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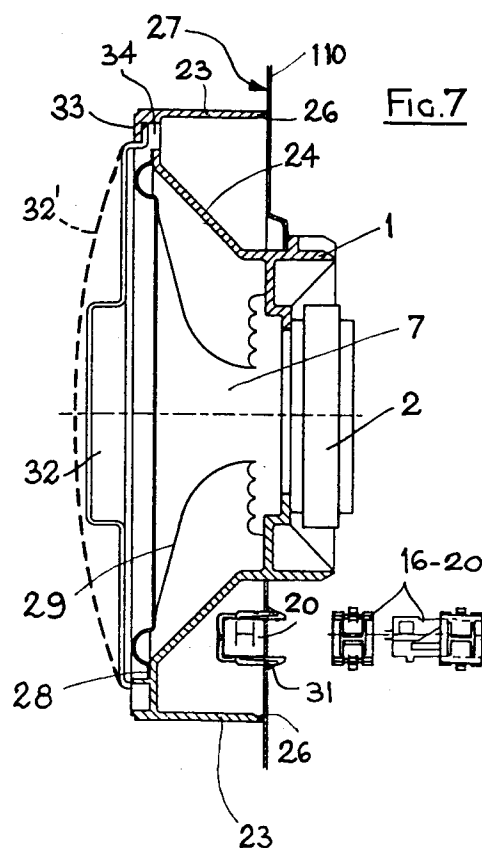
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(54) **Quick connection for loudspeakers.**

(57) A cylindrical annular body (1), rigidly engaged with the magnet (2)-basket (2') back part of any type of loudspeaker (7) connects to fixed support structures (110) by means of slanted or spiral flanges (3), obtained on its external peripheral part, which gets in touch and bayonet-fit in as many walls (8) obtained on edge (33) of dedicated holes (5), obtained on said structures.

Said body (1) may be coupled, in integral form, to a continuous peripheral front band (23) on which the front edge (28) of the diffusion cones (29) of said loudspeakers engages. Band (23) comprises a back free edge (26) which pressure engages with the peripheral surface (27) adjoining holes (5), connecting the quick connection and structure (110).

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This invention relates to a quick connection for loudspeakers, constituted substantially by an annular cylindrical body, either integral with or mounted on to the heavier back part constituting the magnet unit of loudspeakers, bayonet-engageable into a moulded seat which is obtained either directly on the plate of the doors or other suitable parts of the body, or on plastic details of support parts, such as for instance car parts or the like for car radio systems. It is provided with peripheral slanted or spiral flanges having the function of hooking its bayonet connection on said moulded seats.

The annular body, which engages with the magnet unit of loudspeakers, is applicable to said moulded seat thanks to an axial insertion movement followed by a rotation, which may be performed by hand or with mechanical tools and/or arms. No fasteners such as screws or the like are required.

Besides joining loudspeakers to their supporting seats with a more rational and functional system, this invention comprises also connections that, once the whole is assembled, ensure a perfect and stable permanence in their correct position, and a perfect realization of electric connections.

The annular cylindrical body may be also provided with a front part constituted by a peripheral band, with a free lower edge, on which band the front band of the diffusion cone of the loudspeaker engages. The lower edge of said peripheral band is free and participates in the connection getting in pressure relation with the peripheral zone adjoining the hole where said annular body is engaged.

As is known, the configuration of present loudspeakers includes front structures peripherally arranged relatively to the outlet mouths of the diffusion cones, on which mouths coupling holes are provided for screws, rivets, bolts and the like. Thanks to these devices, the loudspeakers are connected to the spaces where they belong.

However, such connections, while appearing to be adequate for their task, have some substantial drawbacks. In particular, one can notice that the connection of loudspeakers with their seats is obtained with rigid means, overlooking the possibility of elastic suspensions suitable to prevent the transmission of possible vibrations and/or recoils due to impacts or the like to the diffusion cones, with the obvious risk of damages.

Another drawback lies in that on site fastening of loudspeakers is rather long and complicated, with screws, rivets and the like for which the operators must utilize adequate equipments, besides wasting time, with obvious economic repercussions on the finished products.

Object of this invention is to eliminate the above drawbacks. The invention, as is character-

ized by the claims, solves the problem by means of a quick connection for loudspeakers through which the following results are achieved: the connection of loudspeakers to the supporting structures is applied on the heavier back part, opposite to the diffusion cones and corresponding to the magnet unit; the front part of loudspeakers, i.e. the diffusion cones, is free from rigid connections; the coupling of fasteners with the related and corresponding seats is by axial insertion and following rotation with bayonet-closing, followed by a final connection and by the closing of electric contacts.

Further advantages are obtained by the utilization of a second part constituted by a continuous front peripheral band, on which the peripheral band of the diffusion cone engages and which comprises a lower edge whose function is to get in touch and pressure-engage with the zone adjoining the hole where said first annular body engages; both parts may integrate a special electric connection: the quick connection is preferably made from plastic material or any other material having antivibration damping characteristics; the whole houses the coupled loudspeaker completely; the quick connection is bayonet-assembleable, either by hand or automatically, with no need for other tools.

The advantages achieved by this invention lie essentially in that the connection of loudspeakers with their seats is obtained in a simple, quick, economical and safe way, the diffusion cones are not required to perform as supports; the freedom of the diffusion cones ensures the optimum operation both from the strictly mechanical point of view and from the more important acoustic point of view.

Further advantages are provided by the fact that the quick connection may be of the universal type, utilizable for corresponding types of loudspeakers and standardized holes to be obtained on the prepared walls of vehicles in general; the connection can be easily fastened in the corresponding spaces by simple alignment and bayonet-hooking rotation, while the possible lower edge gets in touch and pressure relation, with antivibration function, on the peripheral surface adjoining the coupling holes realizable on said prepared walls; the whole operation is quick, simple and economical.

The invention is described with more details hereafter according to some embodiments proposed by way of non limitative example, with reference to the attached drawings, wherein:

Fig. 1 shows a through-section of a loudspeaker provided with the quick connection constituted by the annular body only,

Fig. 2 shows a front view of the same quick connection of Fig. 1,

Fig. 3 shows a side view of the same quick connection of Fig. 1,

Fig. 4 shows a front view of a loudspeaker seat, prepared for the coupling with the quick connection of Fig. 1,

Fig. 5 shows the detail of the electric contacts provided on the seats of Fig. 4,

Fig. 6 shows the detail of the electric contacts provided on the quick connection of Fig. 1, which contacts can be coupled with those provided in the corresponding seat,

Fig. 7 shows a through-section of the quick connection with the peripheral band on which the supporting means for the assembly can be seen,

Fig. 8 shows a through-section of the same quick connection of Fig. 7, with the loudspeaker after the assembly,

Fig. 9 shows the view/through-section of the quick connection only, with the front peripheral band already assembled,

Fig. 10 shows the side view of the detail of the annular body, with the slanted or spiral peripheral flanges,

Fig. 11 shows the side view of a second version of the detail of the annular body, with the slanted peripheral flanges,

Fig. 12 shows a front view of a second version of a hole prepared for housing the quick connection complete of the loudspeaker, and

Fig. 13 shows the back view of a quick connection with the front peripheral band wherein a loudspeaker is already inserted.

The figures illustrate a quick connection for loudspeakers. In a first embodiment, said quick connection is substantially constituted by an annular body (1) so realized as to be assembleable to or substantially integral with the back part (2) and (2') of loudspeaker (7); more specifically, with the back magnet unit and possibly with the lower edge of the restraint basket of the acoustic diffusion cone.

The annular body (1), in its non integral version, is realized according to the concept of a preferably but not limitedly plastic anchoring joint. With a suitable sizing, it allows to transform or to adapt even the traditional loudspeakers provided with a metal basket, not designed in view of an automatic assembly, into the type of quick connection which is the subject matter of this invention.

The annular body (1) is provided along its peripheral edge with slanted or spiral flanges (3) which, during the assembly, get first in alignment relation with as many openings (4) obtained along edge (33) of the through hole (5) of seat (6) constituting the housing of a loudspeaker (7), and get afterwards in an engagement relation with parts (8) of the same seat, through a partial rotation of the same annular body (1).

In practice, a loudspeaker (7) provided with its own annular body (1), either integral or rigidly mounted, gets in engagement and connection relation with a seat (6) by means of an axial coupling of flanges (3) with the corresponding openings (4) and a following partial rotation which causes said flanges to bayonet-fit into the walls of edge (8) of said seat.

Seat (6), prepared to house loudspeaker (7), may be, for instance, either integral with or mounted on the car plates, such as those constituting the structure of the doors or other parts, or the parts from plastic material or the like constituting the accessory pockets or the back parts.

Such seat (6) is preferably so shaped as to create a tile (9) acting as a water-barrier, preventing in this way the need of adding an external element to the structures.

The above connection system has been so designed as to allow an automatic assembly, with no need for screws or other additional fasteners, which may be carried out either by hand by an operator, or mechanically through a robot (10). In the latter case, and by way of example, the mechanized connection system may be provided with dedicated assembly fitting means obtained on the front protection cover (11), which is removed by the same manipulator at the end of the assembly operation. This does not prevent the system from having one or several suitable assembly fitting means at any other point of the above component.

The connection, according to this invention, assures a perfect flushness of the front part (42) of loudspeaker (7), thanks to the uniformity of the bearing on the fixed peripheral annular body (12), possibly realized from elastic material, the traction force being uniformly distributed across the bearing outer area, because of the absence of screws or the like, which, on the contrary, concentrate big stresses on individual points.

This solution ensures less operation criticality and the anchoring of the loudspeakers in the heaviest point, corresponding to zone (2) of the magnet unit, ensuring the absence of projecting weights.

This last condition is very important for the absorption and/or capacity of supporting shocks, even violent, as happens when one closes the doors, or the like.

At the end of the rotation of the bayonet-connection, elastic tangs (13) engage into corresponding seats (21) obtained on seat (6). Such hookings constitute the locking and non-return system of the loudspeakers, so that their positioning is final and assured.

Besides, such hookings (13,) when they are not engaged in the corresponding seats (21), constitute the system which prevents the unhooking of lid

(11); in fact, during the assembly stage preceding the engagement position between the elastic tang (13) and seat (21), the elastic tang (13) is to be considered as resting on the plate. Such situation causes a protrusion of its end part, and an associated interference situation, with a possible rotary movement of lid (11), preventing in practice its removal. To sum up, if the elastic tang (13), is not inside seat (21), lid (11) cannot be removed; this is a clear indication for the operator that the assembly has been poorly done and has therefore to be completed.

In its turn, lid (11), if not removed, prevents the assembly of the finishing cover of the loudspeaker, as special interference zones have been created between the two parts on said lid.

The elastic tangs (13) can be frontally unhooked from their seats (21) to allow the possible disassembly operations. The annular body (13), besides the already expounded characteristics, comprises a peripheral end piece (14) on which a stirrup (15) engages which comprises the electric contacts (16) of loudspeaker (7).

In the axial insertion, stirrup (15) is caused to enter the central hole (5) of seat (6); after which, in the sequential closing rotation (15), also stirrup (15) rotates until it gets in adherence relation with a second stirrup (18) located on an end piece (19) which originates from the surface of seat (6).

Electric contacts (20) are provided also on stirrup (18), which connect with the wires of the radio system. The adherence between stirrups (15) and (18) causes also the adherence of the electric contacts (16) and (20), which close the whole circuit.

The floating contact connection is suitable to accept the two movements which take place during the assembly operation. On said stirrups an additional contact is provided for the end-of-assembly electric functional control, by which it is possible to test directly the correctness of the assembly-electric connection operation.

In a second embodiment, the quick connection for loudspeakers comprises, besides the above cylindrical annular body (1), a continuous peripheral front band (23).

The annular body (1) and the peripheral band (23) are integral to one another and connect coaxially through an intermediate truncated-cone-shaped structure (24), which can substantially replace the restraint basket of the acoustic diffusion cone utilized by the current art.

While the annular body (1) connects, as said, to the back part (2) of a loudspeaker (7), the front peripheral part (27) of said band (23) engages with the front strip (28) of the diffusion cone (29) of said loudspeaker (7).

On the external peripheral part of the annular body (1), the peripheral slanted or spiral flanges (3) are always present, and said body configured as described above constitutes always the real load-bearing structure of all the parts constituting the loudspeaker (7) and the means by which said loudspeaker is connectable to a structure (110).

Therefore, for the connection of the annular body (1) it still suffices that a hole (5) with an edge (33) moulded together with openings (4) be present on the fixed structure.

During the assembly, the spiral flanges (3) get in alignment relation with as many openings (4), which afterwards get in engagement and connection relation with walls (8) of edge (33) of hole (5) by a partial rotation of the basket. The spiral of flanges (3) produces a pressure-closing of the bayonet-fitting type.

Alternatively, in a further embodiment the connecting flanges or teeth (3) may be obtained directly on the peripheral part of the magnet unit (2). However, in this case, the configuration of the central body (1) will be obviously without the annular part supporting teeth (3), being limited to the part connected to the magnet unit (2). In the same way, the corresponding coupling hole (5) obtained on structure (110) will be adequate to the configuration of said magnet unit provided with teeth (3).

In any case, in the bayonet closing rotation there take places, as is evident, a partial axial shifting of the quick connection relatively to the bearing structure (110): in such shifting, the lower free edge (26) of the peripheral band (23) gets in a pressure-engagement relation against wall (27) of support (110).

The lower edge (26) may be flat or blade-beveled or also it may comprise an elastic gasket (38). In any case, the lower edge (26), with or without gasket (38), engages along all of its development against said wall (27) of support (110), and constitutes an elastic lock of the quick connection.

Said lock prevents the onset of possible vibrations and/or the so-called acoustic short-circuits; namely, it prevents the air stressed by the back part of the membrane from interfering with the air stressed by the front part of the same, avoiding phenomena of cancellation of the acoustic signals generated or the formation of interferences that might alterate said signals.

The same lower edge (26) which gets in touch with wall (27) and has thinning or also deformable elastic tangs, has the function of damping the vibrations due to possible deformations of the system.

The continuous peripheral front band (23) with the associated lower edge (26) has also the function of protecting the membrane of loudspeaker (7), the diffusion cone (29) and the electric contacts

(16) (20), which are preferably, but not limitatively, obtained on stirrups (30) and (31) located, respectively, on the middle structure (24) of the quick connection and on wall (27) of the fixed support (110).

At the end of the bayonet locking rotation, contacts (16) (20) get in touch and engage with one another, connecting electrically and allowing the system to operate.

The protection of loudspeaker (7) as a whole is completed by a front cover (32), which engages, through peripheral teeth (33), along the circumferential front seat (34) of the peripheral band (23). Also the connection of cover (32) with band (23) is substantially of the bayonet type, with axial alignment and subsequent rotation.

Once the assembly and workings have ended, cover (32) is removable by counter-rotation and axial slipping off.

Alternatively, a finishing trim or grid (32') may be applied in the same seat and with the same rotation system, which trim or grid has a diameter greater than the system, forming a ledge relatively to the door panel of vehicles or the like.

Such grid is integral with the system or applied subsequently.

The quick connection has a further advantage in that loudspeaker (7) inside it is more uniformly supported, both in the front and the back part, contrary to the present configurations.

The quick connection, configured as described above, may be of the universal type with respect to holes (5) to be made in the structure. In fact, said holes may be standardized, simplifying the moulding operations of supports (110), such as the doors of vehicles or the like. To this aim, the back part of the connection is realized with standard external dimensions, while the middle and front part are realized with dimensions suitable for the restraint of the various models and/or types of loudspeakers.

The so designed quick connection, comprising the small pin (13) and the electric connections (16), ensures a perfect and quick assembly of the whole, excluding possible human errors during the assembly stages.

While this invention has been described and illustrated according to non limitative embodiments, it shall be evident to those expert of the art that many changes in the form, structure, components, proportions and arrangement of the various parts, hooking, connection and touch means and modifications of the whole may be introduced without exceeding its protection scope.

Claims

1. Quick connection for loudspeakers, characterized in that it comprises a back body (1), which engages rigidly or is integral with the heavier back part or zone of the magnet unit (2) and (2'), and a loudspeaker (7), alignable and connectable with a fixed seat (6) by means of a system of restrained hooking and locking which does not require the utilization of complementary means such as screws and the like.
2. Quick connection according to claim 1, characterized in that the connection between the back body (1) and the fixed seat (6) is of the so-called bayonet type; said connection arising from the coupling of peripheral flanges (3) protruding from said body (1) having an annular form, which engage in axial coupling and subsequent rotation with corresponding openings (4) obtained on the edge of the through-hole of a fixed seat (6) and the back walls (8) of said edge.
3. Quick connection according to claims 1 and 2, characterized in that the fixed seat is a restraint space for a loudspeaker (7), so configured as to form a protection tile (9), and in that it comprises an end piece (19) supporting a connection stirrup (18) for electric contacts (20), and a central hole (5), with peripheral openings (4) alignable with the back body (1) provided with the associated peripheral flanges (3).
4. Quick connection according to claims 1 through 3, characterized in that the annular body, rigidly connected to or integral with the magnet unit (2) and the basket body (2') of a loudspeaker (7) is provided with a peripheral end piece (14) on which a stirrup (15) engages which comprises the electric contacts (16) of said loudspeaker.
5. Quick connection according to claims 1 through 4, characterized in that the fixed seat (6) is provided with an end piece (19) on which a stirrup (18) engages which comprises the electric contacts (20) of a radio set.
6. Quick connection according to claims 1 through 5, characterized in that, in conditions of bayonet coupling of the annular body (1) with the fixed seat (6), stirrup (15) and the associated electric contacts (16) of body (1) and stirrup (18) and the associated electric contacts (20) of seat (6) get in touch and align

with one another.

7. Quick connection according to claims 1 through 6, characterized in that on stirrups (15) and (18) of the annular body (1) and seat (6) respectively of loudspeaker (7), the electric contacts (16) and (20) are located of loudspeaker (7) and the radio circuit possibly coupled to an additional control of the assembly and electric connection. 5 10
8. Quick connection according to claims 1 through 7, characterized in that the bayonet engagement of the back annular body (1) with the fixed seat (6) is flush and uniform on a rigid or elastic fixed peripheral ring (12), and has therefore a traction force evenly distributed relatively to the hooking, without concentrated stresses of screws or the like. 15 20
9. Quick connection for loudspeakers, characterized in that it is constituted by a back body (1) and a front peripheral continuous band (23) which connect to one another through an intermediate truncated cone-shaped structure (24), integral with them, and by an electric connection (23), comprised in one of the parts; said back body (1) being the support and the connection of the back part of a loudspeaker (7), substantially constituted by magnet (2) and comprising external peripheral slanted or spiral flanges (3), said front peripheral band (23) constituting the support and connection of the front strip (28) of the diffusion cone (29) of said loudspeaker and comprising a lower flush support free edge (26). 25 30 35
10. Quick connection according to claim 9, characterized in that it forms the loadbearing structure, the protection envelope and the coupling and connection means with other parts of loudspeakers (7), which are engaged in the same in correspondence of the back end, magnets (2), and front ends, strips (28) of the diffusion cones (29). 40 45
11. Quick connection according to claims 9 and 10, characterized in that the external peripheral configuration of the back body (1) can be coupled with a corresponding hole (5) obtainable on a fixed structure (110), such as a vehicle door or the like, which comprises openings (4) for the coaxial coupling with said peripheral flanges (3) of said back body (1), and for the rotation connection with walls (8) of edge (33) of said hole. 50 55
12. Quick connection according to claims 9 through 11, characterized in that the electric connection (16) (22) is obtained at the same time as the rotatory fixing action.
13. Quick connection according to claims 9 through 12, characterized in that the bayonet coupling of the back body (1) with hole (5) of the fixed structure (110) is coupled to the pressure engagement of the lower free edge (26) of said continuous peripheral front band (23) with part (27) adjoining and peripheral relatively to said hole (5): said free edge being straight or thinning or provided with deformable elastic tangs or with an elastic gasket (38).
14. Quick connection according to claim 9 through 13, characterized in that the pressure engagement of the lower free edge (26) of the continuous peripheral front part (23) constitutes a damping, antivibration, anti-acoustic short circuit elastic coupling.
15. Quick connection according to claims 9 through 14, characterized in that it comprises a front circumferential seat (34) wherein the peripheral teeth (33) of a protection and/or finishing removable cover or grid (32) engage; said cover constituting also the manual or automatic assembly fitting means of the complete loudspeaker connection, in said holes (5) of supports (110).
16. Quick connection according to claims 9 through 15, characterized in that the external peripheral configuration of the back body (1) provided with slanted or spiral peripheral flanges (3), and of the coupling hole (5) of structures (110), are of a standardized type, independently on the model of the loudspeaker (7) applied inside the basket.
17. Quick connection according to claims 9 through 16, characterized in that it comprises stirrups (30) and tangs or pins (13) for the coupling of contacts (16) with as many contacts obtained on stirrups (31) of the fixed structure (110), and the connection of said fixed structure in seats (21).
18. Quick connection according to claims 1 through 17, characterized in said the fixed seat (6) comprises peripheral seats (21) wherein frontally unhookable connecting tangs (13) engage elastically.
19. Quick connection for loudspeakers, characterized in that it comprises slanted or spiral pe-

ripheral flanges (3), obtained directly on the peripheral edge of the magnet unit (2), said flanges engaging and connecting a corresponding coupling hole (5) obtained on a structure (110), said coupling and connection being of the bayonet type. 5

20. Quick connection according to claims 1 through 19, characterized in that the bayonet coupling of loudspeaker (7), provided with a back annular body (1) with flanges (3) on the fixed seat (6), with openings (4), is realizable by hand or robotized mechanical means (10); the latter working by means of dedicated assembly fitting means obtained on a removable protection front cover (11), or on other suitable points of the component. 10 15

21. Quick connection for loudspeakers according to the above claims as described with special reference to the last sub-section of the descriptive part, as illustrated by way of example and for the aims specified. 20

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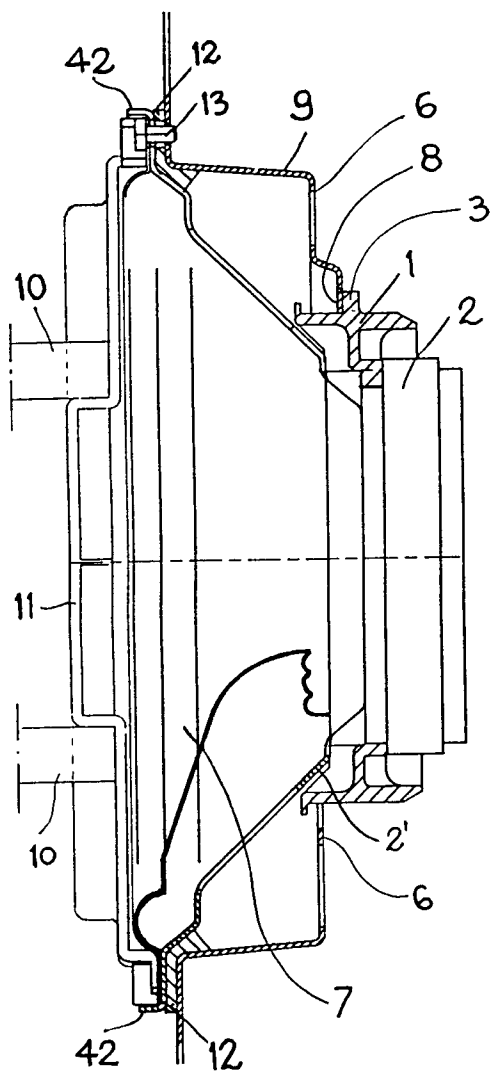


FIG. 1

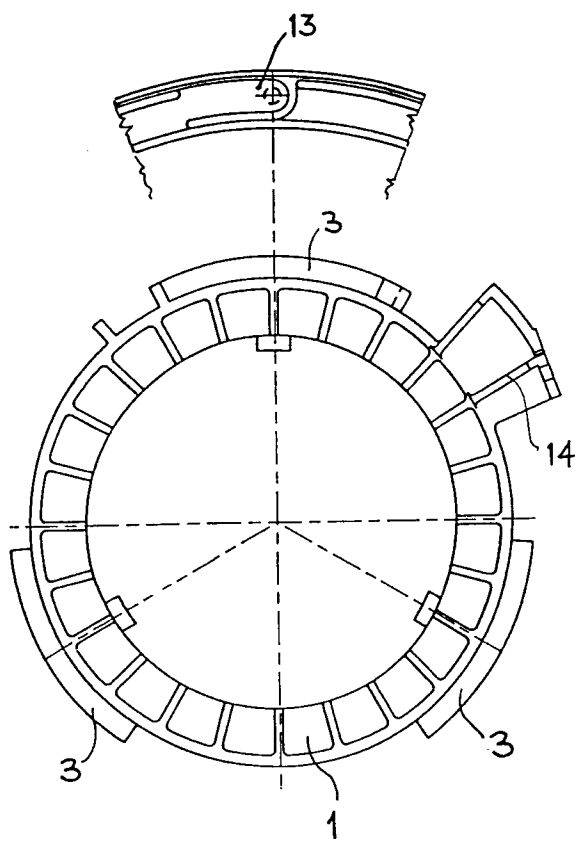


FIG. 2

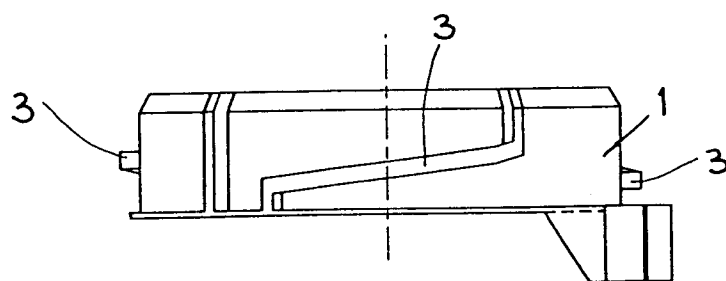


FIG. 3

