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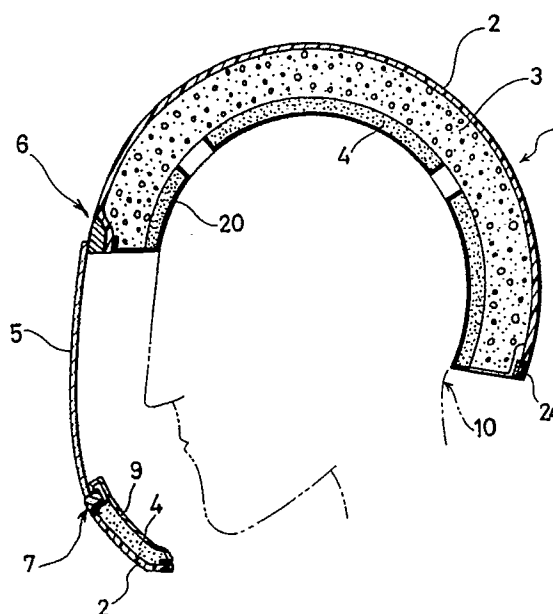
(11) Publication number:

0 424 876 A1

(12)

EUROPEAN PATENT APPLICATION(21) Application number: **90120318.2**(51) Int. Cl.⁵: **A42B 3/28**(22) Date of filing: **23.10.90**(30) Priority: **24.10.89 JP 278085/89**(43) Date of publication of application:
02.05.91 Bulletin 91/18(84) Designated Contracting States:
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W-4040 Neuss 1(DE)**(54) **An air intake device for use in a helmet.**

(57) An air intake device of a helmet (1) having an openable shield (5) for covering a front opening of the helmet (1) includes a recess (29) formed near the front opening so as to produce a space between the shield (5) and the helmet surface, and air intake means (6) having a frame member (60), and a cover (63) for closing a front portion of the frame member (60), and guide means (8, 9, 65) for urging the cover (63) toward a closing state, and guiding the cover (63) from the closing state to an opening state, and keeping the cover (63) in either of the closing state and the opening state, the cover (63) being brought in the opening state to allow the air into the helmet (1) by pushing the cover (63) inward from the outside, and the cover (63) being brought in the closing state to block the air from flowing in by pushing the cover (63) inward another time.

FIG.1**EP 0 424 876 A1**

AN AIR INTAKE DEVICE FOR USE IN A HELMET

BACKGROUND OF THE INVENTION AND RELATED ART STATEMENT

The present invention relates to an air intake device for use in a helmet whose front opening is covered with an openable shield.

In a conventional full face type helmet for use with a motorcycle or the like, the inside of the helmet is liable to be stuffy. To eliminate this drawback, the helmet is provided with an air intake device. Specifically, through holes are formed in the body of the helmet. There is provided an openable shutter means over the through holes. The shutter means is slid to open to allow the air into the inside of the helmet, when necessary.

Such a conventional helmet has the following problems. To attach the shutter means to the helmet body, it is necessary to form openings for holding the shutter means in the helmet body. This impairs the strength of the helmet body. To compensate impaired strength, the thickness of the helmet body is required to increase, which consequently increases the weight of the helmet. Also, the shutter means is required to be slid to open or close the through holes. This sliding operation is very cumbersome when riding a motorcycle.

The present invention has overcome the above-mentioned problems. It is an object of the present invention to provide an air intake device for use in a helmet which makes it possible to open and close an air intake opening more rapidly without impairing the strength of a helmet body.

SUMMARY OF THE INVENTION

Accordingly, the present invention provides an air intake device for use in a helmet having an openable shield for covering a front opening of a body of the helmet, comprising a recess formed near an edge portion of the front opening of the helmet body so as to provide a space between the shield and an outer surface of the helmet, an air intake means including a frame member having an opening in an front portion thereof, a cover for closing the opening, and guide means for urging the cover toward a closing state of allowing the air to flow into the inside of the helmet, guiding the cover from the closing state to an opening state of blocking the air from flowing into the inside of the helmet and vice versa, and keeping the cover in either of the closing state and the opening state, whereby the cover is brought into the opening state from the closing state by pushing the cover inward from the outside one time, and the cover is brought

into the closing state from the opening state by pushing the cover inward from the outside another time.

With the above construction, when the cover is pushed inward from the outside one time, the cover is moved in accordance with the guide means to provide the opening state to allow the air to flow into. When being pushed inward another time, the cover is restored to the closing state in accordance with the guide means.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a view in a central section of a helmet showing an embodiment of the present invention;
 Fig. 2 is an enlarged sectional view of upper air intake means;
 Fig. 3 is a perspective view showing a frame member provided in the upper air intake means;
 Fig. 4 is a perspective view showing a rear part of a cover provided in the upper air intake means;
 Fig. 5 is a perspective view showing a guide cam provided in the upper air intake means;
 Fig. 6 is an enlarged sectional view of the upper air intake means, showing a state in which the air is allowed to flow into the inside of the helmet;
 Fig. 7 is an enlarged sectional view of lower air intake means;
 Fig. 8 is a perspective view showing a frame member provided in the lower air intake means;
 Fig. 9 is a perspective view showing a front part of a cover provided in the lower air intake means; and
 Fig. 10 is a perspective view showing a rear part of the cover.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENTS OF THE INVENTION

Referring now to Fig. 1, a helmet 1 includes a body 2, a shock absorber liner 3 for absorbing impact, an inner pad 4 and an inner sheet 20. The body 2 is made of plastic such as fiber reinforced plastic (FRP). The shock absorber liner 3 is provided on an inner surface of the body 2. The inner pad 4 is provided on an inner surface of the shock absorber liner 3. A front opening portion is covered with a shield 5. The shield 5 is made of a transparent plate and can be opened and closed. The shield 5 is pivotally attached at sides of the body 2 by attachment members (not shown). The position

of the shield 5 can be changed between a state in which the opening portion is covered and a state in which the shield 5 is positioned at an upper portion of the body 2 to open the opening portion.

A trim member 24 is attached to a lower peripheral edge of the body 2. Upper air intake means 6 is provided above an upper edge of the front opening. Lower air intake means 7 is provided below a lower edge of the front opening.

As shown in Figs. 2 to 5, the upper air intake means 6 includes a frame member 60, a cover 63 for closing a front portion of the frame member 60, and a guide cam 8 for guiding an movement of the cover 63. An opening portion 6a is formed in a front portion of the frame member 60. A pair of projections 64 are formed on a rear wall 60a. Each of the two projections 64 is formed with a recess 64a for receiving a spring to be described below. A support shaft 62 is provided in an upper portion of the frame member 60. The support shaft 62 extends in a transverse direction. The guide cam 8 is mounted on an intermediate portion of a lower wall 60b.

As shown in Fig. 4, the cover 63 includes a plate-like member having such a size as to close the opening portion 6a. A cylindrical projection 63a extending in a vertical direction is integrally provided on an intermediate portion of the rear part of the cover 63. Also, an engaging member 63d is provided above the cylindrical projection 63a. The engaging member 63d is rotatably engaged with the support shaft 62. Further, a pair of recesses 63c for receiving the springs are formed in the portions of the cover 63 which are opposite to the recesses 64a respectively. The cylindrical projection 63a has a hollow 63b facing downward. In the hollow 63b are placed a guide pin 9 and a spring 91. The guide pin 9 is urged downward by the spring 91.

As shown in Fig. 5, the guide cam 8 is formed with a guide groove 81 in an upper portion. The guide groove 81 is in the form of a heart and symmetrical with respect to a center line 100. The guide cam 8 has a stem 80 facing downward at one end thereof. The guide groove 81 has regions A, B, C, D, E, and F. A step 82 is formed between the regions A and F. A step 83 is formed between the regions C and D. The region A is lower than the region F. The region D is lower than the region C. The guide cam 8 is mounted on the lower wall 60b of the frame member 60 with the stem 80 being rotatably placed in a hold formed in the lower wall 60b, so that the guide cam 8 can be rotated about the stem 80.

The engaging portion 63d of the cover 63 is rotatably attached on the support shaft 62 of the frame member 60. Compression springs 65 are provided between the recesses 63c in the rear part

of the cover 63 and the recesses 64a of the frame member 60 respectively. Accordingly, the cover 63 is urged in such a direction as to close the opening portion 6a. The guide pin 9, being held in the cylindrical projection 63a of the cover 63, is positioned in the guide groove 81 of the guide cam 8. The guide pin 9 and the guide cam 8 constitute guide means for the cover 63.

A recess 29 is formed in the vicinity of the upper edge of the front opening portion of the body 2 so that a space exists between the body 2 and the shield 5. The frame member 60 is fixedly placed in the recess 29 by adhesive or the like. In this state, the front surface of the frame member 60, the front surface of the cover 63 are flush with the surface of the body 2. A bottom plate 21 is provided on the underside of the frame member 60. A packing member 22 is provided in front of the bottom plate 21. The shield 5 is made to come in pressing contact with the packing 22 so that the front opening portion of the helmet is sealed. In rear of the bottom plate 21 is provided a bottom member including a core 32 covered with a cloth 33. An air permeable cloth 34 is provided between the bottom member and the inner sheet 20 provided thereabove. Consequently, a space 30 is defined by the bottom member, the cloth 34, and a lower wall 31 of the shock absorber liner 3.

It should be noted that the same construction as the upper air intake means may be provided below the lower edge portion of the front opening portion of the body 2 with being symmetrical with the upper air intake means with respect to a center transverse line of the front opening portion.

With the above construction, in a normal state, i.e., the state of Fig. 2, the opening portion 6a of the frame member 60 is closed with the cover 63 so that the air flow is blocked. In this time, the guide pin 9 is stopped on the center line 100 passing through the region A. When the cover 63 is pushed inward against the biasing force of the spring 65 by hand from the outside, the guide pin 9 is moved from the regions A, to B, and to C in a counterclockwise direction because of the fact that the clockwise movement of the guide pin 9 is blocked by the step 82. It is actual that the guide pin 9 moves substantially straightforward. Therefore, the guide cam 8 is rotated about the stem 80 so as to allow the guide pin 9 to move straightforward. When the cover 63 is fully pushed inward, the guide pin 9 is in the region C. If this hand pushing is released in this state, the guide pin 9 moves beyond the step 83 to the region D where the center line 100 passes. In other words, the guide pin 9 is changed from a state in which the guide pin 9 is made in pressing contact with an outer wall 81a of the guide groove 81 to another state in which the guide pin 9 is made in pressing

contact with an inner wall 81b. The guide pin 9 is then pressed against a recessed portion of the inner wall 81b, and stopped on the center line 100. The cover 63 comes into the state shown in Figs. 3 and 6. Consequently, as shown in Fig. 3, an air intake opening 60c comes to existence in both sides of the cover 63. The air is allowed to flow into the space 30 through the air intake opening 60c, and then into the helmet through the air permeable cloth 34.

When the cover 63 is further pushed inward from the outside by hand, the guide pin 9 in the region D is made to come into pressing contact with the outer wall 81a of the guide groove 81, and then moved to a portion between the region D and the region E. Thereafter, when the hand pushing is released, the cover 63 is pressed forward due to the spring 65, so that the guide pin 9 is moved in the counterclockwise direction from the region D, to the region E, and to the region F. In this case, the guide cam 8 is rotated about the stem 80 so as to allow the guide pin 9 to move along the above path. The guide pin 9 is moved beyond the step 82 from the region F to the region A where the center line 100 passes, and then stopped in the region A. Consequently, the cover 63 is returned to the state to close the opening portion 6a of the frame member 60. Accordingly, it will be understood that the air intake means can be opened and closed by merely pushing the cover 63 from the outside. This actuation is very easy.

As shown in Figs. 7 to 10, the lower air intake means 7 includes a frame member 70, a cover 73 and a guide cam 8. The cover 73 close an opening formed in a front portion of the frame member 70. The guide cam 8 is adopted for guiding the movement of the cover 73. A rectangular projection 71 is provided on an intermediate portion of an inner wall 74. The rectangular projection 71 has a hollow 71a. On both sides of the rectangular projection 71 are provided a pair of cylindrical projections 76 for receiving springs. Also, a cylindrical projection 78 is formed on the underside of the rectangular projection 71. The projection 73 has a hollow for holding a guide pin 9 and a spring 91. The guide pin 9 is urged upward by the spring 91 so that a top end portion of the guide pin 9 is projected in the hollow 71a. Openings 79 are formed in corner portions between the inner wall 74 and both side walls 72. Further, a plurality of recesses 75a are formed in an inner portion of a lower wall 75 to allow the air to flow into the inside of the helmet.

The cover 73 includes a plate-like member having such a size as to cover the front opening of the frame member 70. In addition, a projection 73e is formed on an intermediate portion of the back of the cover 73. The projection 73e has a recess facing downward and is movably inserted into the

hollow 71a of the rectangular projection 71. In both sides of the projection 73e are recesses 73c for receiving springs. Further, the cover 73 has projections 73a on both side ends thereof. The projections 73a are placed in the openings 79 when the cover 73 is mounted on the frame member 70. The movement of the cover 73 is restricted by the combination of the projections 73a and the openings 79. The guide cam 8 shown in Fig. 5 is placed in the recess formed in the underside of the projection 73e with the guide cam 8 facing downward and rotatable about the stem 80.

The projection 73e of the cover 73 is inserted into the hollow 71a of the frame member 70. The projections 73a on both sides are placed in the openings 79. Compression springs 77 are provided between the recesses 73c in the back of the cover 73 and the projections 76 of the frame member 70 respectively. The compression spring 77 applies a forward pressure to the cover 73 so that the cover 73 close the opening portion of the frame member 70. The guide pin 9 held in the projection 78 of the frame member 70 is positioned in the guide groove 81 of the guide cam 8.

A recess is formed below the lower edge portion of the front opening portion of the body 2 so as to provide a space between the body 2 and the shield 5. The recess has an opening 28. The frame member 70 is fixedly placed in the opening 28 by adhesive or other way. In this state, the surface of the frame member 70 and the surface of the cover 73 are flush with the surface of the body 2. Also, a space 40 is provided between the inner wall of the frame member 70 and the inner wall of the recess. An upper wall 42 is provided in an upper portion of the space 40. The upper wall 42 has an air intake hole 43. A packing 22 is provided on front of the upper wall 42. The shield 5 is made in pressing contact with the packing 22 so that the front opening portion of the helmet is sealed.

With the above construction, in a normal state, i.e., the state of Fig. 7, the front opening portion of the frame member 70 is closed with the cover 73 so that the air flow is blocked. When being pushed against the urging force of the spring 77 from the outside, the cover 73 is moved inward in parallel owing to the fact that the relative movement of the guide pin 9 and the guide cam 8, and the insertion of the projection 73e in the hollow 71a of the rectangular projection 71. Thereafter, the cover 73 is kept in a halting position by the guide cam 8, that is, the state shown in phantom lines in Fig. 7. In this state, the air is allowed to flow into the space 40 through the openings 79 in the both sides of the frame member 70, and then into the inside of the helmet through the hole 43. At the same time, the recesses 75a formed in the lower portion of the frame member 70 are opened, so that the inside of the

helmet is communicated with the outside through the recesses 75a, and the air is allowed to flow through the recesses 75a. When being pushed inward again, the cover 73 is pushed forward by the urging force of the spring 77 and then returned to its original state.

With this construction, opening and closing can be effected by merely pushing the cover 73 from the outside.

As described above, in an air intake device of the present invention, an air intake state can be attained by pushing a cover from the outside one time to move inward along guide means, and an original state, i.e., air non-intake state can be attained by pushing the cover another time to move forward along the guide means. It will be understood that this operation is very simple. Also, an air intake device of the present invention can be mounted in a recess formed in the vicinity of an edge portion of a helmet, which thus will not involve the impairment of the strength of a helmet.

Claims

1. An air intake device for use in a helmet having an openable shield for covering a front opening of a body of the helmet, comprising:
a recess formed near an edge portion of the front opening of the helmet body so as to produce a space between the shield and an outer surface of the helmet body;
air intake means provided in the recess, the air intake means including:
a frame member having an opening in an front portion thereof;
a cover for closing the opening;
guide means for urging the cover toward a closing state of allowing the air to flow into the inside of the helmet body, guiding the cover from the closing state to an opening state of blocking the air from flowing into the inside of the helmet body and vice versa, and keeping the cover in either of the closing state and the opening state;
whereby the cover is brought into the opening state from the closing state by pushing the cover inward from the outside one time, and the cover is brought into the closing state from the opening state by pushing the cover inward from the outside another time.
2. An air intake device according to Claim 1, wherein the guide means includes a spring and a guide member, whereby the cover is urged toward the position of closing the opening by the spring, the cover is brought into the opening state by pushing the cover inward against the spring from the outside, and the cover is brought in the closing state by pushing the cover inward and releasing

the pressure from the cover.

3. An air intake device according to Claim 1 or 2, wherein the recess has an opening, the frame member is placed in the opening.

4. An air intake device according to Claim 2, wherein the guide member includes a guide cam having a guide groove in the form of a heart, and a guide pin movably placed in the guide groove.

5. An air intake device according to Claim 1 or 2, wherein the frame member has a support shaft, an upper portion of the cover is pivotally mounted on the support shaft so as to open and close the opening of the frame member.

6. An air intake device according to Claim 1 or 2, wherein the cover is formed with a projection, the frame member is formed with a projection having a hollow for receiving the projection formed on the cover, whereby the cover is moved in parallel with the frame member with the projection of the cover moving in the hollow.

FIG.1

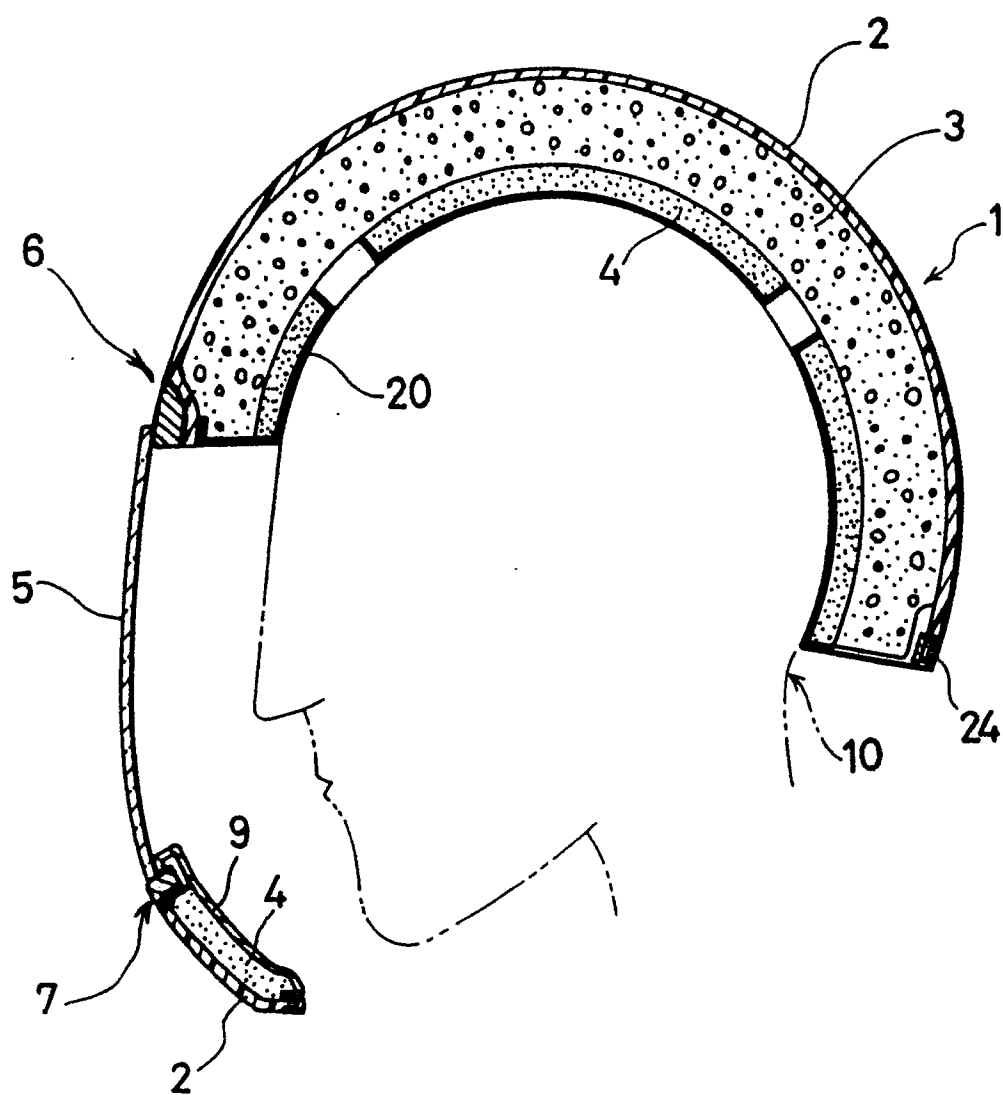


FIG. 2

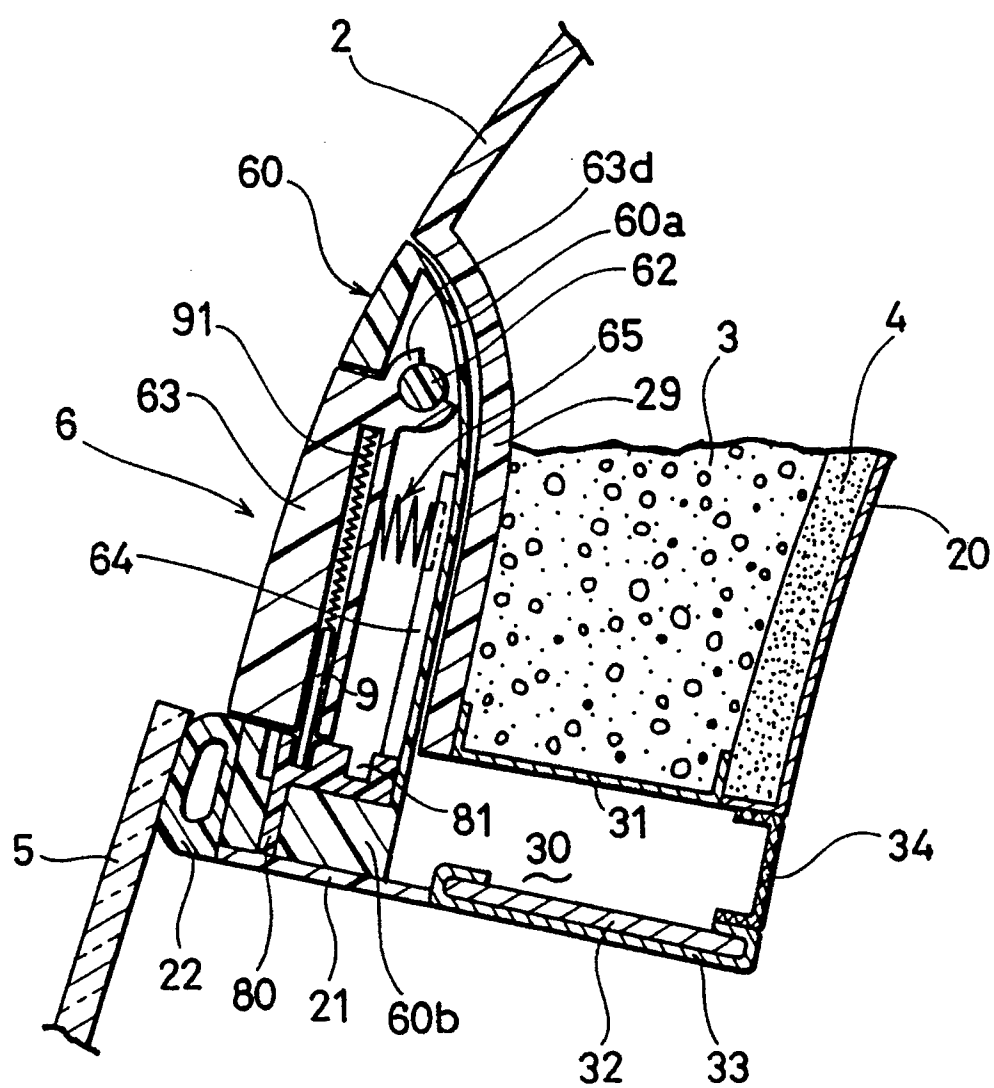


FIG. 3

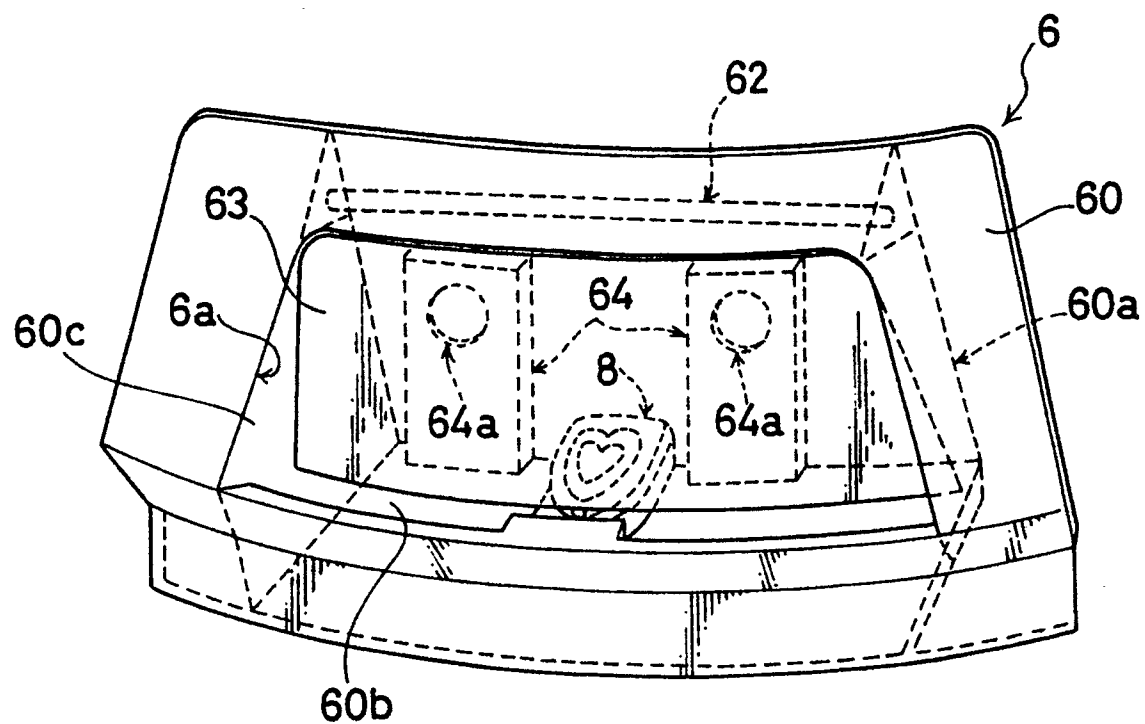


FIG. 4

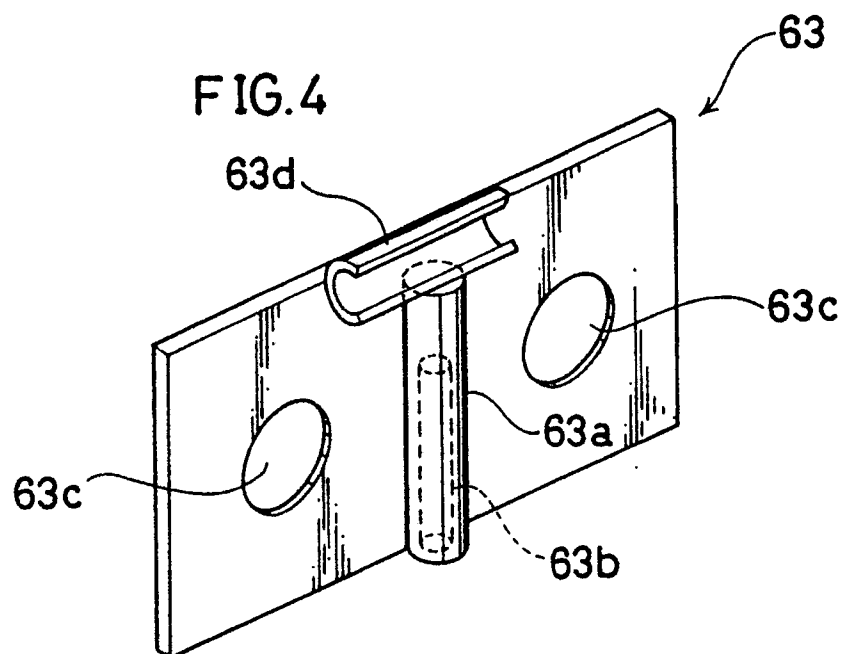


FIG.5

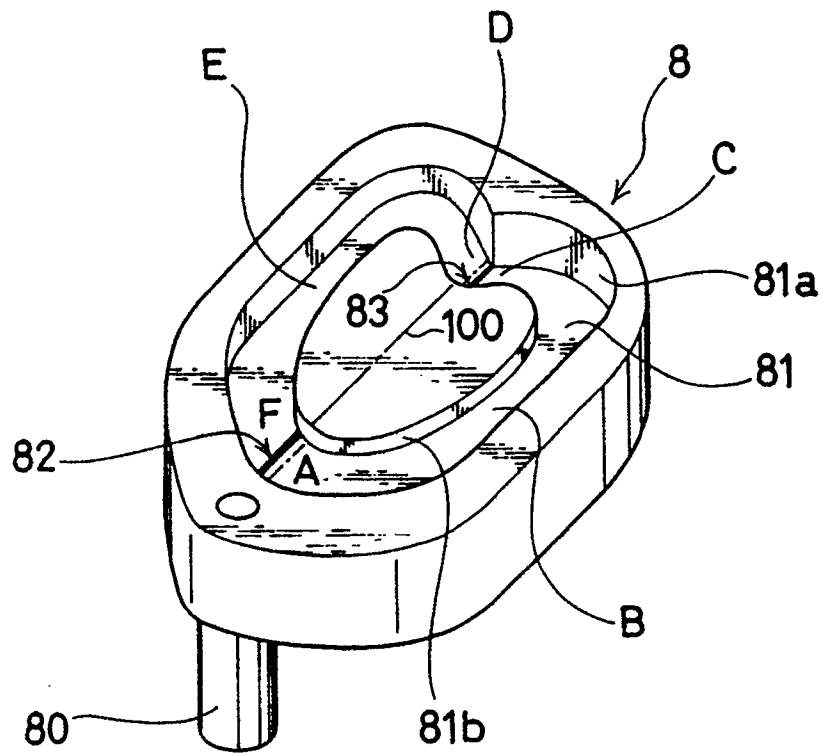


FIG.6

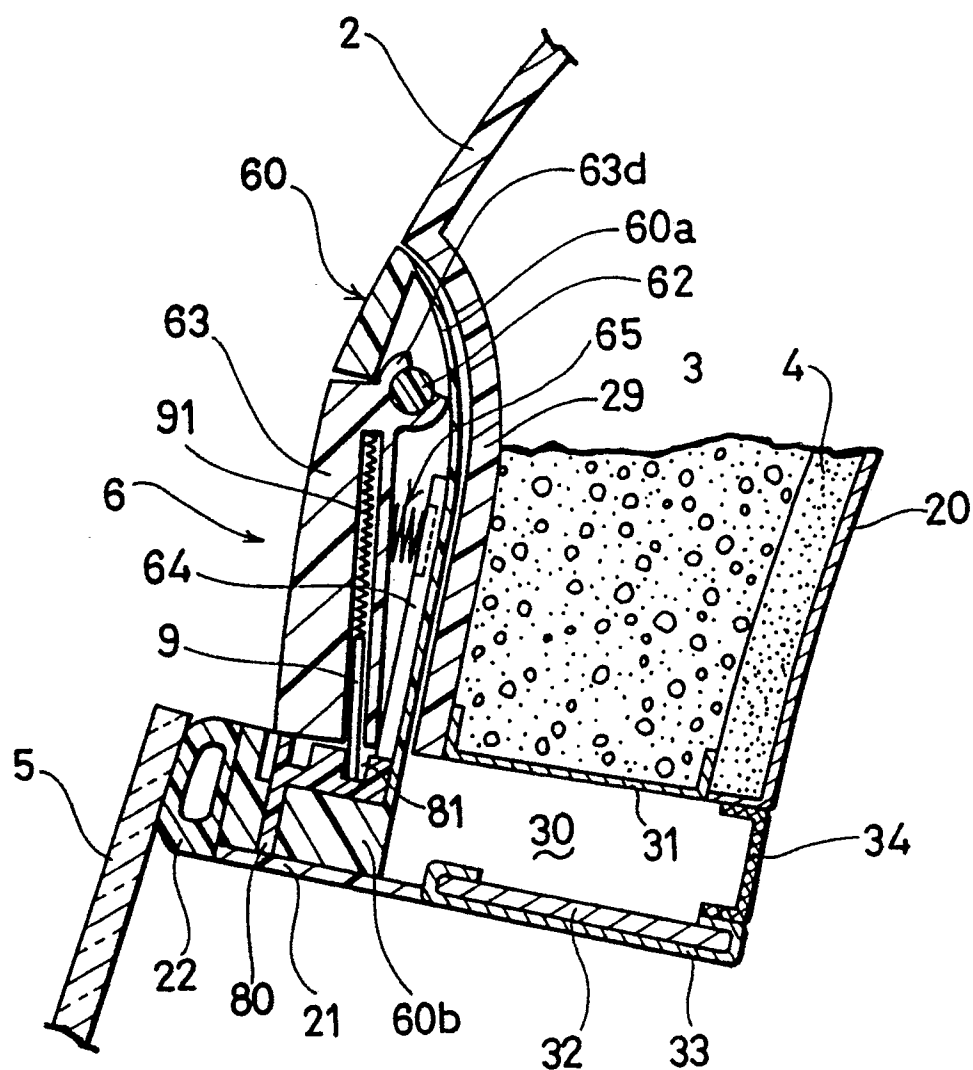


FIG. 7

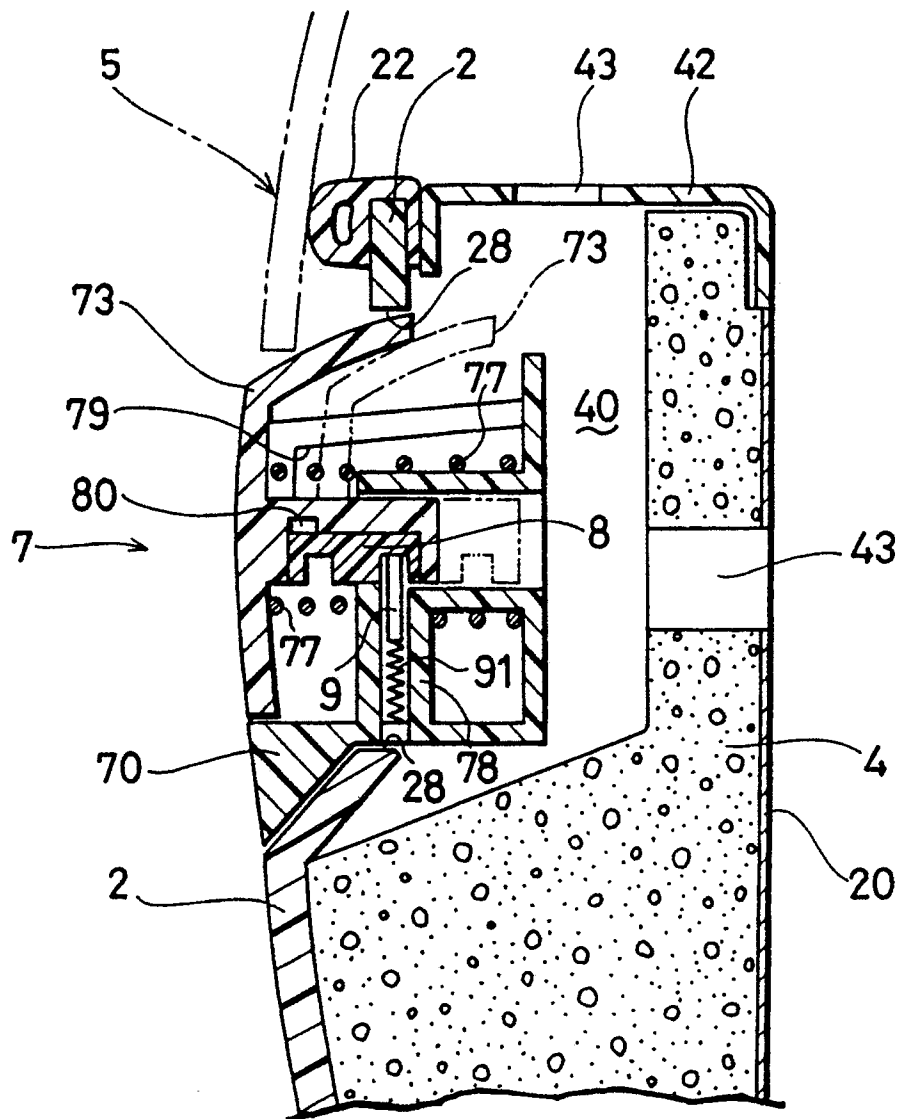


FIG.8

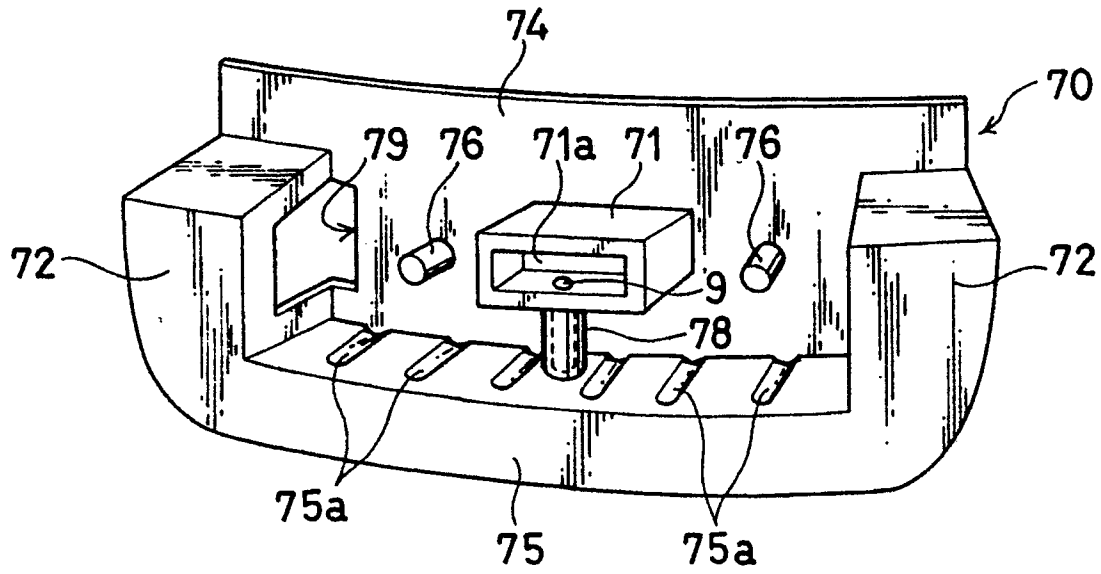


FIG.9

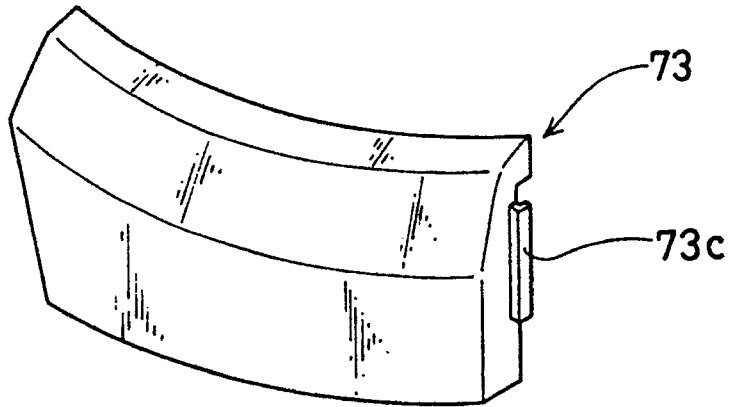
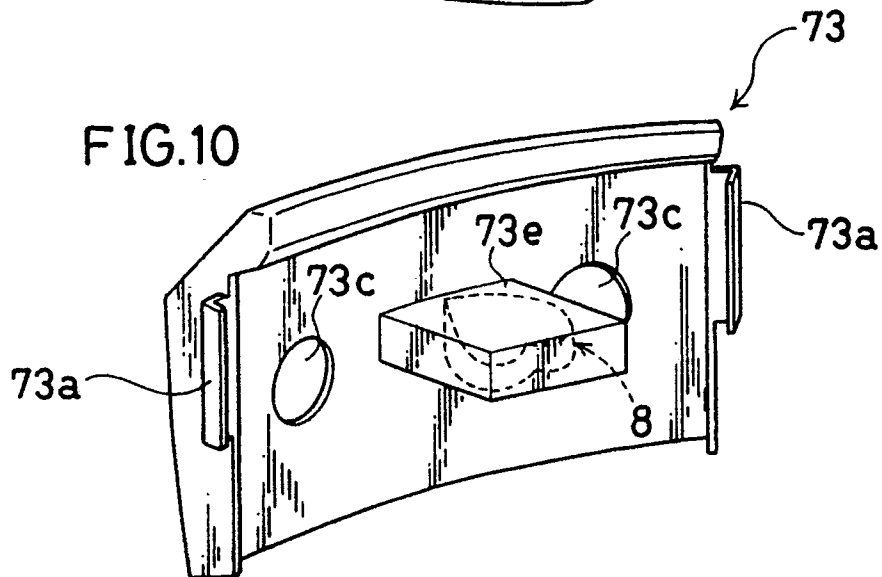


FIG.10





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EUROPEAN SEARCH REPORT

Application Number

EP 90 12 0318

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A	WO-A-8603950 (G. BORETTI) * page 5, line 17 - page 7, line 2 * * page 8, line 20 - page 9, line 27 * * claims 1, 5-8; figures * ----	1, 5	A42B3/28
A	DE-A-3407403 (SCHUBERTH-WERK GMBH & CO KG) * page 7, paragraph 6 - page 9, paragraph 3 * * figures * ----	1-3	
A	GB-A-2198925 (SHOEI KAKO KABUSHIKI KAISHA) ----		
A	DE-A-2539277 (FRITZ HIMMERMANN KG) ----		
A	DE-A-1950953 (H. ROOS) -----		
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			A42B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 12 FEBRUARY 1991	Examiner BOURSEAU A.M.
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