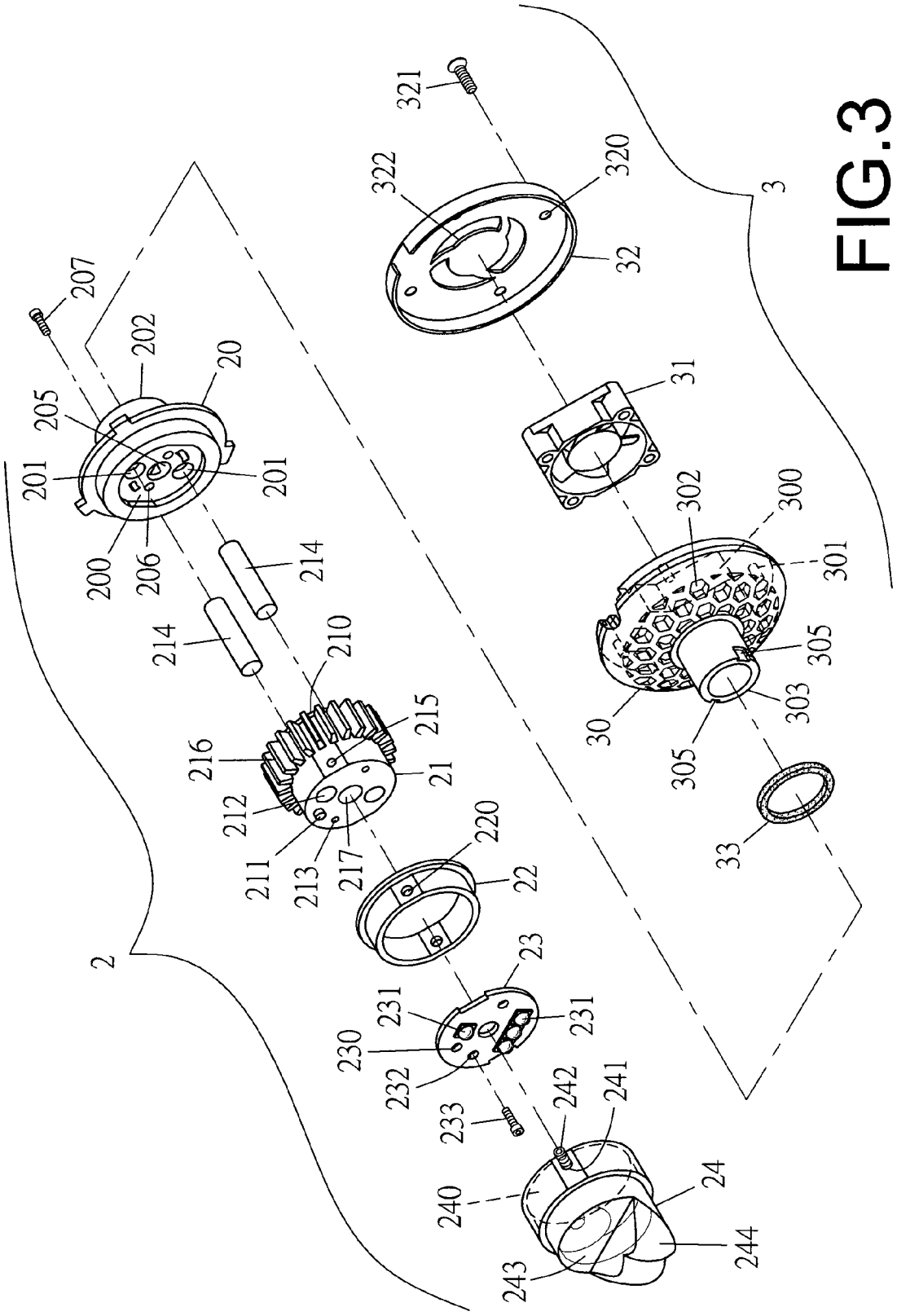
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FIG.3

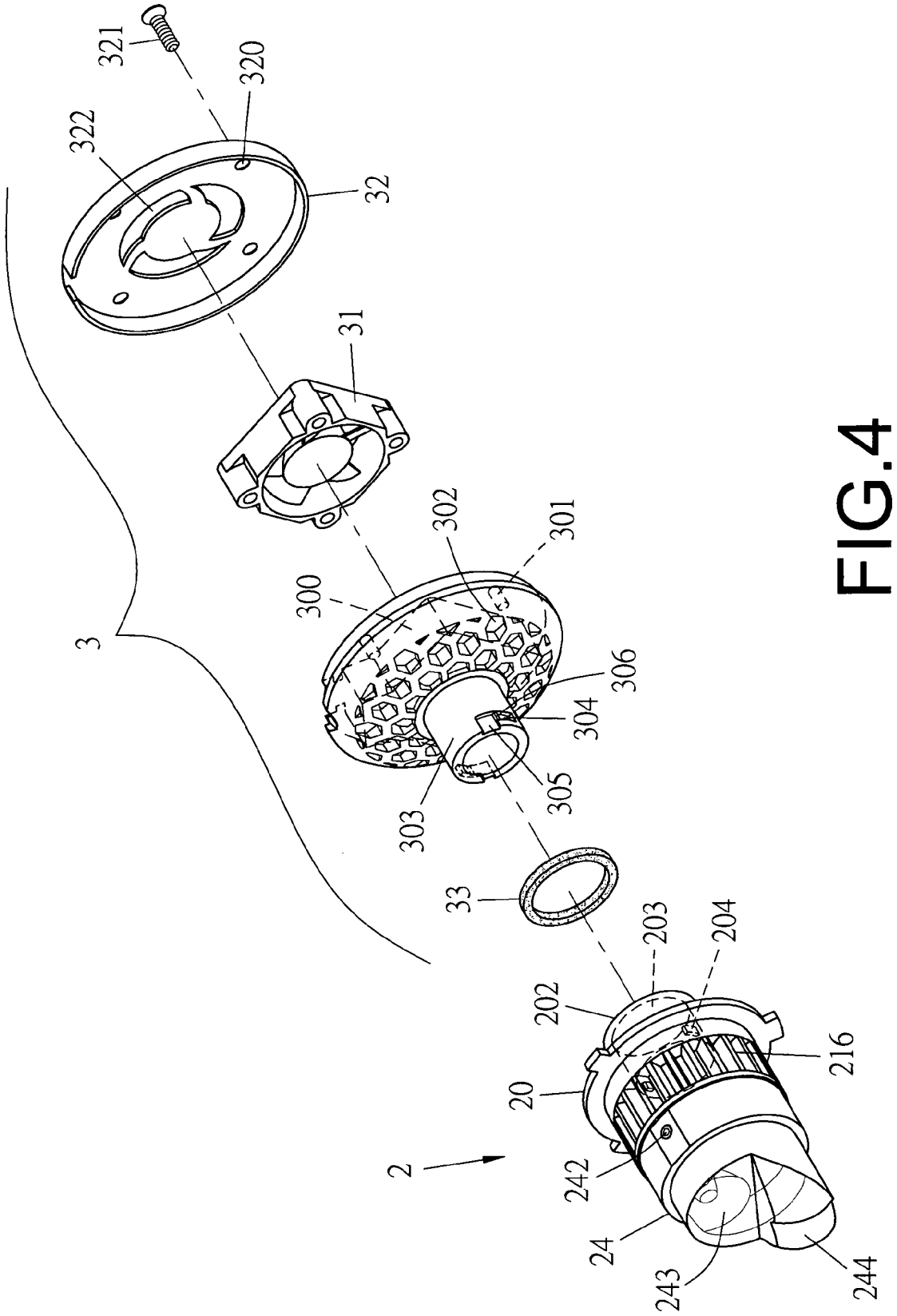
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FIG.4

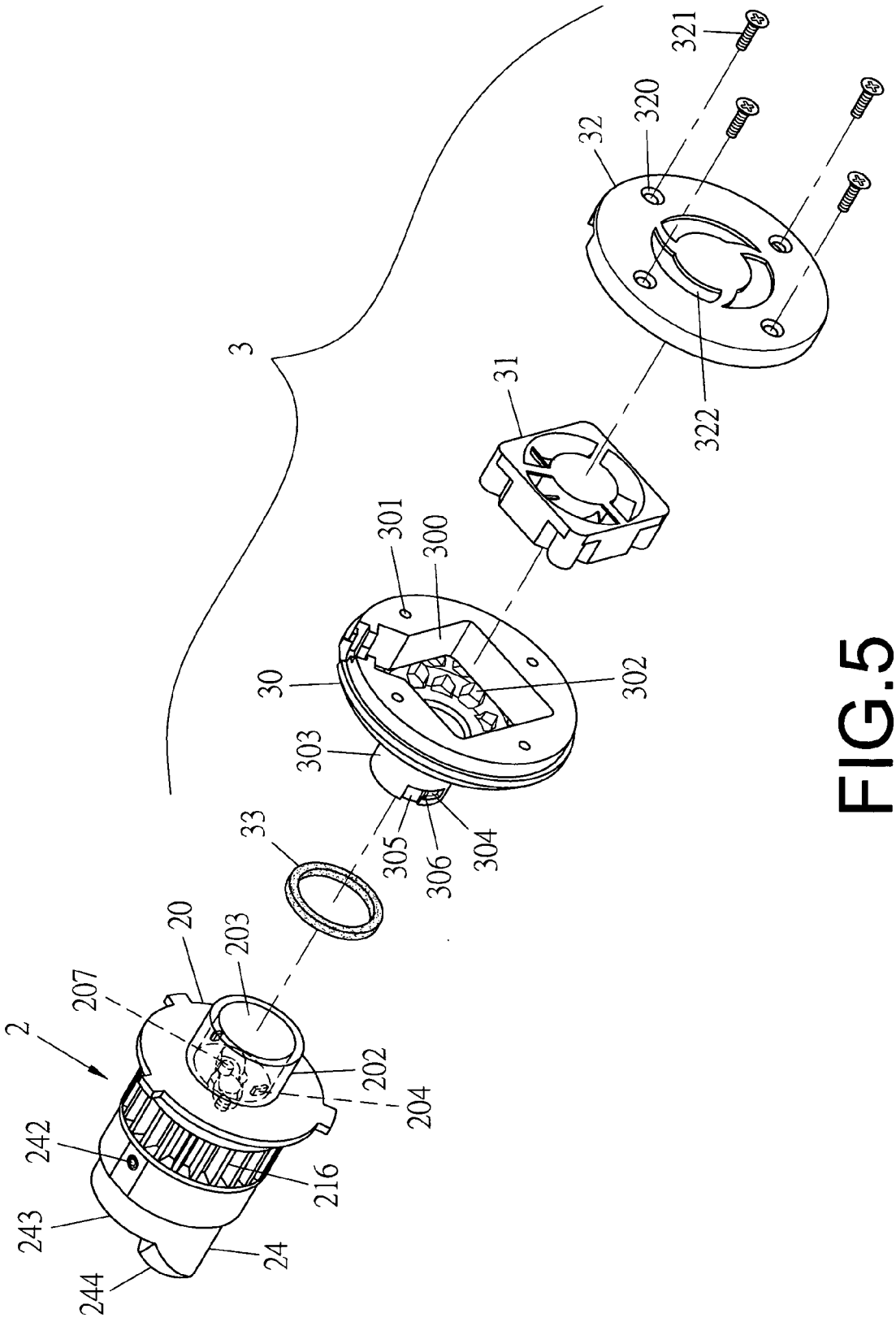
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FIG.5

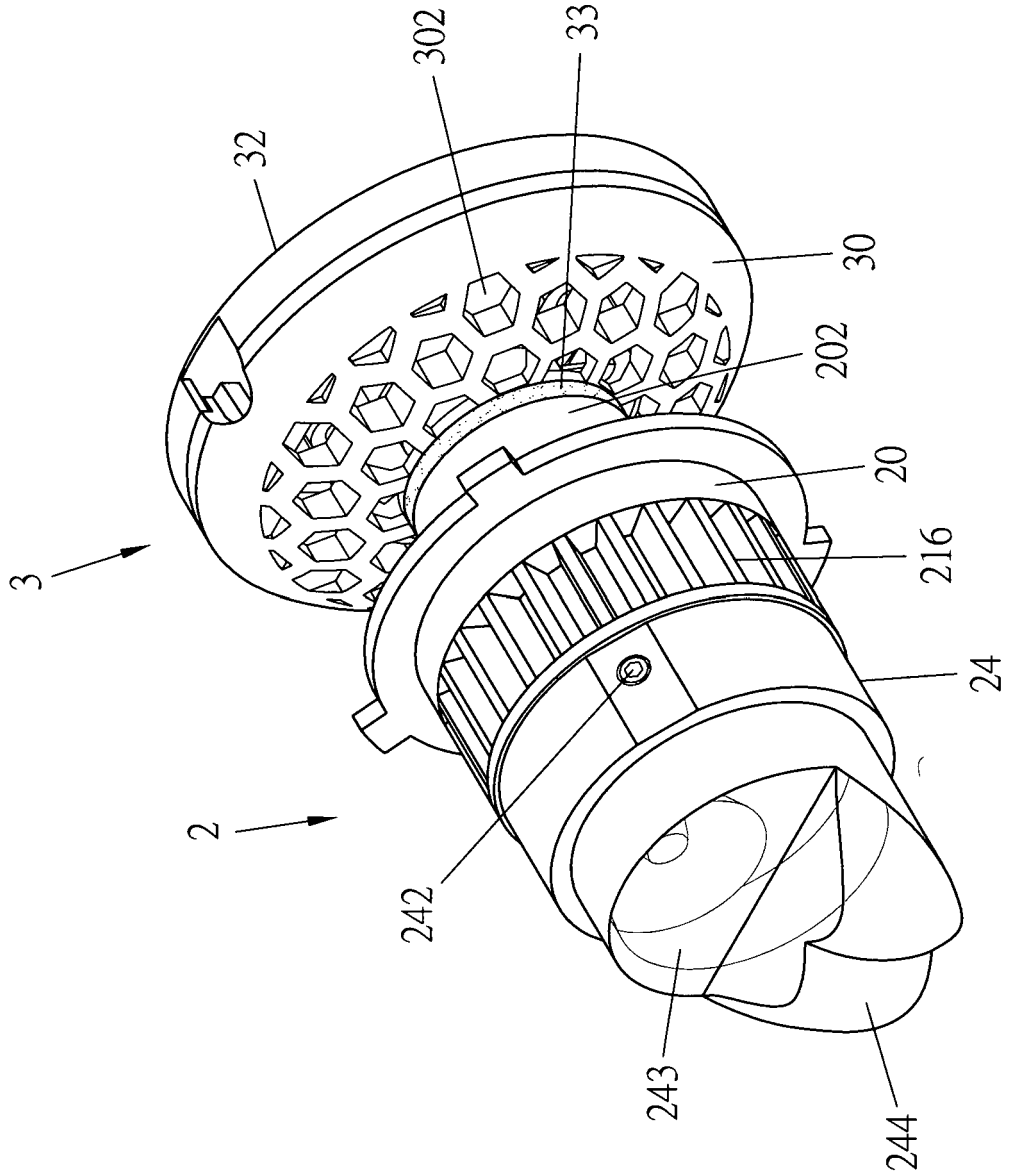

FIG.6

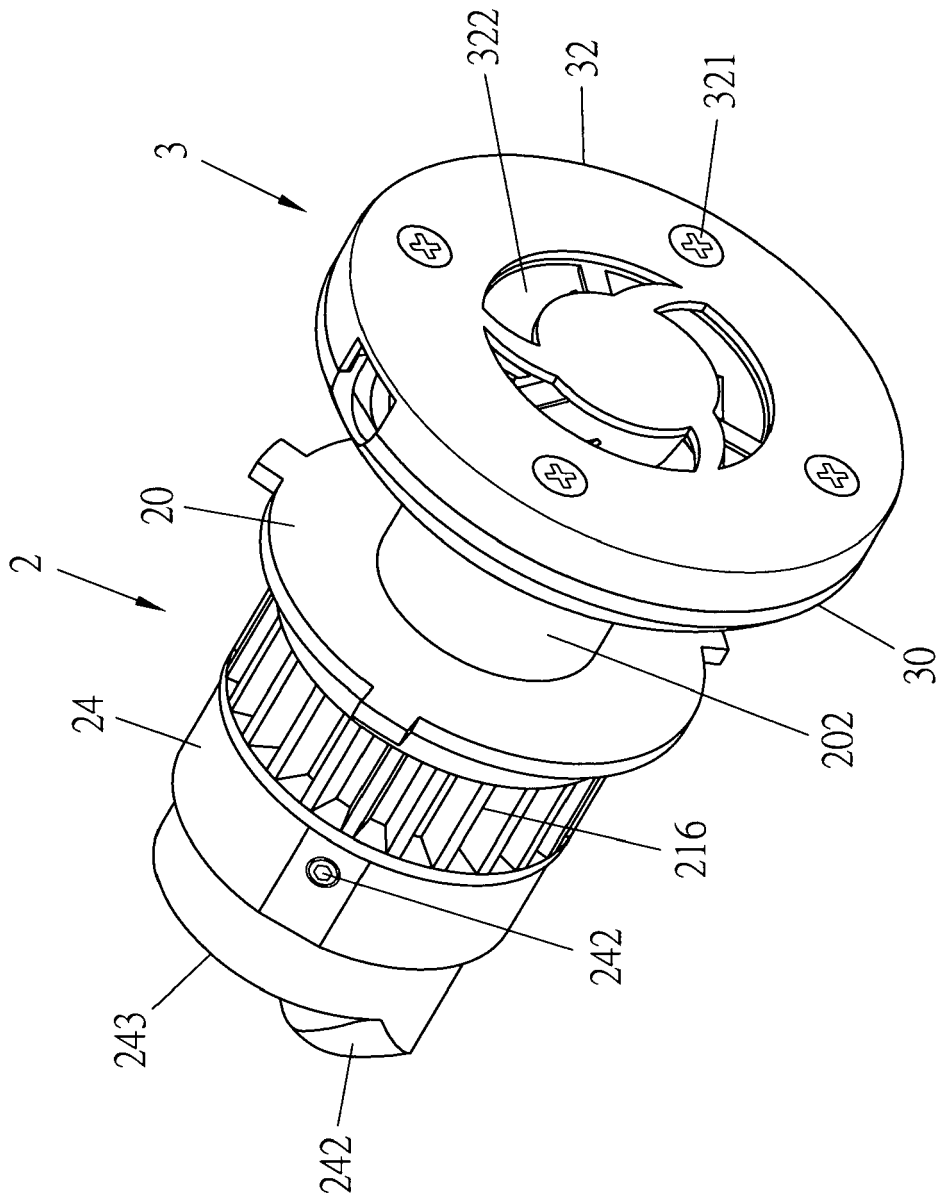

FIG.7

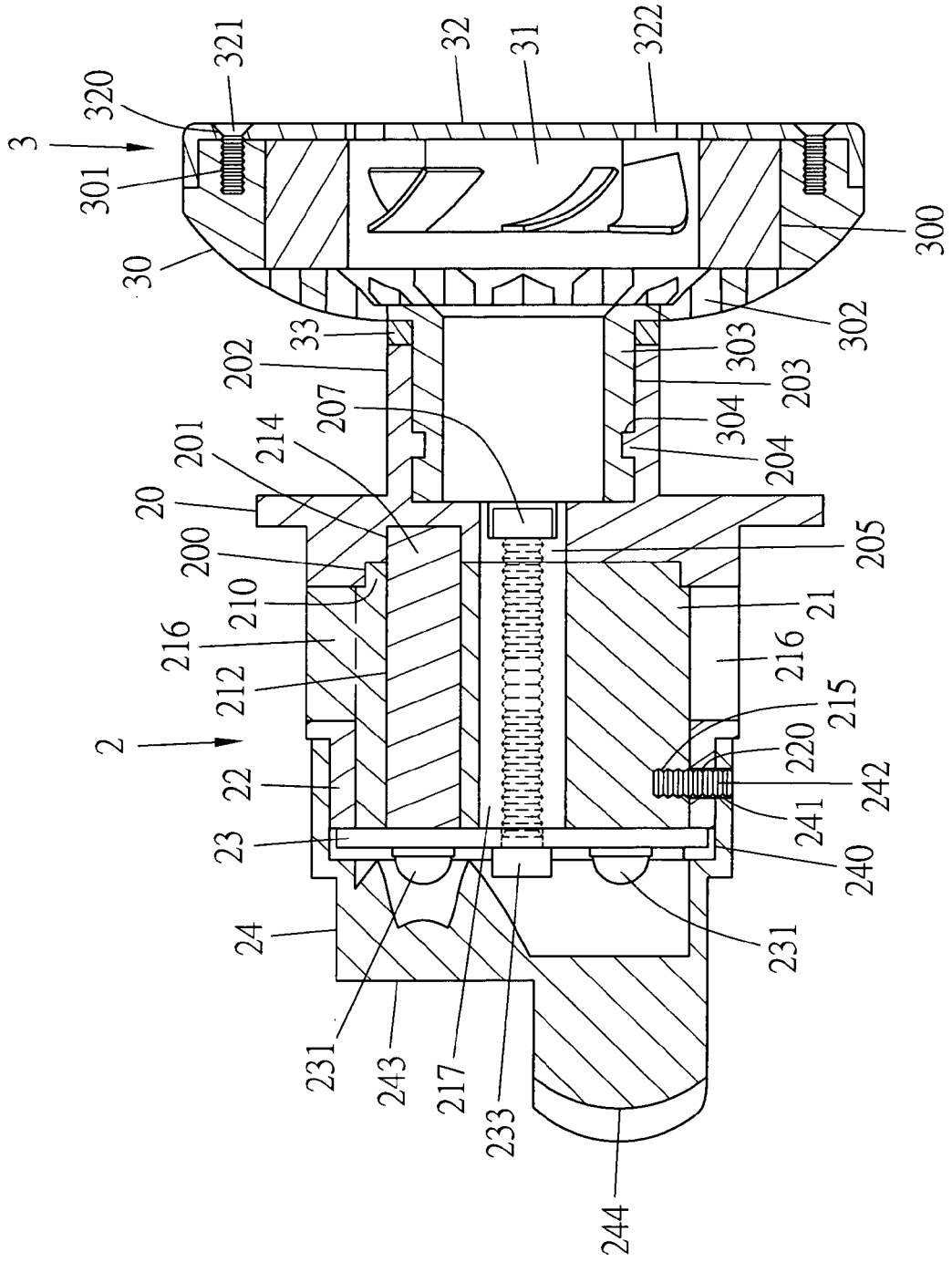
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FIG.8

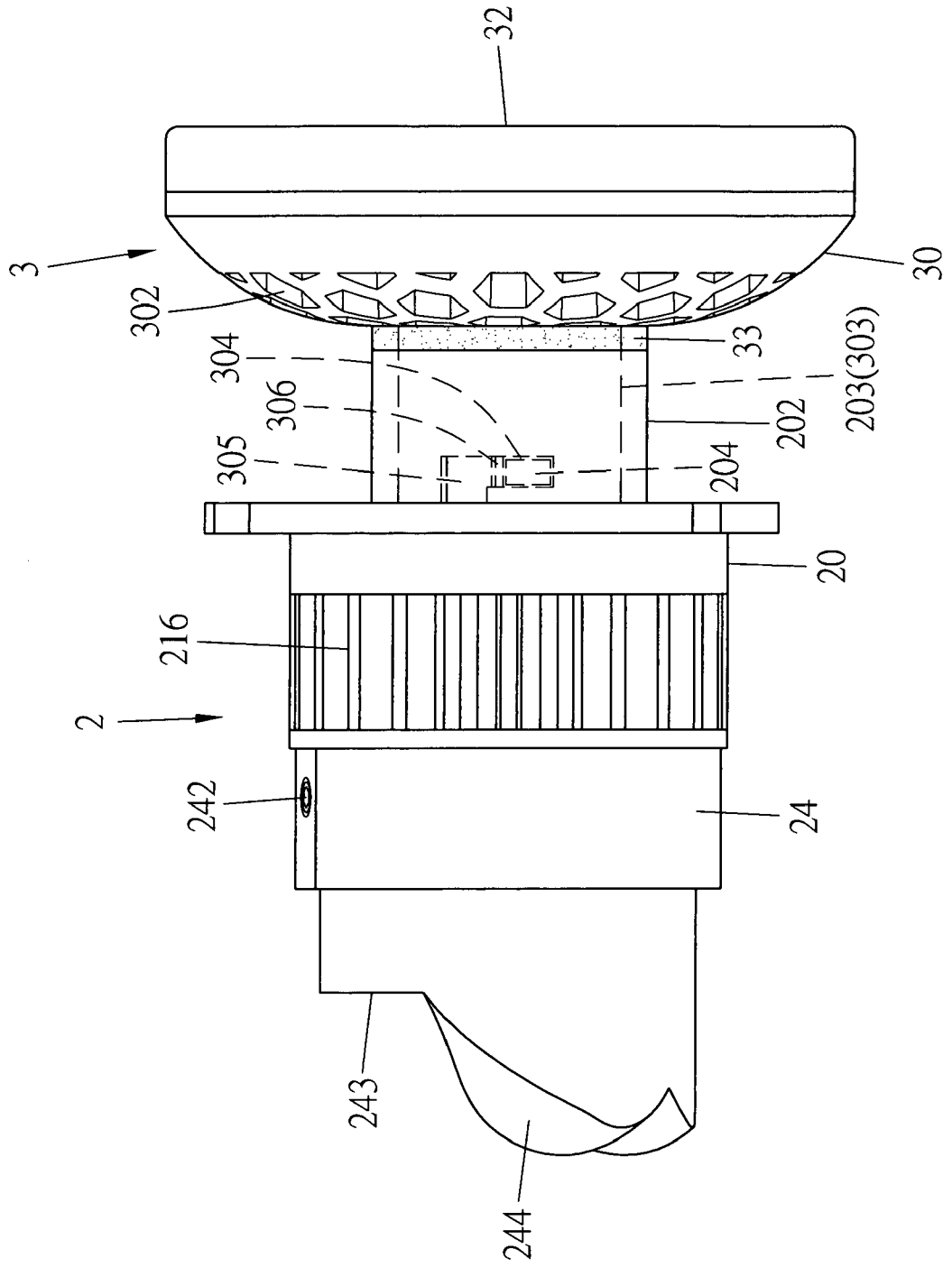

FIG.9

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EUROPEAN SEARCH REPORT

Application Number
EP 15 00 1705

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	DE 20 2014 005684 U1 (HSU CHEN WEI [TW]) 22 October 2014 (2014-10-22) * paragraph [0021] - paragraph [0023] * * figures 3-9 *	1	INV. F21S8/10
A	WO 2014/185510 A1 (ICHIKOH INDUSTRIES LTD [JP]) 20 November 2014 (2014-11-20) * paragraph [0032] - paragraph [0224] * * figures 1-3 *	1	
A	JP 2014 127299 A (ICHIKOH INDUSTRIES LTD) 7 July 2014 (2014-07-07) * paragraph [0001] - paragraph [0059] * * figures 1,2 *	1	

TECHNICAL FIELDS SEARCHED (IPC)
F21S

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	4 December 2015	Blokland, Russell

CATEGORY OF CITED DOCUMENTS

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04-12-2015

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE 202014005684 U1	22-10-2014	NONE	
WO 2014185510 A1	20-11-2014	NONE	
JP 2014127299 A	07-07-2014	NONE	

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82