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European Patent Office
Office européen des brevets



(11)

EP 1 080 655 A2

(12)

EUROPEAN PATENT APPLICATION

(43) Date of publication:

07.03.2001 Bulletin 2001/10

(51) Int Cl.7: **A45C 13/10, A44B 17/00**

(21) Application number: **00307518.1**

(22) Date of filing: **31.08.2000**

(84) Designated Contracting States:

**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE**

Designated Extension States:

AL LT LV MK RO SI

(30) Priority: **03.09.1999 JP 25040099**

31.01.2000 JP 2000021099

21.06.2000 JP 2000185786

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(54) **Magnetic fasteners**

(57) The present invention provides a magnetic fixing unit which enforces strength of an assembly and prevents a mutual shifting in between a first and a second assemblies.

The first assembly comprises an engaging mean, on the other hand, the second assembly comprises a guide mean. When the first and the second assemblies are combined with each other, said engaging mean may be led an inside of said guide mean. A combination of said assemblies may be automatically locked due to magnetism of magnet applied to an engaging member which is formed on said second assembly. Further, a rim-shaped guide mean which covers a side of an attracting surface of the other assembly from outside is formed on the side of said attracting surface of either of said assemblies. Further, an extending guide portion is formed on said engaging mean of said first assembly, by being said extending guide portion combined with a hole of said second assembly, a vertical mutual shifting of said first and said second assemblies will be prevented as well. Further, by being formed a gap member in between said

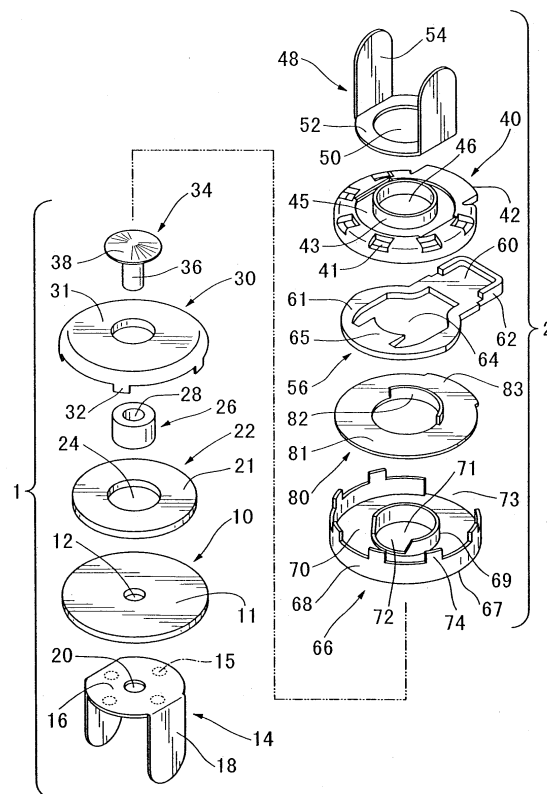


FIGURE 2

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Description

[0001] The present invention relates to a magnetic fixing unit, in particular, to a simplified magnetic fixing unit capable of automatically locking, for example, a handbag in a closed condition.

[0002] In order to keep the lid of, for example, a handbag, bag, knapsack, belt, cigarette case or attaché case in a closed condition, various kinds of fixing units have been designed and are available. One of them is a magnetic fixing unit using magnetic force.

[0003] An example magnetic fixing unit, described above, is released to the patent official report number 2944564 patent applied Heiseil 194638 which is applied by the applicant himself for this patent request. This magnetic fixing unit comprises a first and a second assemblies, and is respectively applied to, for example, a handbag lid and a main body of handbag in the fixing condition. These assemblies are capable of not merely keeping a closed condition of a lid and an object itself and but also locking the closed condition automatically when these assemblies are combined with each other by an operation of magnet.

[0004] More specifically, these assemblies are attracted and combined with each other at their front surface while they allow a projecting portion installed on a front surface of the first assembly to pass through a hole formed on a front surface of the second assembly by an operation of magnet, and enable to lock their combination under the condition that a projection placed on a tip of the projecting portion of the first assembly interferes with the engaging portion member attracted on a middle of the projecting portion of the second assembly when the first and the second assemblies are tried to separate by an attracting engaging portion member placed on the second assembly to the middle of the projecting portion of the first assembly with making use of the operation of magnet.

[0005] Generally speaking, metal are considered as appropriate material for an assembly body, yet these metal, for example, are desirable to be processed by punching, pressing, or bending of an inexpensive thin metal in order to cut a production cost. However, strength will be a big problem when the thin metal is used to make the assembly body. As the especially problematic case, for example, there is provided a fixing method of assembly. As described above, the assembly is applied to a handbag and the other in a fixed condition, yet this fixing method includes a work to bend a part of metal plate by driving with a hammer and like. If the strength of the assembly is weak, the assembly is destructed by this work with ease or deformed. Accordingly, reinforcement for the strength of the assembly is strongly desirable. Moreover, material except metal, for example, plastic and other, is possibly used to form the assembly.

[0006] As described previously, a projecting portion of the first assembly passes through a hole in the second

assembly, which, when combined with each other, a lateral shift may occur horizontally against the top to bottom axis when or after the two are engaged. This shift causes a problem when they are disengaged because the lateral shift of the projection of the first assembly within the second assembly causes it to catch within the second assembly, thus making the smooth engagement and disengagement operation difficult.

[0007] Above-mentioned magnetic fixing unit released in the patent report number 2944643 by the applicant applying this request is designed to install on an annular projecting portion so as to prevent a mutual shifting, and accept a front surface of the first assembly inside the annular projecting portion when or after the first and the second assemblies are combined with each other. However, the installation of the annular projecting portion has shortcomings; a thickness of the annular projecting portion becomes an obstacle when a lid is opened, an appearance is not preferable, and an equipment looks thick. Installation of the annular projected-out portion for preventing the mutual shifting is indispensable, yet it is undesirable to spoil an exterior.

[0008] The present invention is provided to improve a magnetic fixing unit developed by the applicant for this patent request himself, and the object is to provide a magnetic fixing unit which prevents a mutual shifting between the first and the second the assemblies, and simultaneously reinforces strength of assemblies without spoiling its exterior.

[0009] According to an aspect of the present invention, there is provided a magnetic fixing unit comprising a first assembly which is attached to one member of a pair of members which are to be combined each other and a second assembly which is attached to the other member of said pair members, said magnetic fixing unit characterized in that said first and said second assemblies are attracted and combined with each other at their attaching surface by an operation of magnet disposed on either said first or second assemblies, and said first assembly comprises an engaging mean projected from its attracting surface toward a combination direction with said second assembly, and said second assembly comprises a guide mean extended inside of said second assembly from its attracting surface toward an opposite direction to the combination with said first assembly, and said engaging mean is lead inside of said guide mean when the first and the second assemblies are combined with each other, and said second assembly comprises mating engaging mean which locks a combination of said first and said second assemblies by moving toward a lock position for said engaging mean when said first and second assemblies are combined with each other, and a release mean to release said lock.

[0010] According to an embodiment of the present invention, said engaging mean for said first assembly is magnetic, a mating engaging mean of said second assembly is made of a magnetic body and locks a combination of said first and said second assemblies since

said mating engaging mean of said second assembly moves toward a lock position for the engaging mean of said first assembly due to an operation of magnet when the first and the second assemblies are combined with each other.

[0011] According to another embodiment of the present invention, an opening which attracts said mating engaging mean to an engaging mean of said first assembly is installed on a part of a guide mean of said second assembly.

[0012] According to another embodiment of the present invention, said guide mean is made of magnetic body.

[0013] According to another embodiment of the present invention, said second assembly also comprises a frame having said attracting surface as one surface, and a housing member which houses said corresponding engaging mean located on a place between one surface of said frame and opposite surface to said surface of said frame, said guide mean is formed by a guide mean only installed on said frame, guide mean only installed on said housing member, or combination of guide mean of said frame and guide mean of said housing member.

[0014] According to another embodiment of the present invention, said frame is formed by punching, bending, and pressing processing of thin plate.

[0015] According to another embodiment of the present invention, said reinforcing place is installed on an opposite surface to one surface of said frame, and said annular engaging mean is located on there in between said reinforcing plate and said housing member.

[0016] According to another embodiment of the present invention, said reinforcing guide mean which reinforces said guide mean by covering around said guide mean is installed on said reinforcing plate.

[0017] According to another aspect of the present invention, there is provided a magnetic fixing unit comprising a first assembly which is attached to one member of a pair of members which are to be combined each other and a second assembly which is attached to the other member of said pair members, said magnetic fixing unit characterized in that said first and said second assemblies are attracted and combined with each other at their attaching surface by an operation of magnet disposed on either first or second assemblies, and said first assembly comprises an engaging mean projected from its attracting surface toward a combination direction with said second assembly, and said second assembly comprises a guide mean extended inside of said second assembly from its attracting surface toward an opposite direction to a combination with said first assembly, and said engaging mean is lead inside of said guide mean when said first and second assemblies are combined with each other, and said second assembly comprises a mating engaging mean which locks a combination of said first and said second assemblies by moving toward a lock position for said engaging mean when said first

and second assemblies are combined with each other, and a release mean to release said lock.

[0018] According to another aspect of the present invention, a magnetic fixing unit comprising a first assembly which is attached to one member of a pair of members which are to be combined each other and a second assembly which is attached to the other member of said pair members, said magnetic fixing unit characterized in that said first and said second assemblies are attracted and combined with each other at their attaching surface by an operation of magnet disposed on either said first or said second assemblies, and said first assembly comprises an engaging mean projected from its attracting surface toward a combination direction with said second assembly, a size of an outer diameter on a crossing direction with said a combination direction of a back end portion of said engaging mean on the combination direction with said second assembly is substantially set up as same or bigger than the outer diameter on the crossing direction with said combination direction of a tip end portion of said engaging mean, said second assembly comprises a hole at an attracting surface thereof, and said engaging mean of said first assembly is lead along a hole at said second assembly, and said second assembly comprises a mating engaging mean which locks a combination of said first and said second assemblies by moving toward a lock position for said engaging mean when the first and the second assemblies are combined with each other, and a release mean to release said lock.

[0019] According to an embodiment of the present invention, said guide mean that faces an opposite direction to a combination direction with said first assembly from an attracting surface of said second assembly and projects over inside of the second assembly till substantially same length as that of said engaging mean on said combination direction is formed on a hole of said second assembly, said guide mean is lead inside of said guide mean when said first and said second assemblies are combined with each other.

[0020] According to another aspect of the present invention, a magnetic fixing unit comprising a first assembly which is attached to one member of a pair of members which are to be combined each other and a second assembly which is attached to the other member of said pair members, said magnetic fixing unit characterized in that said first assembly comprises at least a fixing plate and an engaging portion formed on said fixing plate, and said second assembly comprises at least an engaging member which is made of magnetic material and may be moved to a lock position for said engaging portion and a release means which is applied to said engaging member to move it from said lock position to a release position, where in magnet which is located between said fixing plate and said engaging member when said first and said second assemblies are combined with each other and a magnet gap which is located between said magnet and said engaging member are disposed

on either of said first and said second assemblies, and said engaging member is designed so as to be movable to the lock position for said engaging portion by an operation of said magnet plate.

[0021] According to an embodiment of the present invention, said magnet gap is formed by a non-magnetic member or a plating made of a non-magnetic member.

[0022] According to an embodiment of the present invention, said magnet is disposed on said first assembly and said engaging portion is disposed on said magnet without installing on said fixing plate.

[0023] There will now be described several preferred embodiments of the present invention.

Fig. 1 is a perspective view of the magnetic fixing unit of the present invention illustrating an assembled condition thereof;

Fig. 2 is an exploded view in perspective of each of the first and the second assemblies;

Fig. 3 is a cross sectional view illustrating an operation mechanism of the locking when the first and the second assemblies are combined each other;

Fig. 4 is a cross sectional view taken along the line A-A of Fig. 3;

Fig. 5 shows an example in practical use of the magnetic fixing unit of the present invention;

Fig. 6 shows an embodiment of the rim-shaped guide of the present invention;

Fig. 7 shows another embodiment of the rim-shaped guide of the present invention;

Fig. 8 shows further embodiment of the rim-shaped guide of the present invention;

Fig. 9 shows further embodiment of the rim-shaped guide of the present invention;

Fig. 10 shows an embodiment of the extending guide portion of the present invention; and

Fig. 11 shows another embodiment of the slider of the present invention.

[0024] Fig. 1 is a perspective view of an assembled magnetic fixing unit according to the present invention. As shown in the drawing, the magnetic fixing unit of the present invention comprises a first assembly 1 and a second assembly 2. Each of these pairs of assemblies is, as described later, fixed respectively to either one of a pair of mating members (for example, a main body and a lid of a handbag) of an object to be equipped with said magnetic fixing unit. Since these assemblies are moved toward a combination direction of the first and the second assemblies (Fig. 1, allow A & B and mutually attracted and combined with each other at respective attracting surfaces 31 and 67 (they are described in detail at Fig. 3 described later), The mating members of the handbag, for example, can be kept in closed condition through this combination. In this magnetic fixing unit, the first and the second assemblies are combined with each other and combination of these assemblies is locked automatically by operation of magnet. This locked condi-

tion of the unit can be easily released by the operation of the second assembly.

[0025] Fig. 2 is an exploded view in perspective of assemblies 1 and 2. Further, Fig. 3 shows a cross sectional view along the center line of the magnetic fixing unit according to the present invention illustrating a combined condition of the first and the second assemblies. These drawings show components of each of the assemblies in detail. The details of the component of each of the assemblies will be described mainly with reference to Fig. 2.

[0026] The first assembly will be initially described.

[0027] As shown is a left side of Fig. 2, the first assembly comprises an annular plate 10; a retainer 14 which is fixed to said annular plate 10, a magnet 22 and a cylindrical sleeve 26 which are attracted and attached onto the annular plate 10 by a magnetic force. A cover 30 which covers said magnet 22 and the annular plate 10 is also shown to be so formal to enable to an engaging pin 34 to pass through the first assembly along a center thereof. As described later, this annular plate 10, however, might be eliminated.

[0028] The annular plate 10 may be made either of a non-magnetic material such as plastics or a magnetic material. When, the annular plate 10, is made of iron a plating is usually applied thereto for anti-corrosion purposes. A plating may be applied as well to other metallic components for anti-corrosion purposes. A hole 12 formed on a center of the annular plate 10 enables the engaging pin 34 to be passed there through.

[0029] The retainer 14 is fixed onto the bottom of the annular plate 10 by, for example, spot welding, solder and wax welding, caulking or other appropriate methods. In the present embodiment, spot welding and caulking are employed in order to ensure fixing the retainer 14. 4 circles described with broken line in Fig. 2 show solution portions caused by the spot welding.

[0030] The location of these solution portions is estranged at even intervals so that force can be applied to the retainer 14 uniformly. The retainer 14 and the annular plate 10 do not have to be formed as separate components, but may be formed into one body. The retainer 14 may be made form any appropriate material, however, when it is formed in one unit with the annular plate 10, it is naturally formed of the same as the annular plate. Further, the retainer 14 may have the same effect as that of the annular plate 10. When magnet 22 is made of a plastic magnet, said plastic magnet or other member and either of the annular plate 10 or the retainer 14, or both of them may be formed into one body. Various members may be equipped to said other member by a screw caulking, welding, or other appropriate methods. Further, a plating may be applied to said plastic magnet.

[0031] The retainer 14 comprises an annular portion 16 and two fixing portions 18 which extend downward from an opposite sides of said annular portion 16. The annular portion 16 of the retainer is fixed to the annular plate 10, while the fixing portions 18 are used to fix the

first assembly to, for example, a main body of handbag or a handbag lid. At the center of the annular portion 16, a hole 20 having approximately the same size as that on the annular plate 10 is formed. When the retainer 14 and the annular 10 are aligned with each other, and thereby an aligning hole for the engaging pin 34 to be passed through is formed.

[0032] The ring-shaped magnet 22 is attached onto the opposite side of the annular plate 10 from that to which the retainer 14 is attached. An outer diameter of magnet 22 is preferable to be smaller than that of the annular plate 10. Said magnet 22 is a permanent magnet which has a N-pole or S-pole on one side or surface thereof and the opposite polarity on the other side or surface. Therefore, the magnet 22 can be attached and attached onto the annular plate 10 by its own magnetic force. As a result of the magnetic attraction and attachment of magnet 22 to annular plate 10, the annular plate 10 is magnetized and also generates a magnetic force. The magnetic force of the annular plate 10 has an important role, in particular, to attract the cylindrical sleeve 26. The magnet 22 may be neodymium magnet or the other magnet. Though thickness of the magnet 22 may be determined from 0.5 mm to 10 mm, said thickness may not be limited in these ranges. Furthermore, a plating may be applied to said magnet 22.

[0033] The cylindrical sleeve 26, as shown in Fig. 2 will be attached to the same side of the annular plate 10 as the magnet 22. While in the present embodiment, the cylindrical sleeve 26 is shown to be located near to the center of the annular plate 10, it needs not be located at the center of the annular plate 10. When the cylindrical sleeve 26 is located near to the center of the annular plate 10, it is placed directly on the annular plate 10 so that it does not obstruct or interfere with an inner edge of a center hole 24 of the magnet 22. The cylindrical sleeve 26 not necessarily to be located away from the magnet 22, but may be brought into contact with the magnet 22. The cylindrical sleeve 26 may be fitted directly into a ring hole of the magnet 22 with keeping this contact condition. In this case, the annular plate 10 can be omitted. The magnet 22 and the cylindrical sleeve 26 may be formed into one unit when the magnet 22 is a plastic magnet. Further, either of the annular plate 10 or the retainer 14, both of them, or the other member may be attached to the cylindrical sleeve 26 by a screw, a caulking or the other appropriate methods.

[0034] The cylinder sleeve 26, similar to the annular plate 10, is made of a magnetic material. Therefore, the cylindrical sleeve 26 can be attracted by and attached to the magnetized annular plate 10. As being obvious, when the cylindrical sleeve 26 is attracted and attached to the annular plate 10 by a magnetic force, the cylindrical sleeve 26 is also magnetized. As a result, the cylindrical sleeve itself generates a magnetic force. The magnetic force of the cylindrical sleeve has an extremely important role to attract the engaging member 64 as will be described later. The cylindrical sleeve and the

annular plate 10 may be formed into one unit.

[0035] When the cylindrical sleeve 26 is magnetically attached onto the annular plate 10, the tops of the cylindrical sleeve 26 will project over the magnet 22. Further, the cylindrical sleeve projects outward from an attracting surface of the first assembly (31) toward a combination direction (Fig. 1 allow A & B direction) with second assembly. The cylindrical sleeve 26 also has a through hole 28 along a longitudinal direction thereof, whose size is almost the same as those of the hole 20 of the retainer 14 and the hole 12 of the annular plate 10. When all of the cylindrical sleeve 26, the annular plate 10, and the retainer 14 are aligned, these holes form an aligning hole to be penetrated by the engaging pin 34.

[0036] The cover 30 is attached to the magnet 22 and the annular plate 10. As shown in Fig. 2, cover 30 has a ring-shaped corresponding to that of the magnet 22. The size thereof is suitable for covering almost of all the surface of the magnet 22 except a bottom portion thereof and a side surface of the annular plate 10. As described above, a rim of cover 30 needs not be formal when the outer diameter of the magnet 22 is smaller set up than that of the annular plate 10. Therefore, a smooth curved surface will be formed at said rim. When the cover 30 is placed to cover the magnet 22 and the annular plate 10, five fixing legs 32 extending downward from an outer periphery of a bottom of said cover 30 are projected over the bottom surface of the annular plate 10. When these fixing legs are bent inward along the bottom surface of the annular plate 10, the cover 30 can be fixedly attached to the magnet 22 and the annular plate 10 making them to be integrated unit. Though the material of the cover 30 is not limited to a particular one, the present embodiment employs non-magnetic material such as brass. The reason way the cover 30 is provided is to protect the magnet 22 and the annular plate 10 and to make the connection there between stronger, so that the cover may be omitted. The outer diameter of the magnet 22 may be either smaller or bigger than that of the annular plate 10. When there is no cover used, the magnet 22 and the annular plate 10 are preferably joined together by bonding or other known methods for making a stronger connection there between. When there is a cover used, a surface attracting to the attracting surface of the second assembly 67 (reference to Fig. 1 and 2) is a front side 31 of said cover 30. Contrarily, when there is no cover used, a surface attracting to second assembly is a front side 21 of the magnet 22 located below the cover 30. Though the cover 30 is used, the annular sleeve 26 projects outward from the attracting surface of first assembly (31) toward a combination direction (Fig. 1 allow A & B direction) with second assembly.

[0037] The engaging pin 34 is installed by being inserted into the aligned hole formed by respective hole of the cylindrical sleeve 26, the annular plate 10, and the retainer 14. The engaging pin 34 comprises a stem

36 and a head 38 formed on said stem 36. Only the stem 36 of the engaging pin 34 is inserted into the aligning hole and the head 38 is not inserted into said aligning hole.

[0038] The stem 36 of the engaging pin 34 is made to have a length that is longer than the total length of the aligning hole formed by the holes of the cylindrical sleeve 26 and the like. Therefore, when the stem 36 of the engaging pin 34 is inserted into the aligning hole, the tip of the stem 36 can be projected out of the hole 20 of the retainer 14 which forms the most bottom side of the aligning hole. By caulking the projected-out portion (not shown) of the stem 36 against the bottom of the retainer 14 or by fixing the projected-out portion of the stem 36 to the retainer 14 using welding, screwing or other appropriate methods, the engaging pin 34 may be fixed to the annular plate 10 and the cylindrical sleeve 26. When the engaging pin 34 is fixed to the bottom of retainer 14, the end portion of the stem 36 of the engaging pin 34 may be flattened to be even with the bottom surface of the retainer 14 or may be formed to be slightly projected from said bottom surface.

[0039] When the engaging pin 34 is inserted through the aligning hole, the head 38 of the engaging pin 34 projects above the top of the cylindrical sleeve 26. At least a portion of the head 38 is made of a non-magnetic material, and therefore is not affected by the magnetic force. As described later, when the first and the second assemblies are combined with each other, the head 38 penetrates a central portion of the second assembly, and since, as described previously, this head 38 is not affected by the magnetic force, a combining operation of the first and the second assemblies is not achieved due to the head 38 being magnetically attracted by any parts of the second assembly. The other remaining portion of the engaging pin 34 except the head 38, that is, the stem 38 may be made of a magnetic material or of a non-magnetic material. The reason why head 38 of the engaging pin 34 is formed to have a conical surface is that even if the head 38 is brought into contact with the engaging piece 65 of the slider 56, to make frictional resistance in between the head 38 and the engaging piece 65 lesser. As a result, the engaging piece 65 is moved smoothly and the head 38 is easily inserted into the aligned holes of the second assembly.

[0040] The second assembly will now be described.

[0041] As shown in a right portion of Fig. 2, the second assembly comprises an annular frame 66, a reinforcing plate 80 which is housed in the annular frame 66, a housing member 40 which forms a housing space in there between thereof and the reinforcing plate 80, a slider 56 which is held in the housing space formed by the reinforcing plate 80 and the housing member 40 so as to be able to move floatably, and a retainer 48 which is fixed in the housing space 40.

[0042] The annular frame 66 is preferably made of a magnetic material such as iron. By being made of a magnetic body, the annular frame 66 has outstanding

effects as described later. First, a magnetic force from the first assembly can be applied to the annular frame 66 when the first and the second assemblies are combined with each other. Further, stronger attracting force in there between the first and the second assemblies is generated when the magnetic force of the first assembly is applied to not merely a slider 56 but also the annular frame. Second, when the first and the second assemblies are combined with each other, the slider 56 will operate smoothly due to the annular frame 66 being functioned as yoke. Even when said annular frame 66 is made of plastic, brass, or the other non-magnetic body, the latter effect described previously, may be given. It will be described later.

[0043] The annular frame 66 is formed into an integrated unit by penetrating, bending, and pressing of relatively thin and flat metal plate. These production methods keep a production cost low. However, it is not necessary to be formed into the integrated unit and the other production methods might be used. For example, a cylindrical guide 69 and the annular frame 66 or the other portion are formed into separated pieces and the cylindrical guide 69 may be attached later. Instead of placing the guide 69 on the annular frame 66, the other member corresponds to the guide 69 may be formed on the housing member 40 side. Further, when a part of the guide 69 (or the other member corresponds to the guide 69) is placed on both the annular frame 66 and the housing member 40, a complete guide may be formed by these combination. A material and production methods are determined by a designer's preference.

[0044] The annular frame 66 is formed as a frame which is surrounded by an outside wall portion 68, an inside wall portion, that is, the guide 69, and a front wall portion 70. Though it is not obvious from the drawing, an annular projecting portion described a conventional art is not formed on a front surface (attracting surface) of the annular frame 66 but is kept flat. This front surface (the opposite surface to the surface described in the drawing) is applied as an attracting surface 67 which is attracted to the attracting surface of the first assembly.

[0045] The inside wall portion, that is, the guide 69 is a notable point. Said guide 69 is a substantially cylindrical-shaped which has a specific inner diameter and is projected out from an inner hole of the second assembly toward an opposite direction from the attracting surface 67 (reference to Fig. 1 and 3) to a combination direction with the first assembly (allow B direction in Fig. 1). There are three reasons to install the guide 69. First, the guide 69 prevents a mutual shifting toward horizontal direction created there between the first and the second assemblies. It is not necessary to install said guide 69 if there is a little or no mutual shifting in there between these assemblies when or after the first and the second assemblies are combined with each other. However, relatively big mutual shifting is created in a practical manner. Such mutual shifting will prevent a magnetic fixing unit from a good operation.

[0046] The reason why the guide 69 is installed is to solve this problem. That is, the guide 69 prevents from the mutual shifting toward horizontal direction created there between the first and the second assemblies when or after these assemblies are combined with each other. Reference to Fig.3, more specifically described, a head 38 of the engaging pin of the first assembly is lead inside of the second assemblies along a hole 71 which is formed inside of the guide 69 and the head prevents the mutual shifting toward the horizontal direction inside of the second assembly after the head 38 reaches inside of the second assembly when the guide 69 is installed on the second assembly. As the example of this function, when a lock is released by pressing the slider 56, a force produced by this action prevents a hole 71 from being off from the head 38 due to the annular frame 66 being pushed toward the horizontal direction.

[0047] The second reason why the guide 69 is installed is to reinforce strength over a top and bottom direction of the annular frame 66. As described later, though the second assembly is fixed on an object such as a handbag by respectively bending and driving the fixing portion 54 of the retainer 48 which is fixed on the housing member 40, a considerable force will be applied to a near the retainer 48, in other words, near center place of the housing member 40 and the annular frame 66 over the top and bottom direction. Said force is big enough to destroy the housing member 40 and the annular frame 66 (therefore, the second assembly itself) or deform them. In particular, as this present embodiment, when the annular frame 66 is formed by relatively less strong thin plate, the annular frame 66 (the second assembly itself) is destroyed easily or deformed easily during its production and the housed slider 56 is not able to be floatable. Accordingly, this problem is attempted to be solved by the installation of the guide 60 on near the center of the annular frame 66 and a reinforcing guide 82 of the reinforcing plate 80 which reinforces the annular frame so that it can make its strength stronger.

[0048] The third reason why the guide 69 is installed relates to an opening portion 72 installed on a part of the guide 69. The opening portion 72 is designed to function so that the slider 56, especially its engaging portion 65 can approach and attract to inside of the guide 69, that is, the cylindrical sleeve 26 which is magnetized by the first assembly and located on inside of the guide 69. Size of the opening portion is necessary and sufficient enough to pass the engaging portion 65 through. Contrarily, the guide 69 is installed on with successive condition over the remaining portion except the opening portion 72. The third reason why the guide 69 is installed is that the slider 56 is not affected by a magnetic force over the remaining portion except the opening portion 72, that is, the guide 69 is functioned as a magnetic shield to the remaining portion of the slider 56 except its engaging portion 56.

[0049] In order to accomplish said three purposes completely, the guide 69 is installed with an angle range

at least bigger than 180 degree, for example, in the present embodiment, it is installed with the angle range of around 240 degree. Said angle range is efficient enough to attract the slider 56 to the first assembly by a magnetic operation applied to the engaging portion 65 of the slider 56, to prevent the mutual shifting toward the horizontal direction created there between the first and the second assemblies when or after these assemblies are combined with each other, and to reinforce strength toward the top and bottom direction of the annular frame 66. When the angle range is smaller than 180 degree, for example, the meaning as being the guide 69 will be gone since its own the head 38 of the engaging pin 34 is projected out of the guide 69 and insufficient strength will be provided. Nevertheless, designer can determine that the angle would be smaller than 180 degree. Further, a length of the guide 69 is as same length as that of which is formed by the cylindrical sleeve 26 and the head 38 on the combination direction of the first and the second assemblies. Inner diameter of the guide 69 is slightly bigger than outer diameter of the head 38. However, the length of the guide 69 and a design of its inner diameter are determined by designer's preference.

[0050] An enforcing plate 80 has a role to reinforce the annular frame 66. However, the enforcing plate 80 will be omitted since it is installed in order to only reinforce the annular frame 66. The reinforcing plate 80, toward direction described in the drawing, is housed from an opened back portion of inside of the annular frame 66.

[0051] Though the reinforcing plate 80 is, similar to the annular frame 66, formed in one unit by penetrating, punching, or bending of thin magnetic plate, it needs not to be formed in one unit and may be formed in similar shape by the other production methods. Steel metal used for the reinforcing plate 80 may be similar to that of the annular frame 66 and the reinforcing plate 80 is formed through similar procedure to that of the annular frame 66. In this case, production cost will be inexpensive. However, similar to the annular frame 66, it needs not to be formed in one unit and is formed by a non-magnetic body.

[0052] The reinforcing plate 80 has shape or size which enables to reinforce strength over, in particular, the front wall portion 70 of the annular frame 66 and the inside wall portion, that is, the guide 69. That is, the reinforcing plate 80 comprises a main body portion 81 which corresponds to the front wall portion 70 of the annular frame 66 and whose shape is similar to a doughnut shape and a reinforcing guide portion 82 which corresponds to the wall portion 70 of the annular frame 66 and extends from the main body portion toward top and bottom direction.

[0053] When the reinforcing plate 80 is housed inside of the annular frame 66, the main body portion 81 of the reinforcing plate 80 covers almost whole inside of the front wall portion 70 of the annular frame, that is, an opposite side surface to the attracting surface of said an-

nular frame 66. A projection portion 83 installed on the outer diameter of the main body portion 81 is fitted in the opening portion 73 which is installed correspond to the outer wall portion 68 of the annular frame 66 when the reinforcing plate is housed in the annular frame 66. The reinforcing plate 80 is housed in the annular frame 66 with designated direction by a mutual fitting of the projecting portion 83 and the opening portion 73. Further, the reinforcing plate 80 is retained with predetermined direction to the reinforcing plate 80 corresponds to the annular frame 66 when after the reinforcing plate 80 is housed in inside of the annular frame 66.

[0054] Though the reinforcing guide 82 is installed in a smaller angle range than that of the guide 69 of the annular frame 66, for example, in around 180 degree, it may be same angle as that of the guide. The height of the reinforcing guide 82 will be set up lower than that of the guide 69 of the annular frame 66, or same as it when the reinforcing plate 80 is housed in the annular frame 66. However, when the height will be set up lower, difference in level 84 (refer to Fig. 3) will be formed due to a relation with the guide 69. The reason for it will be described later. It is obvious from the relation between the angle range of the reinforcing guide 82 and the angle range of the guide 69 of the annular frame 66 that the reinforcing guide frame 82 thoroughly plays role to reinforce the annular frame 66 even though the reinforcing guide frame 82 does not encircle whole perimeter of the guide 69 of the annular frame 66. Though the reinforcing guide 82 may encircle the whole perimeter of the guide 69 of the annular frame 66 and be bigger angle range than that of the guide 69, in that case, the opening for the engaging portion 65 of the slider 56 has to be ensured. On the other hand, it is obvious from the relation between height of the reinforcing guide 82 and of the guide 69 of said annular frame 66 that the difference in level 84 of the top and bottom direction, shown in Fig. 3, is formed by the guide 69 and the reinforcing guide 82 when the reinforcing plate 80 is housed in the annular frame 66. The difference in level 84 which is formed by the guide 69 and the reinforcing guide 82 forms a mutual supplemental shape to a difference in level 47 place on the housing member 40. As described later, when the difference in level 84 and 47 are placed correspondently, an aligned hole which does not have an opening substantially is formed, a hole which is formed by the guide 69 is substantially extended, and strength of said hole is enhanced.

[0055] When the reinforcing plate 80 is made of the magnetic body such as iron, various effects described in relation to the annular frame 66 will be received. If the reinforcing plate 80 is installed in order to only intensify strength of the annular frame 66, an object is thoroughly attained even though the reinforcing plate 80 is made of non-magnetic body. However, if an attracting and yoke functions of the annular frame 66 are reinforced by the reinforcing plate 80, the reinforcing plate may be made of a magnetic body. That is, if the reinforcing plate 80 is

made of magnetic body, the magnetic force of the first assembly will be applied to both the slider 56 or the annular frame 66 and the reinforcing plate 80 and stronger attracting force will be produced in there between the first and the second assemblies when the first and the second assemblies are combined with each other. Further, in addition to the annular frame 66, if the reinforcing plate 80 is functioned as yoke corresponds to magnetism from the first assembly, the slider 56 will work smoothly. Though these effects are received when the reinforcing plate 80 or the annular frame 66 is made of a non-magnetic body, greater effects will be brought about when the annular frame 66 and the reinforcing plate 80 are made of a magnetic body.

[0056] The slider 56 is used to lock a combination part between the first and the second assemblies automatically when said assemblies are combined with each other. Further, the second assembly is attracted to the first assembly, in particular, due to an operation of magnet from the cylindrical sleeve 26 located in the first assembly. This attracting operation is, that is, the lock operation between the first and the second assemblies.

[0057] In the present embodiment, though the slider 56 is formed in one unit by penetrating, bending, and pounding in order to cut the production cost, it needs not to be formed in one unit and may be used the other production methods. This regard is similar to that of the annular frame 66 or the reinforcing plate 80. Said slider 56 finally offers a bilateral symmetry key shape (the other shape is possible). The engaging pin 34 of the first assembly and the cylindrical sleeve 26 located on the periphery of the engaging pin 34 are passed through the hole 64 which is located on near the center of the slider 56 and are located on there when the first and the second assemblies are combined with each other.

[0058] The slider 56 offers a main body 61 and a lever 61. The engaging portion 65 which is projected inside is installed on the main body 61. When the first and the second assemblies are combined with each other, the engaging portion 65 is attracted to the cylindrical sleeve 26 which is located on the periphery of the engaging pin 34 of the first assembly and plays a role to lock these assemblies automatically. The engaging portion 65 as a whole is formed as half moon shape (the other shape is possible). Though conical surface which gets thinner toward edge corresponds to the head 38 of the engaging pin 34 of the first assembly which is being made thinner is formed on ends of the engaging 65, it needs not to be formed. If the engaging portion 65 may be brought into contact with the head 34 of the engaging portion 65 when the first and the second assemblies are combined with each other, frictional resistance between the engaging portion 65 and the head 34 will be lesser by being corresponded shape of the engaging portion 65 to that of the engaging pin 34. Attraction corresponded to the cylindrical sleeve 26 is occurred at the end of the conical surface of the engaging 65. On the other hand, the lever 60 is applied to release the engaging portion 65 which

is attracted to the cylindrical sleeve 26 from the first assembly and release the lock.

[0059] The slider 56 is located on over the reinforcing plate 80 which is housed in the annular frame 66 and the main body portion 61 of the slider 56 is covered from top by the housing member 40. As shown in Fig. 3, a space 49 is formed on the housing member in order to house the slider 56 and the main body portion 61 of the slider 56 is housed in the space 49. On the other hand, the lever portion 60 of the slider 56 is exposed outward through an opening portion 42 which is formed on the outer wall portion of the housing member 40. Though the housing member is housed in the annular frame 66 later, here is also similar to the case of the reinforcing plate 80, the housing member 40 is housed in the annular frame 66 with predetermined direction be being fitted the opening portion 42 which is projected from the housing member 40 into an opening portion 73 which is correspondently formed on the outer wall portion 68 of the annular frame 66, further, the housing member 40 is retained with the predetermined direction corresponds to the annular frame 66 after the housing member 40 is housed in the annular frame 66. When the member 40 is housed in the annular frame 66, only the lever portion 60 of the slider 56 is projected out from the housing space which is formed by the housing member 40 and the annular frame 66, respective opening portions 42 of the housing member 40 and the reinforcing plate 80, and opening portion 73, and the main body portion 61 offering the engaging portion 65 is to be floatable and housed inside of the housing space. It is obvious from the shape of the opening portion 42 of the housing member 40 and of the slider 56 that the floatable direction of the slider 56 is a direction normal to the opening portion 73 formed on the housing member 40 and the outside wall portion 68 of the annular frame 66, that is, a longer direction along the slider 56 (allow B direction in Fig. 3).

[0060] After the housing member 40 is housed in the annular frame 66, six fixing pieces which is projected out of the outer wall portion 68 of the annular frame 66 is respectively bended toward a cutting portion 41 corresponds with the housing member 40. Therefore, the housing member 40 is fixed on the annular frame 66.

[0061] The slider 56 inside of the housing space, in particular, its engaging portion 65, is able to move its location freely by an operation of the lever 60. Therefore, the engaging portion 65 will not be fallen into an undesired lock condition. If it is happened, the undesired lock condition will be released easily by movement of the lever portion 60. Corresponds to the movement of the lever portion 60, the engaging portion 65 of the slider 56 passes through the opening portion 72 which is formed on the guide 69 of the annular frame 66 and approaches, interferes or is kept away from inside of the guide 69, in particular, the magnetized annular sleeve 26 of the first assembly which may be located on the inner part of the guide 69. However, since approach and attraction to the

annular sleeve 26 is caused naturally due to magnetic operation of the annular sleeve 26, a primary objective of an installation of the lever portion 60 is to be kept the engaging portion 65 away from the engaging portion 65.

In order to facilitate an operation of the slider 56, a tongue portion 62 is formed on the end of the lever 60 by bending or pressing the lever 60.

[0062] In order to make magnet of the first assembly operate, the slider 56 may be made of a magnetic body or a non-magnetic body. Among a component member of the second assembly, the engaging portion 65 of the slider 56 is the only portion which is needed to be made of the magnetic body. When the slider 56 is formed in one unit by non-magnetic body, the engaging portion 65 may be applied by a magnetic -plating, or may be covered by the magnetic body or makes it to be substantial magnetic body by the other methods. When the slider 56 is not be formed in one body, the whole body is not necessary to be magnetic body, only the engaging portion which is attracted to the first assembly ought to be made of the magnetic body, and the other remaining parts of the first assembly may be made of a non-magnetic body. Further, depends on design, the engaging portion 65 may be kept away from the annular sleeve 26 by pressing or pulling the engaging portion 65 due to a movement of the lever portion which is installed on either of the engaging portion 65 or the main body 61 or both of them. Its design is up to a designer's preference. However, there is a point to notice when whole body of the slider 56 is made of a magnetic body since the remaining parts of the magnetic-made slider 56 except the engaging portion is attracted to the first assembly. If the remaining parts are attracted, a lock by the engaging portion is disabled or is not functioned properly. Therefore, it is necessary to contrive a means to ensure the engaging portion 65 attracting to the cylindrical sleeve 26. On the hole located in a center of the slider 56, the engaging portion 65 of the slider 56 makes it to be projected toward the side on which the cylindrical sleeve 26 of the first assembly is placed, that is, the direction making closer to the hole, at the same time, the remaining part the engaging portion 65, in particular, the confronting part to the engaging portion 65 is recessed deeper toward farther side from the cylindrical sleeve 26 of the first assembly, that is, toward farther direction from the hole. As described previously, the slider 56 is formed as bilateral symmetry since it moves toward only direction. Due to this shape, the magnet applied to the engaging portion 65 is much bigger than that of the remaining part of the slider 56 except the engaging portion 65. Accompanied with a structure of the engaging portion 65, the engaging portion 65 is ensured attracting to the cylindrical sleeve 26 due to the operation of the magnetic shield by the guide 69 of the annular frame 66. However, the recessing at the slider 56 is not always necessary, according to circumstances, the engaging portion 65 is ensured attracting to the cylindrical sleeve 26 by only the operation of the magnetic shield from the

guide 69. Design of an engaging portion, of a lever portion, and of a slider is up to designer's preference.

[0063] The retainer 48 is fixed on the housing member 40 and its configuration is as same as that of the retainer 14 which is fixed on the annular plate 10. That is, the retainer 48 comprises an annular portion 52 and two fixing portion 54 which extend upward from both sides of the annular portion 52. The annular portion 52 is used to be fixed the housing member 40, while the fixing portion 54 is used to be fixed the second assembly to an object such as the main body of lid of a handbag. Further, the retainer 48 is, similar to said retainer 14 which is fixed on the annular plate 10, formed in one unit. However, the size of a hole 50 of the retainer 48 which is fixed on the housing member 40 is different from that of a hole 20 of the retainer 14 which is fixed on the annular plate 10. Though the hole 50 of the retainer 48 fixed on the housing member is not always necessary and could be omitted, there is an advantage that thickness created when the first and the second assembly is combined with each other will be thinner when the hole 50 is formed on since the hole 50 enables to receive the engaging pin 34, in particular, its head 38 later.

[0064] The operation of the housing member 40 is described previously. Its material may be either a magnetic body or a non-magnet body since the operation as the housing member 40 is achieved. An annular projected-out portion 43 which is projected upward is formed on the housing member 40 and an annular hollow 45 is formed on the projected-out portion 43. These the projected-out portion 43 and the hollow 45 enable the retainer 48 to determine the housing member 40 at the predetermined place and facilitate the retainer 48 to fix. That is, it is obvious from Fig. 1 to Fig.3 that when the retainer 48 is fixed on the housing member 40, the hole 50 of the retainer 48 is enabled to insert into the projected-out portion 43 of the housing member 40, the annular portion 52 of the retainer 48 is enabled to be received in the hollow 45 of the housing member 40 which is formed as corresponding shape to the annular portion 52, and the projected-out portion 43 is enabled to be caulked outside of the hole 50 of the housing member 40. Accordingly, the retainer 48 is ensured fixing on the housing member 40 at predetermined place.

[0065] As described previously, the annular difference in level 47 corresponds to the difference in level 84 which is formed by the guide 69 of the annular frame 66 is formed on the housing member 40. These differences in level 84 and 47 have almost similar supplemental shape and their strength for the top and bottom direction is enhanced when they are mutually engaged each other. Further, the hole 46 of the housing member 40 and the hole 71 which is formed inside of the guide 69 of the annular frame 66 are ensured aligning by an engagement of the differences in level 84 and 47. When the hole 46 and the hole 71 are aligned, a mutual opening is hardly ever formed, therefore, the first assembly, in particular, the head 38 of the engaging pin 34 will not

be caught and these assemblies are combined each other smoothly when the first and the second assemblies are combined with each other.

[0066] There will now be described the locking motion which occurs when the first and the second assemblies are combined with each other with reference to Fig. 3.

[0067] A combining motion between the first and the second assemblies is accomplished by a magnetic operation between a plurality of components of the first and the second assemblies. When the first and said second assemblies are got close to each other and their distance becomes smaller some extent, these assemblies are clicked together by the magnetic operation in between the slider 56 and the first assembly, or the magnetic operation in between the slider 56, the annular frame 66 and the reinforcing plate 80, the first assembly when the annular frame 66 or the reinforcing plate 80 is made of the magnetic body.

[0068] When the first and the second assemblies are combined with each other, the front surface of the cover 31 (the front surface of magnet if the cover is not formed) of the first assembly is attracted to the front surface of the annular frame 66 of the second assembly, and the engaging pin 34 and the cylindrical sleeve 26 which are projected out on the top portion of the first assembly are inserted into the aligned hole 68 of the second assembly. At the same time, the inner boundary portion of the head 38 of the engaging pin 34 reaches up to the hole 46 formed on the housing member 40 of the second assembly and at least a top end portion of the cylindrical sleeve 26 penetrates through it the closed housing space formed between the housing member 40 and the annular frame 66.

[0069] In this magnetic fixing unit, the first and the second assemblies are combined with each other, at the same time, the combination of these assemblies is automatically locked. The automatic locking is accompanied by a cooperative magnetic operation among the magnet 22, the cylindrical sleeve 26, the annular frame 26, and the engaging portion 65. Specifically, the magnet operation between the annular sleeve 26 and the engaging portion 65 could be described, since the cylindrical sleeve 26 is magnetized by the magnetic force generated by the magnet 22 through the annular plate 10 and thereby also generates magnetic force, the slider 56 located near the cylindrical sleeve 26, in particular, its engaging portion 65 is attracted to the outer surface of the cylindrical sleeve 26. When the engaging portion 65 of the slider 56 is attracted to the cylindrical sleeve 26, the aligning hole of the second assembly is made narrower or partially closed by the engaging portion 65 and since there occurs an interference between the engaging portion 65 and the engaging pin 34, in particular, between the engaging portion 65 and the reverse surface of the head 38 of the engaging pin 34 when the combination between the first and the second assemblies is attempted to be released, the combination between the assemblies cannot be released. That is, the

first and the second assemblies are left in the automatically locked condition. This regard is described in detail with reference to Fig. 4.

[0070] An operation as yoke which is shown only when the annular frame 66 or the reinforcing plate 80 is made of a magnetic body will be additionally described. It is obvious that when the first assembly and the second assembly are combined with each other, the magnetism from the magnet 22 of the first assembly is generated at the annular frame 66 or the reinforcing plate 80 due to the operation of magnet and the slider 56 is attracted to not only the cylindrical sleeve 26 but also the annular frame 66 or the reinforcing plate 80. As a result, there is a question raised that the engaging portion 65 of the slider 56 may not be smoothly attracted to the cylindrical sleeve 26. However, this problem will be solved if the annular frame 66 or the reinforcing plate 80 is made of a magnet body such as iron and like and these are operated as yoke.

[0071] In order to describe this principle, the magnet 22 is assumed to have the S- magnet pole on the surface of the annular plate 10 side thereof and the - magnet pole on the other side (in case of opposite pole nature, it is considered likewise.) Magnetism from the S-pole is gathered onto near the end portion of the cylindrical sleeve 26 by the operation of the annular plate 10, which functions as a yoke, and the cylindrical sleeve 26, and generates the strongest magnetic force near this end portion. On the contrary, magnetism from the - pole is gathered onto near the outer periphery of the annular frame 66 and the reinforcing plate 80 by the annular frame 66 and the reinforcing plate 80, and a flow of magnetism toward the S-pole is gathered in this outer periphery portion. Therefore, the magnetism on the remaining part of the annular frame 66 except the outer periphery which includes a part located on the slider 56 is made weaker as this flow of magnetism is generated more and thereby the attracting force applied to the slider 56 is made weaker. As a result, since the magnetic force near the end portion of the cylindrical sleeve 26 where the magnetism is gathered approximately to one point is greater than that on the annular frame 66 where the magnetic force is reduced by the generation of the magnetic flow, the engaging portion 65 can be smoothly attracted and attached to the cylindrical sleeve 26 having more magnetic force though the engaging portion 65 being attracted by the attraction plate 66.

[0072] Things described above do not mean that the annular frame 66 or the reinforcing plate 80 ought to be always made of the magnetic body, however, it is considered as one of the effective effects when these components are made of the magnetic body.

[0073] The slider 56 which is formed by the other component may be smoothly attracted to the cylindrical sleeve 26. The one way to do is that a magnetic gap member which is made of a non-magnetic material is inserted in between the slider 56 (in particular, its engaging portion 65) and the magnet 22. For example, de-

pending on strength or size of magnet, shape or square measure of the engaging portion 65 corresponds to the cylindrical sleeve, transfer distance, or cooperative magnetic operation with the other members, the magnetic gap member which is made of a non-magnetic material and whose thickness is 0.01 mm - 10 mm makes it to be located on between the engaging portion 65 and the magnet 22. As a result, the slider 56 will be smoothly attracted to the cylindrical sleeve 26. This has been experienced by the inventor of the present invention. In addition, instead of inserting the magnetic gap member, a non-magnetic plating applied to the slider 56 itself, the magnet 22 itself, or any member located between the slider 56 (in particular, its engaging portion 65) may provide the same kind of effect. The thickness of the plating can be controlled by a dipping period into the plating solution, and therefore when an appropriate thickness of plating is applied to the slider 56, the same effect as that described above might be provide. Hitherto, the magnetic gap material made of a non-magnetic has not been existed. For example, as released in patent published Showa 50-112170 which is applied by applicants for this request, a magnetic cover which is made of a non-magnetic material and is formed to protect a magnet seems to be seen as the magnetic gap member since it results in being located between the magnet 22 and the slider 56. However, in the conventional example, the magnet cover made of a non-magnetic material has not been intended to actively utilize as an instrument which enables the slider 56 to move smoothly. Further, when patent published Showa 50-112170 described above was applied, it was necessary to form the magnet cover for the purpose of protecting a magnet since only fragile magnet such as ferrite magnet was provided. The magnet cover which is released in patent published Showa number 50-112170 is formed for the purpose of protecting magnet and is not intended to utilize as an instrument which enables the slider 56 to move smoothly. The applicant for this request, at the first time, confirmed that even if the magnet cover was made of a non-magnetic material, depending on its thickness, it would be utilized as the magnetic gap member that would enable the slider 56 to move smoothly. Said a non-magnetized magnetic gap member may be combined with a magnetic member or a magnetic plating. Further, a coating or a plastic material or the others may be considered as the other non-magnetized magnetic gap member. In stead of using the magnetic gap member, an empty space might be used. These designs are up to its own preference.

[0074] Relates to the principle described above, in this magnetic fixing unit, it is necessary to make the location of the slider 56 move to a lock release position before the first and the second assemblies are combined with each other. That is, in this magnetic fixing unit, though the engaging portion 65 of the slider 56 is located on the obstruct position which may cover the aligned holes of the second assembly, the slider 56 will

be naturally and easily shifted from the lock position through an interference of, in particular, the head 38 portion of the engaging pin 34 of the first assembly with the engaging portion 65 since according to the principle described previously, the force that the slider 56 is attracted to the annular frame 66, the reinforcing plate 80, or / and the magnet 22 is gotten smaller and friction resistance in between the engaging portion 65 and the head 38 of the engaging pin is become lesser. In this case, after the engaging portion 65 is shifted from said position once, it is able to be automatically attracted to the cylindrical sleeve 26 again and be automatically completed the lock. Therefore, in this magnetic fixing unit, it is necessary to make the location of the slider 56 move to the lock release position before the first and the second assemblies are combined with each other.

[0075] Fig. 4 is a cross sectional view take along the line A-A of Fig. 3. This drawing shows the relative arrangement of the slider 56 and nearby components in a lock position and a release position, where Fig. 4 (a) shows a relative arrangement in the lock position and Fig. 4 (b) shows that of the release position respectively.

[0076] As being obvious from Fig. 4 (a), in the lock position, the engaging portion 65 of the slider 56 is disposed in a position where the engaging position 65 is attracted and attached to the outer surface of the cylindrical sleeve 26. As a result, when the combination between the first and the second assemblies is attempted to be released (that is, when the engaging pin 34 is attempted to be moved perpendicularly upward on the drawing), the locking condition cannot be released because the head 38 of the engaging pin 34, in particular, the portion thereof shown by a broken line interfere with the engaging portion 65 of the slider 56.

[0077] In order to release this lock condition, as shown in Fig. 4 (b), the engaging portion 65 should be moved to, at least, outside of the periphery of the head 38 of the engaging pin 34. The engaging portion 65 can be moved by moving the slider 56 along an arrow direction shown on the drawing. When the slider 56 is moved along the arrow, the engaging portion 65 is moved to the head 38 outwardly, and thereby the interference between the engaging pin 34 and the engaging portion 65 is released. That is, the lock condition is released. Through before and after the lock is released, the magnetism from the first assembly substantially operates to the engaging portion 65 of the slider. This is, described above, due to the configuration of the slider and the function of the magnetic shield of the guide 69 of the annular frame 66.

[0078] Next, some examples in practical usage of the magnetic fixing unit of the present invention will be described with reference to Fig. 5. The magnetic fixing unit of the present invention may be applied to various objects such as handbag, bag, knapsack, belt, cigarette case, attache case, door, and the like. There will be employed herein the handbag as a typical example. Fig. 5 is shows the first and the second assemblies, each be-

ing attached to the elarged handbag inside view.

[0079] According to the present embodiment, the first and the second assemblies are fixed to a right side of a handbag main body 4 and a reverse side of a lid 3 of the handbag respectively. Contrarily, the first assembly may be fixed on lid 3 of the handbag and the second assembly may be fixed to the handbag main body 4 respectively.

[0080] These assemblies are respectively fixed to predetermined places by the retainers 18 and 54 installed on respective assemblies. As described above, each of these retainers respectively has two fixing portions 18 and 54 (shown in Fig. 1,2 clearly), and a pair of holes (not shown) for inserting respective fixing portions is formed on corresponding portions of the main body 4 and the lid 3 respectively. The first and the second assemblies can be fixed to the main body 4 and the lid 3 respectively by completely inserting respective fixing portions 18 and 54 into these holes and then bending them outward (inward). As described previously, since strength toward the top and the bottom direction in said second assembly is intensified by the guide 69 of the frame 66, said second assembly will not be destroyed or deformed by said work for fixing.

[0081] Generally, in order to ensure fixing, washers 6, 5 are placed between the fixing portion 18 and the main body 4 and between the fixing portion 54 and the lid 3 respectively. On these washers 6,5 are formed holes corresponding to those formed on the main body 4 and the lid 3. When the washers are used, respective fixing portions 18, 54 of the retainers are inserted into the hole formed on the body 4 and the hole of the washer or into the hole formed on the lid 3 and the hole of the washer respectively in this order, and then are bent. Further, though the retainer 14 and 48 are used as the method for fixing the first and the second assemblies to handbag and like, a caulking stop, a screw stop, or other methods may be used as well.

[0082] When the first and the second assemblies which have been respectively fixed on the main body 4 and the lid 3 are combined with each other, that is, when the lid of the handbag is locked, the first and the second assemblies are located on between the main body 4 of the handbag and the lid 3 and the lid 3 of the handbag and thereby can hardly be seen from outside. The lock between the first and the second assemblies is released by inserting a finger into a clearance between the main body 4 and the lid 3 and pushing the tongue portion 62 of the slider of the second assembly. In order to facilitate this operation, it is preferable that the tongue portion 62 of the second assembly is fixed, as shown in the drawing, near or the same location as an edge 7 of the lid 3, yet the tongue portion 62 may be projected out of the edge 7. Further, as the other release methods, there is provided to push the handbag portion where the lever of the second assembly is fixed. Though not shown in the drawing, the main body 4 and the lid 3 are formed by folding at least two sheets of leather or cloth and bend

portion of respective fixing portion 18, 54 are located between respective folded sheets. Accordingly, these fixing portions cannot be seen from outside. Further, when the tongue 62 is located on the same position as the edge 7 of the lid 3, the tongue portion 62 obstructs to be sewn by a sewing machine. In order to solve this problem, only the second assembly, that is, including the lever 60 and the tongue portion 62, makes it to operate to turn right or left substantially around 90 degree when the fixing portion 54 is fixed on the predetermined position of the lid 3. Later, the second assembly including the tongue portion 62 makes it to be returned the predetermined position.

[0083] According to the fixing method described above, since these assemblies are not exposed substantially to the outside, the magnetic fixing unit of the present invention allows various decorations (not shown) to be applied to any favorite place on by user's preference. Therefore, design may not be determined by the fixing unit and the user's preference will be fully reflected.

[0084] There has been described an example of practical usage of the magnetic fixing unit of the present invention by taking the case of the handbag, and the magnetic fixing unit of the present invention can be used not only for the handbag but also bag, belt, knapsack, cigarette case, attach case, knob of the door and any other objects which require to be locked. Therefore, the objects which the magnetic fixing unit of the present invention is attached are not limited.

[0085] In the embodiment described above, when the components are to be made of a non-magnetic material, a non-magnetic plating may be applied to those components, to induce there from the same effect as that of the components made of a non-magnetic material. Therefore, in respective embodiments, the component to be made of nonmagnetic material may be replaced by the magnetic components to which a non-magnetic plating is applied or that coated by a non-magnetic material. Further, a non-magnetic material may be applied by a plating or coved by a magnetic material, to induce an effect as a magnetic material. Accordingly, plating is used as anti-corrosive, decoration, and to make a part of respective portion or a whole body to be a non-magnetic or a magnetic. In particular, this usage method is considered as effective when a part of material, for example, only the engaging portion 65 of the slider is made it to be magnetic. In the embodiment described above, magnet needs not to be formed on the first assembly and may be formed on the second assembly. For example, there are methods to locate magnet in between the annular plate of and the reinforcing plate of the second assembly or in between the slider 56 and the annular plate 10 if the annular frame is omitted. The magnet may be a plastic magnet or the other magnet, or applied by plating. The other method is possible to be applied. Further, though the present invention of the magnetic fixing unit as a whole is formed as cylindrical shape, it is not

always necessary to be that shape, for example, a square cylindrical shape, an ellipse cylindrical shape, or the other variety of shape will be applied to form the magnetic fixing unit.

[0086] The annular plate 10 is, as described previously, not necessary to be made of a magnetic body and may be made of the non-magnetic body. It is obvious that if the annular plate 10 is made of a non-magnetic body, the magnet or the cylindrical sleeve 26 is not fixed to the annular plate 10 by an operation of magnet of the magnet 22. However, it is enough if the magnet or the cylindrical sleeve 26 is fixed by welding, an adhesive, caulking, screw stop, or the other various methods. It is said similar thing when the retainer is fixed on the magnet.

[0087] Further, the head 38 is, as described previously, preferable to be made of a non-magnetic body. However, it is not necessary to be a non-magnetic body and may be made of a magnetic body.

[0088] Further, the cylindrical sleeve 26 of the first assembly is not necessary to pass through the closed housing space in between the housing member 40 and the annular frame 66. It only needs to be reached the near side of the slider 56. Even in this case, the slider 56 may be movable to the lock position due to the operation of magnet from the cylindrical sleeve 26.

[0089] As described the conventional art, though the exterior is spoiled if the annular projected-out portion is formed on the second assembly, the guide 69 and the annular projected-out portion prevent effectively the horizontal mutual shifting in between the first and the second assemblies.

[0090] For example, an annular projected-out portion, that is, rim-shaped guide is formed on a circular rim of the annular frame of the second assembly which is shown in Fig. 3, in particular, a side surface on the attracting surface of 67. When the first and the second assemblies are combined with each other, the rim-shaped guide which will cover the circular rim of the first assembly (the example of the embodiment is the cover 30 or the circular rim of the magnet 22 when the cover 30 is not formed) enables to prevent a vertical direction of mutual shifting in between the first and the second assemblies.

[0091] Further, it is possible to prevent the horizontal direction of the mutual shifting in between the first and the second assemblies by forming only the rim-shaped guide instead of the guide 69. For example, a height of rim-shaped projected-out portion formed on the second assembly, that is, the height of rim-shaped projected-out portion on direction normal (a combination direction of the first and the second assemblies) with a front surface of the second assembly (the example of the embodiment is the annular frame 66) is set up as substantially same or higher than that of the engaging pin formed on the first assembly, that is, the height of projection of the engaging pin from the front surface of the first assembly (the example of the embodiment is the

cover 30 or the magnet 22 if the cover 30 is not formed) on the direction normal (the combination direction of the first and the second assemblies). Without forming on the guide 69, the horizontal direction of the mutual shifting in between the first and the second assemblies will be able to be prevented since a location of the first assembly is stipulated by the rim-shaped projected-out portion of the second assembly as long as the first and the second assemblies are combined with each other.

[0092] With a reference to Fig. 6 to Fig. 8, the rim-shaped projected-out portion will be described concretely as followings. These respective figure shows the magnetic fixing unit on a cross sectional view along the center line as same as that of Fig.3 and numbers in the figure are same as the numbers which show the members in the Fig. 1 to Fig. 5 or show the members correspond to the numbers in the Fig.1 to Fig. 5. However, the guide (69 in Fig. 2 and Fig. 3) described above is not shown in Fig. 6 to Fig. 8.

[0093] The embodiment of Fig. 6 shows the example of when rim-shaped projected-out portion 33 and the magnet 22 are formed on the first assembly. In the present embodiment, rim-shaped projected-out portion 33 is formed on the cover 30. When the first and the second assemblies are combined with each other, rim-shaped projected-out portion 33 which is formed on the side surface of the attracting surface 31 of the first assembly is led along the side surface 66 a of the attracting surface 67 of the second assembly while it is including the attracting surface 67 of the second assembly inside. After the first and the second assemblies are combined with each other, rim-shaped projected-out portion 33 covers at least a portion of the side surface 66 a of the attracting surface 67 of the second assembly. When and after the first and the second assemblies are combined with each other, this component enables to effectively prevent a horizontal direction shifting in between the first and the second assemblies. In the example shown in the drawing, though rim-shaped projected-out portion 33 is formed by penetrating and pressing of the magnetic cover 30, it is not always to be formed by such ways. For example, without installing the magnetic cover (not shown in the drawing), rim-shaped projected-out portion 33 may be installed on the main body of the magnet 22 and applied by the other methods. Further, the magnet 22 may be a plastic magnet or a plated plastic magnet.

[0094] In particular, as the embodiment shown in Fig. 6, when the magnet 22 and the rim-shaped projected-out portion 33 are formed in the same assembly, an effect which cannot be expected if these are formed in the separate body will be induced. In order to make this effect be obvious, it ought to be assumed what if the first and the second assemblies are not combined with each other. In this condition, when especially the either assembly installed on the magnet gets close to a magnetic card, in particular, a credit card or a train ticket, the magnetic card is usually destroyed due to an operation of a

magnet. However, the installation of the rim-shaped projected-out portion 33 on the assembly does not allow the magnet card to get closer to said assembly when the magnet card interferes with the rim-shaped projected-out portion 33 and prevents and protects destruction of the magnet card. As generally known, since an operation of magnet is decreased inversely proportional to unobstructed distance squared, even such a small distance produces sufficient effect.

[0095] The embodiment in Fig. 7, contrarily, shows an example of when rim-shaped projected-out portion 75 and the magnet 22 arc formed on the second assembly. However, in this embodiment, different from that of Fig. 6, a cover is not formed on the annular frame 66 but rim-shaped projected-out portion 75 is formed on there. Since the magnet 22 and the rim-shaped projected-out portion 75 are formed on the same assembly, as similar to that of the embodiment in Fig. 6, destruction of a magnet card will be prevented or protected effectively. As similar to the embodiment in Fig. 6, in this embodiment, when the first and the second assemblies are combined with each other, rim-shaped projected-out portion 75 which is formed on the side surface of the attracting surface 67 of the second assembly is led along the side surface 10 a of the attracting surface 11 of the first assembly while it is including the attracting surface 11 of the first assembly inside. After the first and the second assemblies are combined with each other, rim-shaped projected-out portion 75 covers at least a portion of the side surface 10 a of the attracting surface 11 of the first assembly. Therefore, when and after the first and the second assemblies are combined with each other, this component enables to effectively prevent a horizontal direction shifting in between the first and the second assemblies. In the example shown in the drawing, though rim-shaped projected-out portion 75 is formed by penetrating and pressing of the annular frame 66, it is not always to be formed by such ways and the other methods may be used to form rim-shaped projected-out portion 75. The member shown in Fig 7 and reference number 13 is a magnetic gap member.

[0096] In the embodiment shown in Fig. 7, rim-shaped projected-out portion 75 not only prevents horizontal mutual shifting but also produces the other effect. That is, when the first and the second assemblies are combined with each other, these assemblies are closed each other under the slightly shifting condition (as described with reference to Fig. 5, when this present invention of the magnetic fixing unit is applied to a main body of handbag and a handbag lid, said condition is frequently occurred), the head 38 of the engaging pin 34 of the first assembly is not inserted into the hole 71 of the annular frame 66, and the head may be interfered with the front surface (attracting surface 67) of the annular frame. However, even in such case, since the rim-shaped projected-out portion 75 is formed in this invention, as long as the head 38 of the engaging pin 34 of the first assembly is taken in the inside of said rim-

shaped projected-out portion 75, the head 38 of the engaging pin 34 makes it easily to lead the hole 71 of the annular frame 66 by the slight shifting of the assemblies (a main body of a handbag and a handbag lid). Therefore, rim-shaped projected-out portion 75 has an effect which enables a combination of the first and the second assemblies to facilitate.

[0097] The embodiment of Fig. 8 is similar to that of which the embodiment of Fig. 6 and the embodiment of Fig. 7 are combined with each other. That is, it shows the example of which rim-shaped projected-out portion 75 is formed on the second assembly and the magnet 22 is formed on the first assembly. In this case, since it is different from Fig. 6 and Fig. 7, though it does not have an advantage that will protect or prevent destruction of a magnet card, it can effectively prevent horizontal direction of a mutual shifting in between the first and the second assemblies. Further, in the embodiment of Fig. 8, as similar to that of Fig. 7, it has an advantage that enables the first and the second assemblies to combine each other easily.

[0098] In the embodiment of this Fig. 8, when the annular frame is especially made of a magnetic body, an attracting force of the first and the second assemblies is enforced by being formed rim-shaped projected-out portion 75. In order to explain about this effect, N pole on the upper portion of and S pole on the lower portion of the magnet 22 in Fig. 8 are assumed to be located (considered as the same even if these poles are located in the opposite portions). In this case, magnetism from upper N pole portion, as shown as the allowance C in the drawing, is lead S pole side to be passed through the annular frame 66. At this time, since the rim-shaped projected-out portion 75 is installed in this invention, the magnetism from N pole portion is lead to the top portion 75 a of the rim-shaped projected-out portion 75, is propagated from the top portion 75 a through the air and dropped outward and downward, passed through the annular plate 10 of the first assembly, and finally reached S pole side. By being installed on the projected portion 75, flow of the magnetism form N pole side is effectively reached to the both the first and the second assemblies and stronger magnetic force in between these assemblies will be generated. Therefore, by being installed the rim-shaped projected-out portion 75, the attractive force in between the first and the second assemblies is enforced.

[0099] In addition, this rim-shaped projected-out portion 75 makes the annular frame 66 strong. That is, by being installed the rim-shaped projected-out portion 75, strength of the annular frame 66, in particular, strength to twist can be enforced. Since the annular frame is made by relatively thin plate, such effect is very important. As described above, installation of the rim-shaped projected-out portion 75 produces considerable effects though appearance is not good to look at.

[0100] The embodiment in Fig. 9, contrary to the embodiment in Fig. 8, shows an example of which rim-

shaped projected-out portion 33 a is formed on the first assembly and the magnet 22 is formed on the second assembly. Even in this case, the similar effect as described above is induced. The member similar or correspond to the member described previously is given the same numeral as previous numeral.

[0101] In Fig 10, the other embodiment in order to prevent horizontal direction of a mutual shifting in between the first and the second assemblies is shown as same methods as that of Fig. 6 to Fig.9.

[0102] The embodiment in Fig. 10 shows an example of which an annular extending guide portion 27 is formed on the first assembly, in particular, a lower portion of the cylindrical sleeve 26. An outer diameter of the extending guide portion 27, in particular, the outer diameter at direction normal to a combination direction of the first and the second assemblies has substantially same size as that of tip of the engaging portion 38 and is set up as bigger size than that of the cylindrical sleeve 26. Correspond to the extending guide portion 27, the outer diameter of the hole of the second assemblies, in particular, the outer diameter at near an entrance to the hole has been set up substantially bigger than that of the engaging head 38 or the extending guide portion 27. When or after the first and the second assemblies are combined with each other, the extending guide portion 27 of the first assembly is fitted at near the entrance of the hole of the second assembly and prevents the horizontal mutual shifting in between these assemblies effectively. The outer diameter of the lower portion of the cylindrical sleeve 26 needs not to be substantially same as that of the outer diameter of the engaging head 38, if it is set up bigger than that of the engaging portion 38, the similar effect described above is produced. For example, not particularly shown in drawing, the cylindrical sleeve has conical shape, if the diameter of the bottom whose surface is the biggest, is set up to the substantially same or bigger size as that of the engaging head 38, the similar effect described above will be produced. Further, the extending guide portion 27 needs not to be annular shaped and may be square shaped, pole shaped, or any other shaped.

[0103] Finally, with reference to Fig. 11, the present invention of the slider 56 and the other embodiment will be described. The slider 56 a shown in Fig 11 and the slider 56 described above with reference to Fig. 1 to Fig. 5 has the same shape except the lever portion 60 a which connects to the slider 56 a. Further, the tongue portion has not been installed on the lever portion 60 a of the slider 56, instead, a hole in order to install an extending member 86 has been formed.

[0104] The lever portion 60 a of the slider 56 a can be substantially extended by being installed the extending member 86 on the slider 56 a. The extending member 86, for example, assembly, particularly the second assembly is a clearance between a main body of a handbag and a handbag lid, is necessary if it is installed on deeper location than that of the edge 7 of the lid 3. As

described previously, the lock between the first and the second assemblies is released by being inserted finger into the clearance and pushed the lever portion of the second assembly, yet the release will be disabled if the second assembly is located deeper position.

[0105] The extending member 86 comprises two sheet metals, that is, an inner plate 88 and an outer plate 89. These sheet metals are respectively formed by penetrating, pressing, and bending of thin metal plate, later, they are fixed as described in the drawing. In the fixing between them, a center hole 93 of the inner plate 88 is passed through by the projected portion 94 which goes toward inside of the outer plate and then the two sheet metals are caulked there. The other methods, solder, waxing, or spot welding might be used to fix them. Though the end portion of the outer plate is slightly cut off inward by an arc 95, it is merely adjusted to the outer periphery of the annular frame 66 and the other shape may be applied.

[0106] Pay attention, in particular, near the top portion corresponding to connecting portion with the slider 56a. An opening 90 in order to receive the lever portion 60 a of the slider 56 a is formed here. The size of the opening 90 is big enough to receive the lever portion of the slider 56. The slider 56 is fixed on the top portion by being the lever portion 60 a inserted into the opening 90 and is taken off from there by being the lever portion 60 a pulled off from the opening 90. however, it may keep the fixed condition.

[0107] A projection which is made by outer pressure is formed on the near top center of the inner plate 88 which forms a part of the opening 90. (In the drawing, it is not shown as a projection, but as hollow). When the extending member 86 is fixed on the slider 56 a, the projection 91 is closed (joined) by the hole 87 which is formed on the portion corresponds to the slider 56.

[0108] The top center portion of the inner plate 88 where the projection 91 is formed is possible to be elastic displacement by being formed a cut 92 on both side. By the operation of displacement, the projection 91 of the inner plate 88 is fixed on the hole 87 of the slider 56 a with predetermined force and also taken off from the hole 87. In order to effectively induce an operation of getting on and off of the extending member 86, in particular, the inner plate 88 had better be made of phosphorus bronze. However, iron, the other metal, or a non-metallic material such as plastic is applicable for creating the inner plate 88. Though material of the outer plate 89 is not particularly limited, in respect of strength, both the inner plate 88 and the outer plate 89 are preferable to be made of metal (brass, iron, or the other material).

[0109] Though the traders concerned would think of a combination of various embodiments which is described in the present detailed statement, this request includes these components.

[0110] The present invention provides a magnetic fixing unit which allows strength of an assembly to be enforced and prevents a mutual shifting in between a first

and a second assemblies. Further, according to the present invention, a magnetic fixing unit provides a component which allows an engaging member to move on magnet smoothly.

Claims

1. A magnetic fixing unit comprising a first assembly which is attached to one member of a pair of members which are to be combined each other and a second assembly which is attached to the other member of said pair members, said magnetic fixing unit characterized in that said first and said second assemblies are attracted and combined with each other at their attaching surface by an operation of magnet disposed on either said first or second assemblies, and said first assembly comprises an engaging mean projected from its attracting surface toward a combination direction with said second assembly, and said second assembly comprises a guide mean extended inside of said second assembly from its attracting surface toward an opposite direction to combination with said first assembly, and said engaging mean is lead inside of said guide mean when said first and second assemblies are combined with each other, and said second assembly comprises mating engaging mean which locks a combination of said first and said second assemblies by moving toward a lock position for said engaging mean when said first and second assemblies are combined with each other, and release mean to release said lock.
2. A magnetic fixing unit as claimed in claim 1, in which engaging mean of said first assembly is magnetic, and a mating engaging mean of said second assembly is made of magnetic member, when said first and second assemblies are combined with each other, the mating engaging mean of said second assembly applied to said magnetism is moved toward a lock position corresponding to the engaging mean of said first assembly, a combination of said first and said second assemblies is locked.
3. A magnetic fixing unit as claimed in either of claims 1 or 2, in which an opening that attracts said mating engaging mean to engaging mean of said first assembly is installed on a part of guide mean of said second assembly.
4. A magnetic fixing unit as claimed in either claims 1 to 3, in which said guide mean is made of magnetic member.
5. A magnetic fixing unit as claimed in either claims 1 to 4, in which said second assembly also comprises a frame offering said attracting surface as one sur-

face housing member which houses said corresponding engaging mean and is located on a place between said frame and opposite surface to one surface of said frame, and said guide mean is formed by guide mean only installed on said frame, guide mean only installed on said housing member, or combination of guide mean of said frame with guide mean of said housing member.

6. A magnetic fixing unit as claimed in claim 5, in which said frame is formed by penetrating, bending, and pressing processing of thin plate.
7. A magnetic fixing unit as claimed in either of claims 5 or 6, in which a reinforcing plate is installed on the opposite surface to one surface of said frame, and said corresponding engaging mean is located on a place between said reinforcing plate and said housing member.
8. A magnetic fixing unit as claimed in claim 7, in which a reinforcing guide mean in order to reinforce said guide mean by covering around said guide mean is installed on said reinforcing plate.
9. A magnetic fixing unit comprising a first assembly which is attached to one member of a pair of members which are to be combined each other and a second assembly which is attached to the other member of said pair members, said magnetic fixing unit characterized in that said first and said second assemblies are attracted and combined with each other at their attaching surface by an operation of magnet disposed on either said first and second assemblies, and said first assembly comprises an engaging mean projected from its attracting surface toward a combination direction with said second assembly, and said second assembly comprises a hole at said attracting surface thereof, and a rim-shaped guide mean which is projected outward to said combination direction so that said rim-shaped guide mean can cover at least a part of said attracting surface of other assembly installed on either attracting surface of said first or said second assembly when said first and said second assemblies are combined with each other, and engaging mean of said first assembly is lead to said hole at said second assembly and said rim-shaped guide mean which is installed on either said first or said second assembly is lead along side of said attracting surface of the other assembly when said first and second assemblies are combined with each other, and said second assembly comprises mating engaging mean which locks a combination of said first and said second assemblies by moving toward a lock position for said engaging mean when said first and second assemblies are combined with each other, and a release mean to release said lock.

10. A magnetic fixing unit comprising a first assembly which is attached to one member of a pair of members which are to be combined each other and a second assembly which is attached to the other member of said pair members, said magnetic fixing unit characterized in that said first and said second assemblies are attracted and combined with each other at their attaching surface by an operation of magnet disposed on either said first and second assemblies, and said first assembly comprises an engaging mean projected from its attracting surface toward a combination direction with said second assembly, a size of an outer diameter on a crossing direction with said combination direction of a back end portion of said engaging mean on the combination direction with said second assembly is substantially set up as same or bigger than the outer diameter on crossing direction with said combination direction of a tip end portion of said engaging mean, said second assembly comprises a hole at said attracting surface thereof, and said engaging mean of said first assembly is lead along the hole at said second assembly, and said second assembly comprises mating engaging mean which locks a combination of said first and said second assemblies by moving toward a lock position for said engaging mean when said first and second assemblies are combined with each other, and a release mean to release said lock.

11. A magnetic fixing unit as claimed in either of claims 9 or 10, in which a guide mean that faces an opposite direction to a combination direction with said first assembly from an attracting surface of said second assembly and projects over inside of the second assembly till substantially same length as that of said engaging mean on said combination direction is formed on a hole of said second assembly, said guide mean is lead inside of said guide mean when said first and second assemblies are combined with each other.

12. A magnetic fixing unit comprising a first assembly which is attached to one member of a pair of members which are to be combined each other and a second assembly which is attached to the other member of said pair members, said magnetic fixing unit characterized in that said first assembly comprises at least a fixing plate and an engaging portion formed on said fixing plate, and said second assembly comprises at least an engaging member which is made of magnetic material and may be moved to a lock position for said engaging portion and a release means which is applied to said engaging member to move it from said lock position to a release position, wherein magnet which is located between said fixing plate and said magnetic plate when said first and said second assemblies are

combined with each other is disposed on either of said first or said second assemblies, and a magnetic gap which is located in between said magnet and said engaging member, and said engaging member is designed so as to be movable to the lock position for said engaging portion by an operation of said magnet. 5

13. A magnetic fixing unit as claimed in claim 12, in which said magnetic gap is formed by a non-magnetic member or a plating made of a non-magnetic member. 10

14. A magnetic fixing unit as claimed in either of claims 12 or 13, in which said magnet is installed on said first assembly and said engaging portion is installed on said magnet without an installation of said fixing plate. 15

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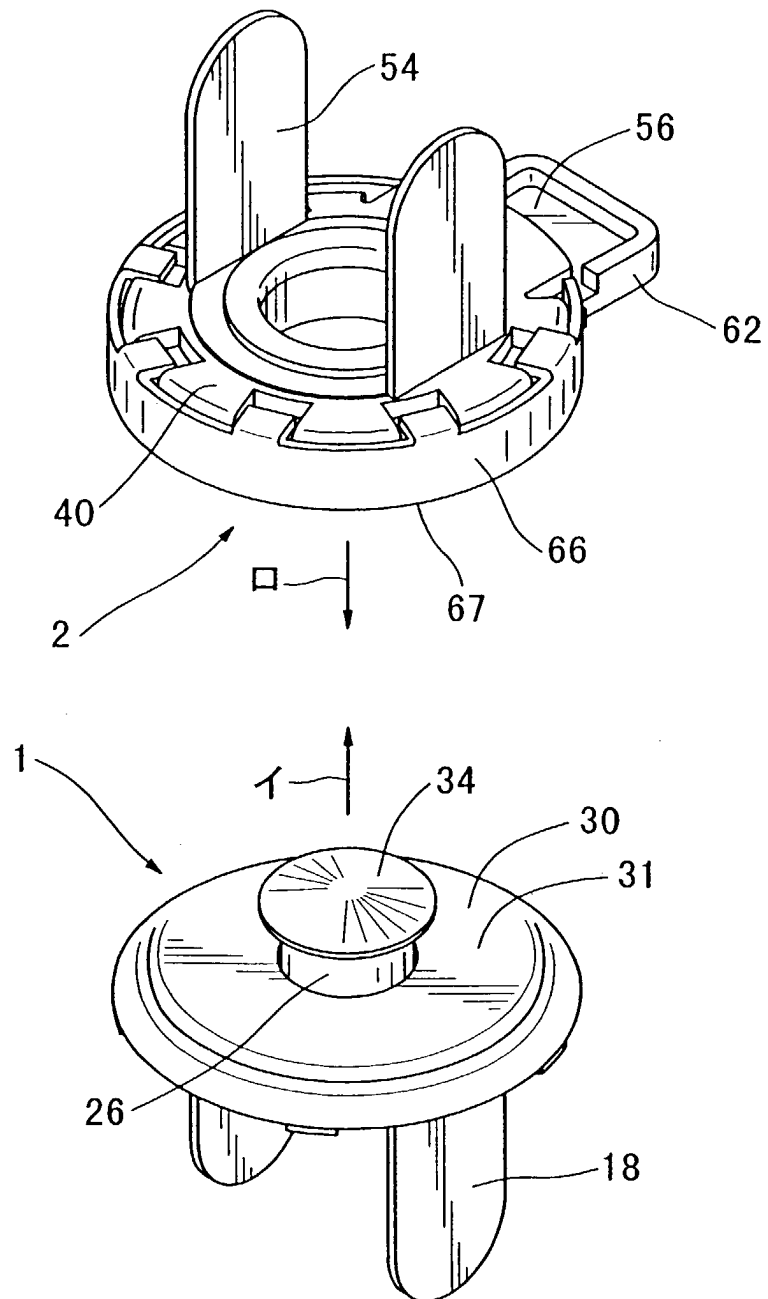


FIGURE 1

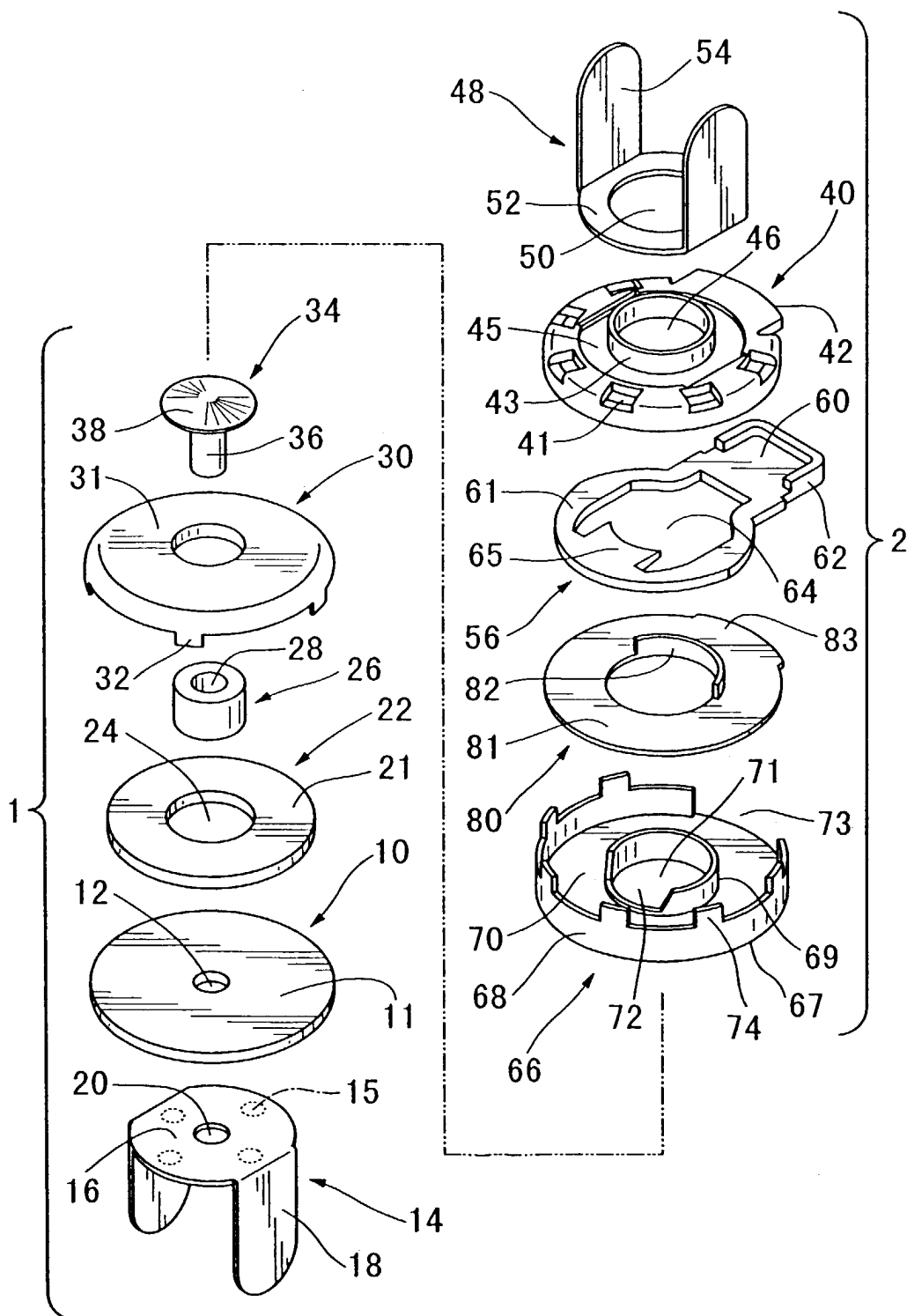


FIGURE 2

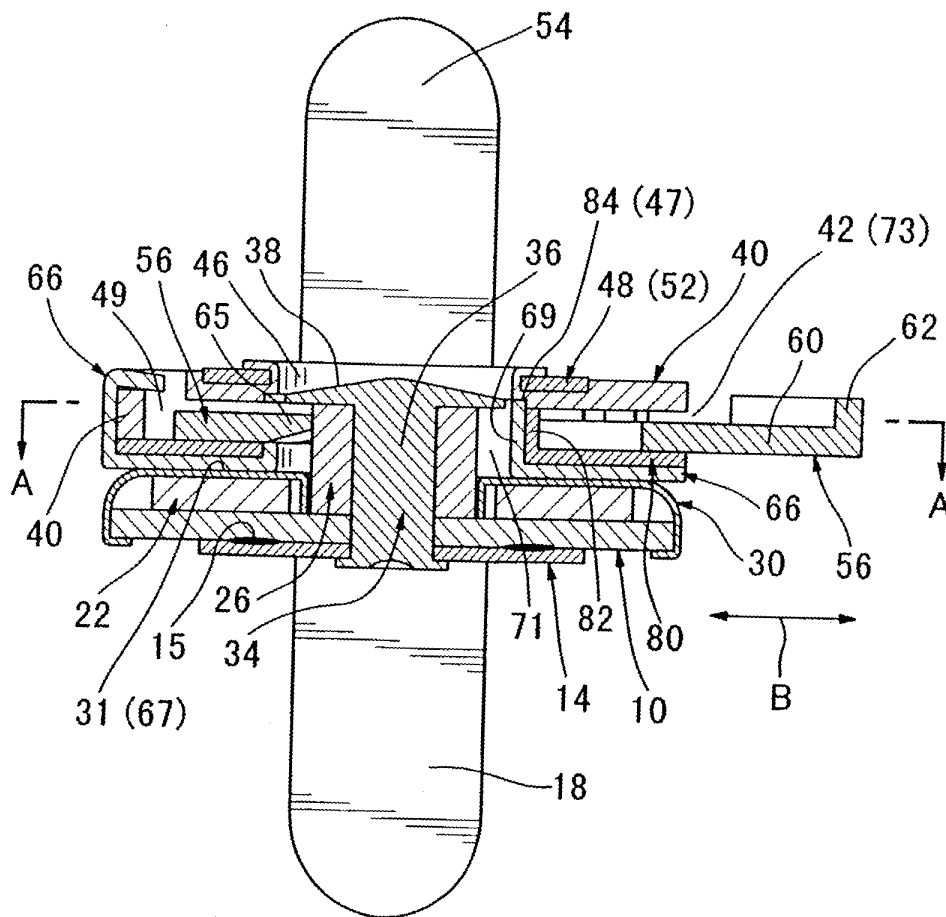


FIGURE 3

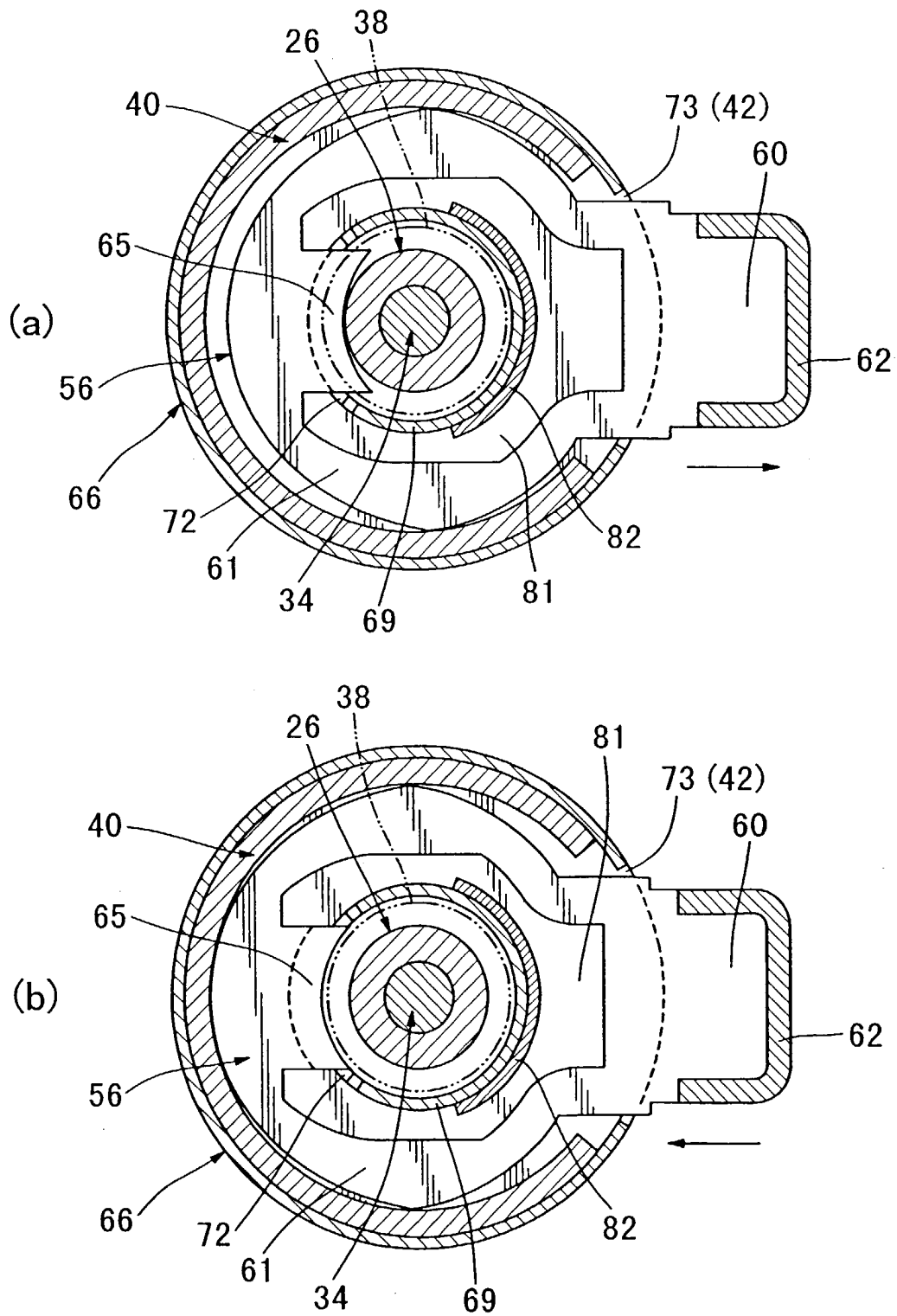


FIGURE 4

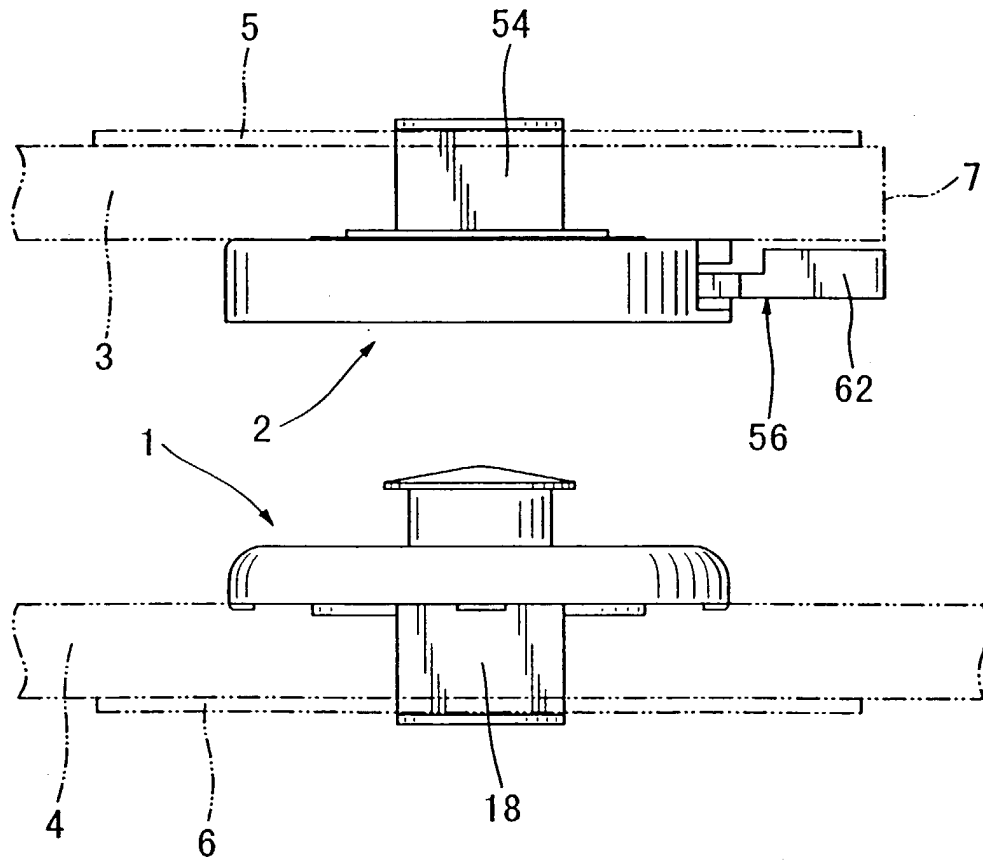


FIGURE 5

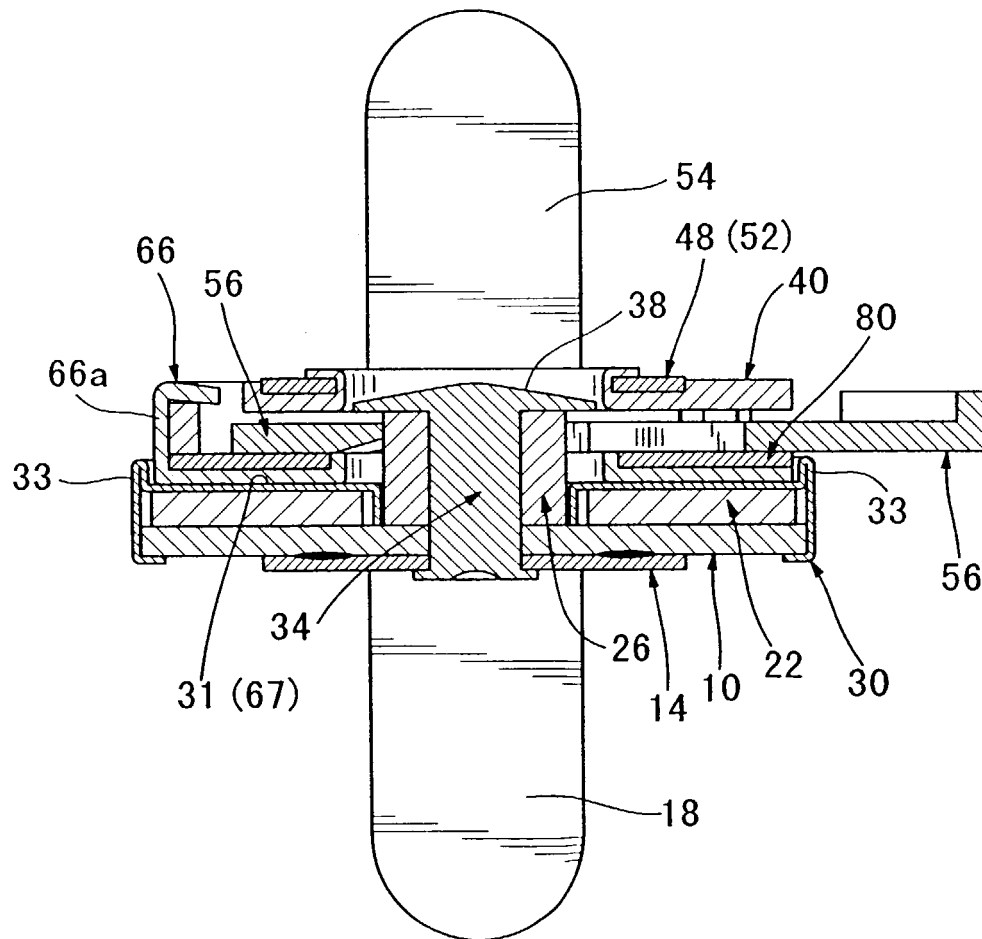


FIGURE 6

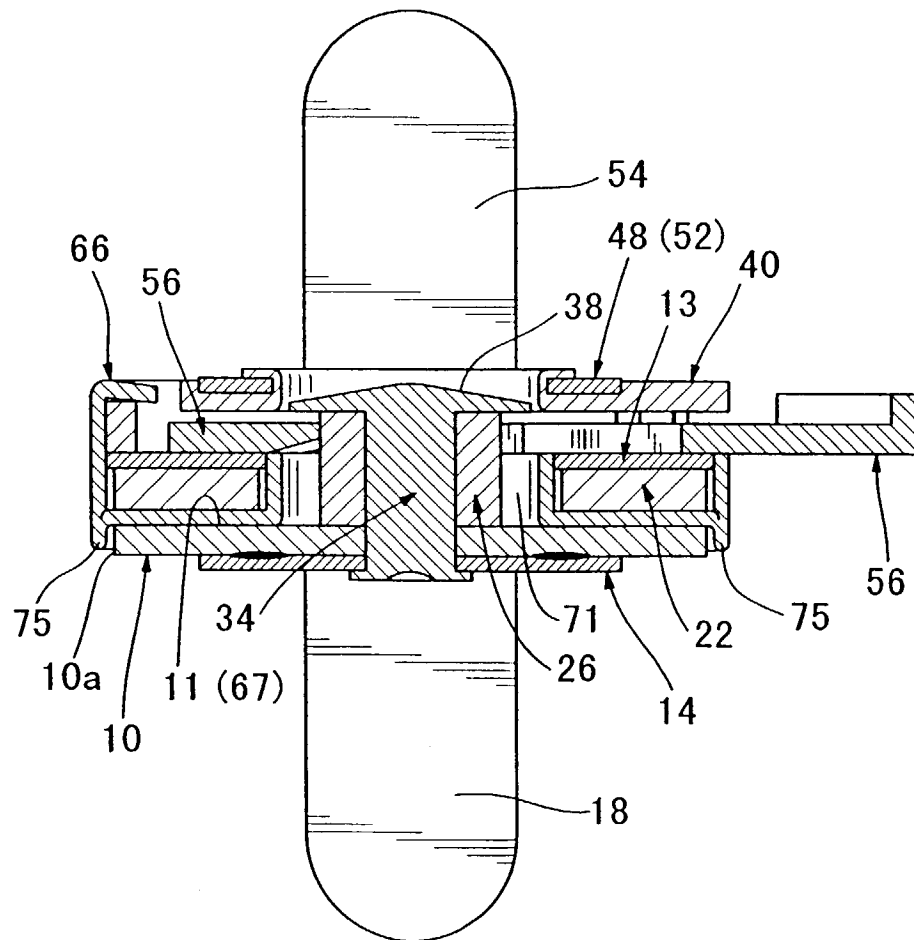


FIGURE 7

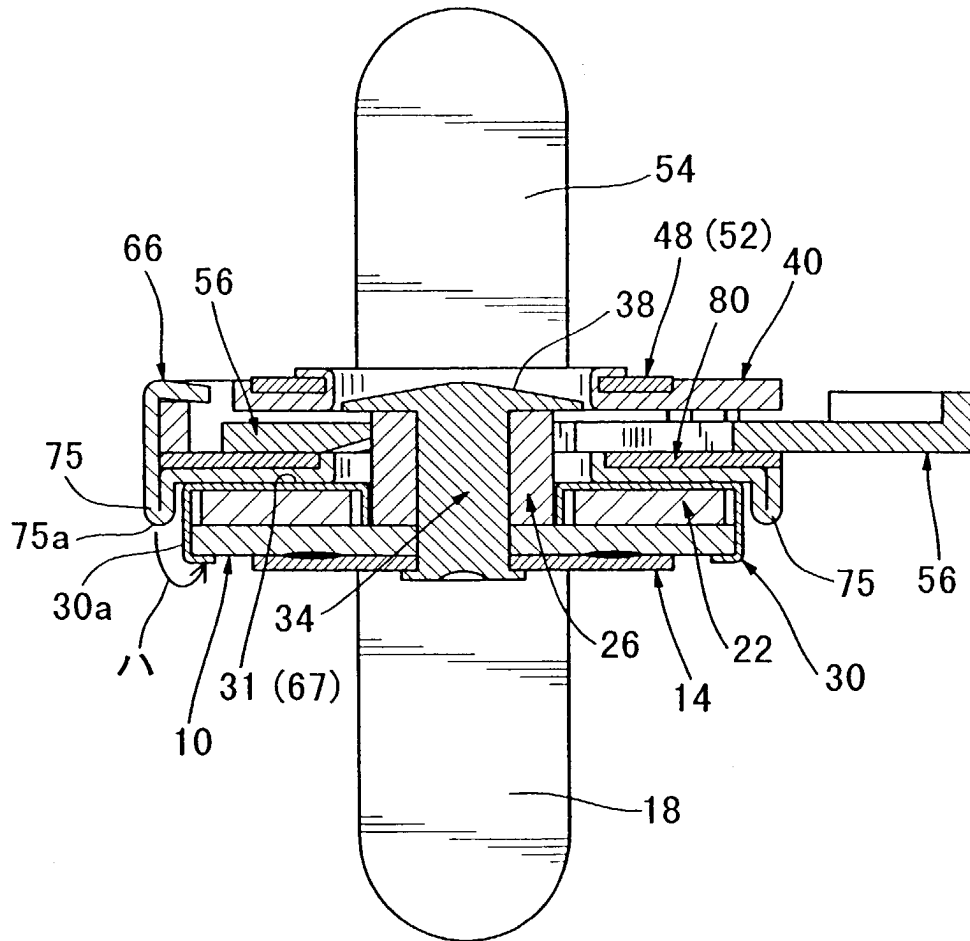


FIGURE 8

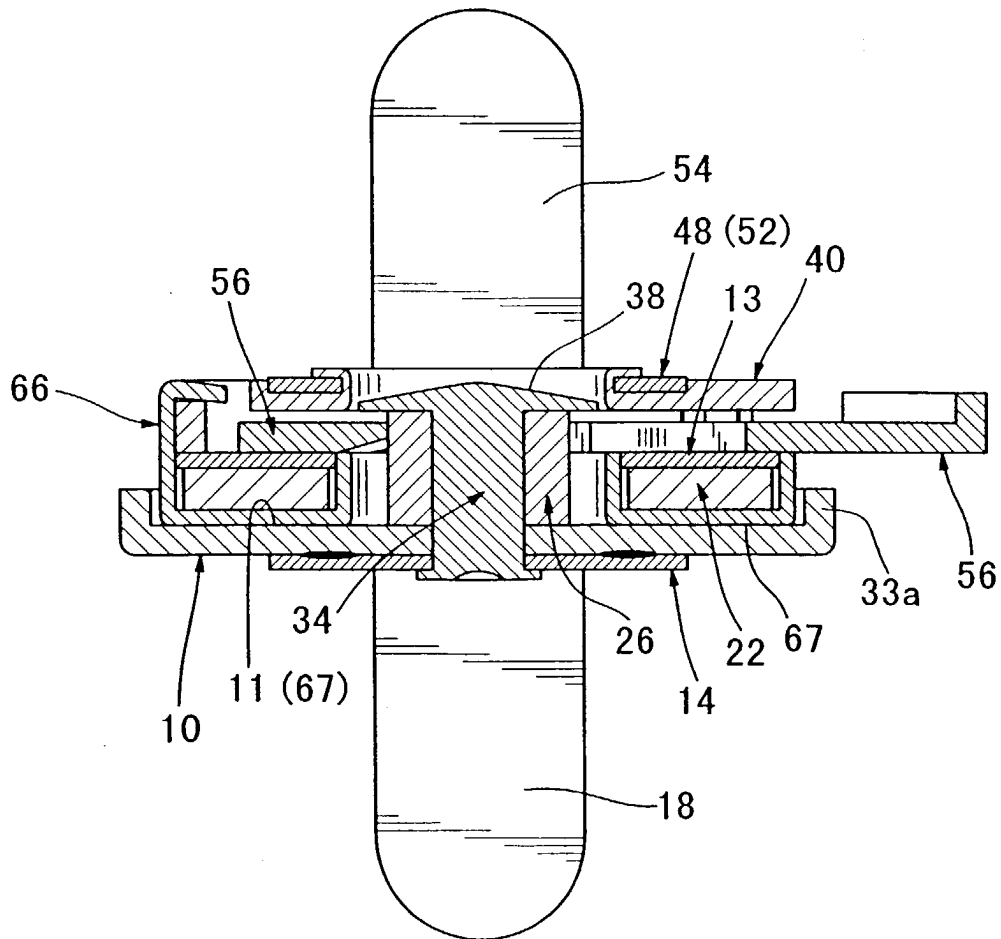


FIGURE 9

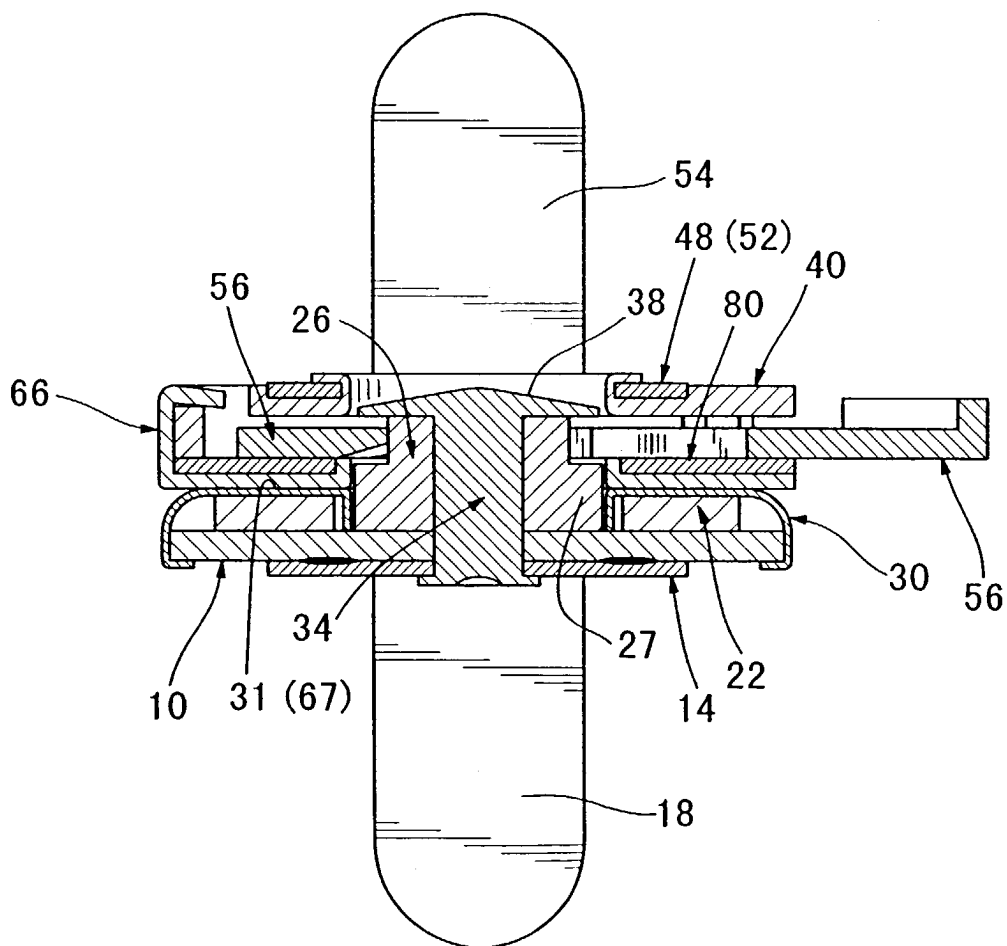


FIGURE 10

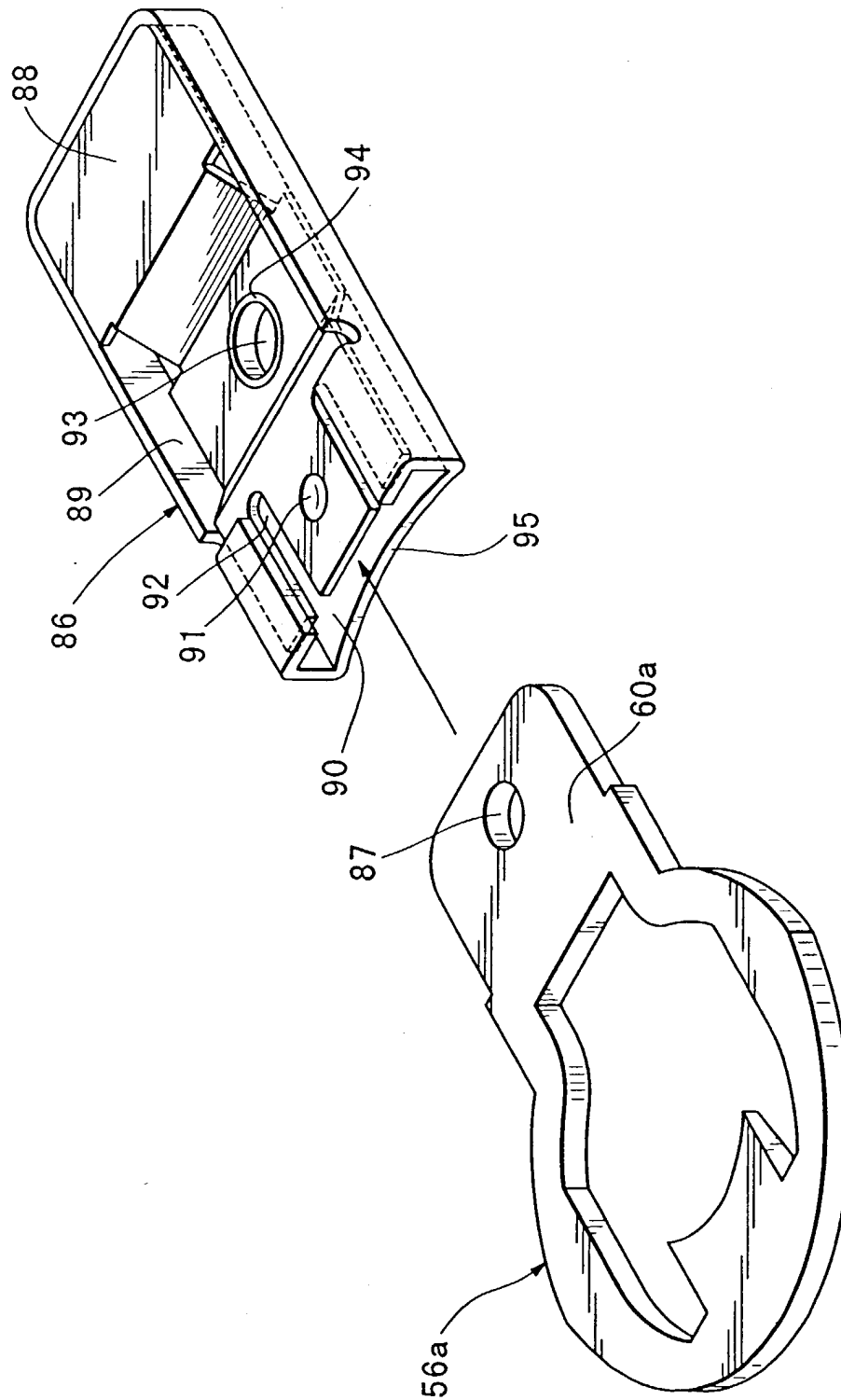


FIGURE 11