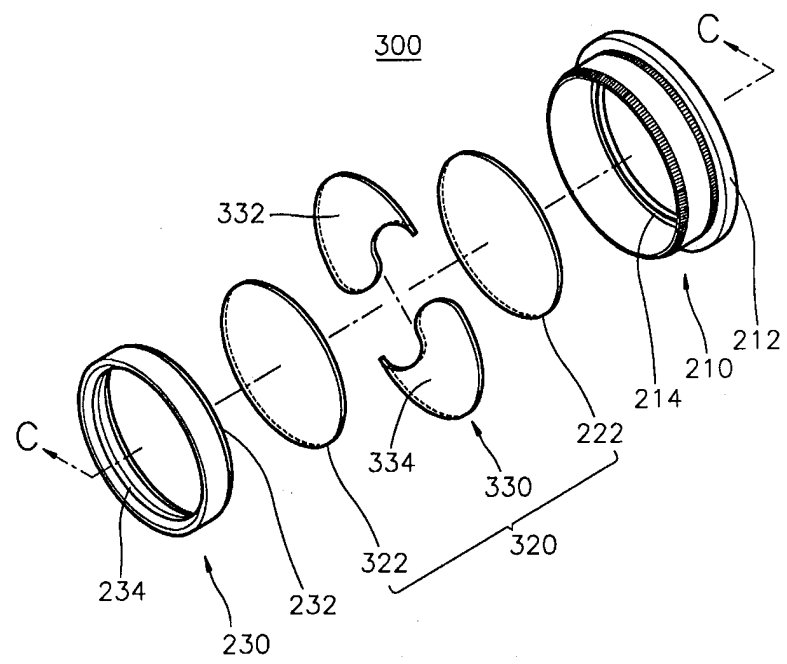




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<p>(21) International Application Number: PCT/KR97/00163 (22) International Filing Date: 1 September 1997 (01.09.97) (30) Priority Data: 1996/56561 22 November 1996 (22.11.96) KR (71)(72) Applicant and Inventor: AN, Sung, Kyun [KR/KR]; 355-101, Jukong Apartment, 20-9, Banpo-dong, Seo-cho-ku, Seoul 137-040 (KR). (74) Agents: PARK, Hee, Jin et al.; 401, Miele Haus Building, 607-10, Yoksam-dong, Kangnam-ku, Seoul 135-080 (KR).</p>		<p>(81) Designated States: AL, AM, AT, AU, AZ, BB, BG, BR, BY, CA, CH, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IL, IS, KE, KG, KP, KZ, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TR, TT, UA, UG, UZ, VN, ARIPO patent (GH, KE, LS, MW, SD, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG).</p> <p>Published <i>With international search report.</i></p>

(54) Title: FILTER ASSEMBLY OF CAMERA



(57) Abstract

Disclosed is a filter assembly including a pattern having at least two colors and refractive indexes for producing special effects during photographing. The filter assembly includes a frame, a filter part inserted into the frame, and a fixing ring for fixing the filter part to the frame. The filter part includes a first filter (222), a second filter (322) and a pattern filter (332, 334) is made of glass or a synthetic resin having at least two colors and refractive indexes. The pattern filter (332, 334) partitions a circular area having the same diameter as the diameters of the first (222) and the second filters (322) into the predetermined shapes.

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FILTER ASSEMBLY OF CAMERA

Technical Field

The present invention relates to a camera accessory and, more particularly, to
5 a filter assembly of a camera.

Background Art

As for accessories for a camera, a tripod for preventing the shaking of the
camera, a flash for lighting up a thing pictured for photographing in a dark
environment, various filters for improving a photographing technique, such as an
10 ultraviolet (UV) filter for shielding UV irradiated through a camera lens, can be
illustrated. A camera lens is demountably attached in front of the objective lens for
filtering the light which irradiates film through the objective lens or for modifying the
thing image of the object captured the film) to produce various effects on the pictured
image.

15 Generally, a camera may be classified as either an auto-focusing camera, which
automatically adjusts the focus or a manual-focusing camera, which the user adjusts the
focus manually. Manual-focus cameras adjust the focus while confirming the object
viewed through a viewfinder which is related to the objective lens. On the other hand,
an auto-focus camera adjusts the focus while confirming the object viewed through a
20 viewfinder which is separate from the objective lens. Accordingly, the image of the
object viewed may be confirmed during photography when using a manual-focus
camera. Whereas, the camera image of the object viewed is not identical with the view
of the object through the viewfinder when using an auto-focus camera.

A conventional camera filter assembly includes: a frame which is attached to
25 the camera objective lens; a filter inserted into the frame; and a fixing ring for fixing
the filter to the frame. The filter may be used to provide various effects during
photography such as modifying the image, reducing the intensity of a specific color,
etc.

FIG. 1 is an exploded perspective view of a conventional filter assembly 10
30 used in a manually-focusing camera. As illustrated in FIG. 1, filter assembly 10 for
the manually-focusing camera includes: a frame 12 having a protrusion 18 protrusively
formed by means of a molding on the inner surface of frame 12; a fixing ring 30 fixed

at the inner surface portion of frame 12 by means of a meshing engagement; and a filter 20 inserted between frame 12 and fixing ring 30. At one portion of the outer peripheral surface of frame 12, a first screw 14 for combining frame 12 with the camera lens, is formed. At one portion of the inner peripheral surface of frame 12, a second screw 16 is formed. At the outer peripheral surface of fixing ring 30, a third screw 32 is formed. Fixing ring 30 combines with frame 12 through second screw 16 and third screw 32. Filter 20 which is inserted between fixing ring 30 and frame 12, is made of glass and has a predetermined color, as necessary.

FIG. 2 is a conventional filter assembly 50 which may be used for accomplishing special effects (hereinafter referred to as "special filter assembly") during photography. Special filter assembly 50 illustrated in FIG. 2 includes: a pattern filter 20 having a first filter 22; a second filter 24; and a pattern 26 inserted between first filter 22 and second filter 24. First and second filters 22 and 24 are generally made of transparent glass.

Pattern 26 may be used to provide special effects during photography and is a monocolored thin film or multicolored thin film. Examples of pattern 26 include: a very small pattern positioned at the center line of first and second filters 22 and 24 and having a diameter smaller than the diameters of first and second filters 22 and 24, respectively; a pattern having a plurality of colors and being positioned on the whole surface of first and second filters 22 and 24; and a partitioning pattern which partitions the image and passing through first and second filters 22 and 24 into three or more images.

Pattern filter 20 having pattern 26 is manufactured by inserting a pattern having a predetermined shape between first and second filters 22 and 24, respectively and compressing first and second filters 22 and 24 tightly together, while producing a vacuum state. Accordingly, pattern filter 20 as shown in the figures is obtained.

A specialized apparatus is needed to manufacture the filter assembly having a pattern, the manufacturing process is complicated, and the manufacturing cost of the special filter assembly is correspondingly high.

Moreover, since a screw for attaching the filter assembly to the camera lens cannot be formed on the lens of an auto-focusing camera, a filter assembly for obtaining special effects during photography cannot be used with an auto-focusing

camera lens.

In order to solve the problem described above, apparatuses for attaching a filter assembly to an auto-focusing camera have been disclosed in Korean Utility Model Publication Nos. 95-50049 and 95-5039 on June 21, 1995, for "Holder for Camera Filter" and "Holder for Camera Lens Filter", in pending U.S. patent application for "Apparatus for Demountably Attaching a Lens Filter to a Camera", which is filed together with this application on even date.

FIGs. 3 & 4 illustrate a filter assembly 100 that may be utilized in the apparatuses (including the apparatus 500 as shown in FIG. 12) disclosed in the above-mentioned publications. As shown in the figures, filter assembly 100 for auto-focusing camera includes: a frame 110 having a mounting protrusion 112 formed on the outer cylindrical surface of frame 110; a filter 120 inserted into the inner cylindrical surface of frame 110; and a fixing ring 130 for fixing filter 120 to frame 110.

Filter 120 is seated on a receiving protrusion 114 formed on the inner cylindrical surface of frame 110 and is fastened to frame 110 by fixing ring 130, which is, in turn, fastened to the inner cylindrical surface of frame 110 by means of an adhesive agent. A plurality of filters 120 may be inserted between frame 110 and fixing ring 130 and a pattern for obtaining special effects is inserted between the filters 120, as described above concerning the manual-focusing camera.

When the pattern is formed in filter assembly for auto-focusing camera 100, the manufacturing process is complicated and the manufacturing cost is high. In addition, in case of forming the pattern between the filters and the adhesive power of fixing ring 130 fixed to the inner cylindrical surface of frame 110, is weak, the filter is likely to be separated from frame 110.

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Disclosure of Invention

Accordingly, it is an object of the present invention to provide a simple, inexpensive filter assembly which may be used conveniently, and is easy to manufacture.

To accomplish the object, there is provided in the present invention a filter assembly for a camera comprising: a frame having a mounting protrusion formed at an outer end portion of periphery of the frame and a receiving protrusion formed at an

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inner periphery of the frame, a filter part seated on the receiving protrusion of the frame, and a fixing ring which has a pressing protrusion for pressing the filter part when the filter part is inserted into the frame, and of which outer periphery sticks to the inner periphery of the frame. The frame has a receiving groove between the receiving protrusion and the inner surface of the frame, and the fixing ring further has a fixing protrusion inserted into the receiving groove so that the fixing protrusion and the receiving groove are stick together through an exposure of ultrasonic waves after inserting the fixing ring into the frame.

The filter part includes a first filter, a second filter pressed by the pressing protrusion of the fixing ring and a pattern filter inserted between the first filter and the second filter. The pattern filter partitions a planar area of the filter having the same diameter as the diameters of the first and the second filters into a predetermined ratio and includes at least two partition filters having predetermined colors and refractive indexes. The partition filters are made of glass or a synthetic resin.

In addition, the filter part is received into and fixed to the frame by the receiving groove of the frame and the pressing protrusion and the fixing protrusion of the fixing ring. The fixing ring is attached and fixed to the frame by an adhesive agent.

According to the present invention, the pattern filter for obtaining special effects during photography is easy to manufacture. The structure of the filter assembly is simple and its manufacturing cost is low.

Brief Description of the Drawings

The above object and advantages of the present invention will become more apparent by describing in detail preferred embodiments thereof with reference to the attached drawings in which:

FIG. 1 is an exploded perspective view of a conventional filter assembly for a manually focusing camera;

FIG. 2 is an exploded perspective view of a conventional filter assembly having a pattern for a manually focusing camera;

FIG. 3 is an exploded perspective view of a conventional filter assembly for an auto-focusing camera;

FIG. 4 is a cross-sectional view of the assembled state of the filter assembly of

FIG. 3 cut along the line A-A;

FIG. 5 is an exploded perspective view of a filter assembly according to a first embodiment of the present invention;

FIG. 6 is a cross-sectional view of the assembled state of the filter assembly of

5 FIG. 5 cut along the line B-B;

FIG. 7 is an exploded perspective view of a filter assembly according to a second embodiment of the present invention;

FIG. 8 is a cross-sectional view of the assembled state of the filter assembly of FIG. 7 cut along the line C-C;

10 FIG. 9 illustrates examples of the pattern inserted into the filter assembly in FIG. 7;

FIG. 10 is an exploded perspective view of a filter assembly according to a third embodiment of the present invention;

15 FIG. 11 is a cross-sectional view of the filter assembly of FIG. 10 cut along the line D-D;

FIG. 12 is a cross-sectional view of the assembled state of the filter assembly of FIG. 10 cut along the line D-D;

FIG. 13 is an exploded perspective view of a filter assembly according to a fourth embodiment of the present invention;

20 FIG. 14 is a cross-sectional view of the assembled state of the filter assembly of FIG. 13; and

FIG. 15 is an example for showing the applied state of the filter assembly of FIG. 13.

25 Best Mode for Carrying out the Invention

Hereinafter, the constituting elements and the operation principles according to preferred embodiments of the present invention will be explained in more detail with reference to the accompanying drawings. In the drawings, the same reference numerals are given to the same elements.

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Embodiment 1

FIG. 5 is an exploded perspective view of a filter assembly 200 according to

a first embodiment of the present invention and FIG. 6 is a cross-sectional view of the assembled state of filter assembly 200.

As illustrated in FIGs. 5 and 6, filter assembly 200 according to the first embodiment of the present invention includes: a first frame 210 having a first mounting protrusion 212 formed at an outer surface end portion of first frame 210 and a first receiving protrusion 214 formed at an inner surface end portion of first frame 210; a first filter part 220 positioned on first receiving protrusion 214 of first frame 210; and a first fixing ring 230 which fixes first filter part 220 to first frame 210.

First frame 210 has a cylindrical shape. A receiving groove 216 is formed between first receiving protrusion 214 and the inner surface of first frame 210. The cylindrical first frame 210 is molded to have a sawtooth shape for prevent sliding.

First filter part 220 includes a first filter 222 which is positioned on first receiving protrusion 214. First filter 222 is generally made of glass. In addition, first filter 222 may has a predetermined color, when necessary. First filter 222 may be manufactured so as to shield a light having a predetermined wavelength range such as an ultraviolet ray.

First fixing ring 230 is provided with a fixing protrusion 232, which is inserted into receiving groove 216 and is formed at the outer surface end portion of first fixing ring 230. A first pressing protrusion 234 which directly presses the distal surface portions of first filter 222 by making contact with the upper surface portion of first filter 222 is formed on the inner surface of first fixing ring 230. Both the outer surface of first fixing ring 230 and fixing protrusion 232 are coated with an adhesive. The outer surface of first fixing ring 230 is thus attached to the inner surface of first frame 210; fixing protrusion 232 is inserted into and fixed to receiving groove 216. Accordingly, first filter part 220 is seated on and fastened to first frame 210 by means of first fixing ring 230.

Embodiment 2

FIGs. 7 to 9 illustrate a filter assembly 300 according to a second embodiment of the present invention. FIG. 7 is an exploded perspective view of filter assembly 300 according to the second embodiment of the present invention and FIG. 8 is a cross-sectional view of the assembled state of the filter assembly in FIG. 7. FIG. 9 illustrates

various examples of pattern filters 300 in FIGs. 7 & 8.

Filter assembly 300 according to the second embodiment of the present invention includes first frame 210, a second filter part 320 and first fixing ring 230. In this embodiment, first frame 210 and first fixing ring 230 are the same as first frame
5 210 and first fixing ring 230, respectively, of filter assembly 200 according to the first embodiment. Therefore, an explanation of the structure and functions of these common elements is omitted from the description below.

As shown in FIGs. 7 and 8, second filter part 320 includes first filter 222 seated on first receiving protrusion 214, a second filter 322 pressed by first pressing
10 protrusion 234 of first fixing ring 230, and a first pattern filter 330 inserted between first filter 222 and second filter 322. First filter 222 and second filter 322 are made from the same material, such as a transparent glass. The diameter of first pattern filter 330 is the same as the diameters of first and second filters 222 and 322, respectively.

First pattern filter 330 includes a plurality of first partition filters 332 and 334,
15 as shown in FIG. 7. The plurality of first partition filters 332 and 334 partition the planar area of first pattern filter 330 into predetermined shapes by a predetermined ratio. The plurality of first partition filters 332 and 334 may be manufactured to have different colors and/or refractive indexes. First pattern filter 330 may have various partitioned shapes, some of which are illustrated in FIG. 9. First partition filters 332
20 and 334 are made of glass or a synthetic resin having a predetermined color and a predetermined refractive index. First pattern filter 330 may be obtained by assembling first partition filters 332 and 334 together into a circular shape.

First pattern filter 330 is assembled and seated on first filter 232 after the latter has been seated on receiving protrusion 214 of first frame 210. Second filter 322 is
25 then positioned on the upper (distal) surface of first pattern filter 330. First fixing ring 230 is attached to the inner surface of first frame 210 to complete the assembly of filter assembly 300.

Embodiment 3

30 FIGs. 10 to 12 illustrate a filter assembly 400 according to a third embodiment of the present invention. FIG. 10 is an exploded perspective view of filter assembly according to the third embodiment of the present invention.

As shown in FIGs. 10-12, filter assembly 400 according to the third embodiment of the present invention includes: a second frame 410 having a second mounting protrusion 412 formed on the outer surface end of second frame 410 and a second receiving protrusion 414 formed at the inner surface of second frame 410; a
5 third filter part 420 seated on second receiving protrusion 414 of second frame 410; and a second fixing ring 440, which fixes third filter part 420 to second frame 410.

Second frame 410 has a hollow cylindrical shape and has a plurality of adhesive protrusions 416 located at a predetermined interval on the inner surface of second frame 410. Second frame 410 is molded so that the outer cylindrical surface thereof
10 has a sawtooth shape for preventing sliding. Second fixing ring 440 has a second pressing protrusion 442 for pressing third filter part 420, formed on the inner surface of second fixing ring 440. The outer surface of second fixing ring 440 makes contact with the plurality of adhesive protrusions 416.

After second fixing ring 440 has been inserted into second frame 410, second
15 fixing ring 440 and second frame 410 are exposed to ultrasonic waves. The plurality of adhesive protrusions 416 melt due to their exposure to ultrasonic waves and thereby bond the cylindrical outer surface of second fixing ring 440 to the inner surface of second frame 410. Third filter part 420 is seated on and fixed to second frame 410 by the adhesion of second fixing ring 440 to the inner surface of second frame 410. (see
20 FIGs. 11 & 12)

Third filter part 420 includes a third filter 422 seated on second receiving protrusion 414, a fourth filter 426 pressed by second pressing protrusion 442 of second fixing ring 440 and a second pattern filter 430 inserted between third filter 422 and fourth filter 426. Third filter 422 and fourth filter 426 are made of the same material,
25 usually a transparent glass.

Second pattern filter 430 includes at least one set of second partition filters 432 and 434, as shown in FIG. 10. Second partition filters 432 and 434 partition the planar area of second pattern filter 430 into predetermined shapes at a predetermined ratio. The plurality of second partition filters 432 and 434 are manufactured to have different
30 colors and/or different refractive indexes. Second pattern filter 430 may have various partitioned shapes. FIG. 9 illustrates examples of the partitioned shapes. Second partition filters 432 and 434 are made of glass or a synthetic resin having a

predetermined color and a predetermined refractive index. Second pattern filter 430 can be obtained by fitting second partition filters 432 and 434 in a circular shape. The diameter of second pattern filter 430 is the same as the diameter of third and fourth filters 422 and 426. Second pattern filter 430 is provided with separating protrusions 436 protrusively formed on both sides of second pattern filter 430 with a predetermined height. Separating protrusions 436 contact with the surfaces of third and fourth filters 422 and 426 to separate second pattern filter 430 from third and fourth filters 422 and 426 at a predetermined distance. Therefore, when second fixing ring 440 sticks to second frame 410, second pattern filter 430 is separated from third and fourth filters 422 and 426 by the length of separating protrusions 436. The lengths of separating protrusions 436 are in the range of 0.1mm to 0.3mm.

After third filter 422 is placed on second receiving protrusion 414 of second frame 410, second pattern filter 430 is placed to match the third filter 422. Then, fourth filter 426 is positioned on the upper surface of second pattern filter 430. Second fixing ring 440 is inserted into the inner cylindrical surface of second frame 410 so that second pressing protrusion 442 can sufficiently press fourth filter 426. At this time, when second frame 410 and second fixing ring 440 are exposed to ultrasonic waves, the plurality of adhesive protrusions 416 melt to fasten second fixing ring 440 to second frame 410. Then, the assembly of filter assembly 400 is completed.

20

Embodiment 4

FIGs. 13 to 15 illustrate a filter assembly 500 according to a fourth embodiment of the present invention. FIG. 13 is an exploded perspective view of filter assembly 500 according to the fourth embodiment of the present invention. FIG. 14 is a cross-sectional view of the assembled state of filter assembly 500 in FIG. 13.

Filter assembly 500 according to the fourth embodiment of the present invention further includes a housing 510 for rotatably receiving filter assemblies 200, 300 and 400 according to the first, the second and the third embodiments, respectively. Housing 510 is utilized for mounting a rectangular filter of a camera.

Filter assemblies 200, 300 and 400 according to the first, the second and the third embodiments, respectively, may be rotatably received by housing 510. Housing 510 includes a bottom plate 514 having a through hole 512 of the same diameter as

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receiving protrusions 214 and 414 of frames 210 and 410, respectively, and a receiving ring 516 which rotatably receives mounting protrusions 212 and 412 of frames 210 and 410, respectively.

Receiving ring 516 includes a blocking jaw 518 at an end portion thereof to
5 block mounting protrusions 212 and 412. The inner diameter of blocking jaw 518 is the same as or somewhat larger than the outer diameter of frames 210 and 410. Receiving ring 516 passes through and inserted into the outer surface of frames 210 and 410. Blocking jaw 518 is positioned on the upper surface of mounting protrusions 212 and 412. At this state, receiving ring 516 is attached to and fixed to bottom plate
10 514. Accordingly, frames 210 and 410 are rotatably mounted between bottom plate 514 and receiving ring 516.

As shown in FIG. 15, filter assemblies 200, 300 and 400 according to the first, the second and the third embodiments, respectively, of the present invention are rotatably mounted in housing 510. These can then be utilized in a filter fixing apparatus
15 of an auto-focusing camera or a filter holer 600.

As described above, the filter assembly of the present invention can be advantageously used with either an auto-focusing camera or a manually focusing camera. In addition, the pattern can be simply and inexpensively manufactured and the
filter can be firmly fastened to the frame.

20 Although the preferred embodiment of the invention has been described, it is understood that the present invention should not be limited to the preferred embodiment, but various changes and modifications can be made by one skilled in the art within the spirit and scope of the invention as hereinafter claimed.

What is claimed is:

1. A filter assembly of a camera comprising:
a frame having a mounting protrusion formed at an outer surface end portion
5 of said frame and a receiving protrusion formed at an inner surface of said frame;
a filter part positioned on said receiving protrusion of said frame; and
a fixing ring which has a pressing protrusion for pressing said filter part when
said filter part is inserted into said frame, and of which outer surface sticks to said
inner surface of said frame.
10
2. A filter assembly of a camera as claimed in claim 1, wherein said frame
has a receiving groove between said receiving protrusion and said inner surface of said
frame, and said fixing ring further has a fixing protrusion inserted into said receiving
groove so that said fixing protrusion and said receiving groove are stick together
15 through an exposure of ultrasonic waves after inserting said fixing ring into said frame.
3. A filter assembly of a camera as claimed in claim 1, wherein said filter
part comprises:
a first filter seated on said receiving protrusion of said frame;
20 a second filter pressed by said pressing protrusion of said fixing ring; and
a pattern filter placed between said first filter and said second filter.
4. A filter assembly of a camera as claimed in claim 3, wherein a diameter
of said pattern filter is the same as diameters of said first and second filters, and said
25 pattern filter includes at least two partition filters which partition a planar area of said
first and said second filters into a predetermined ratio and have predetermined colors
and predetermined refractive indexes.
5. A filter assembly of a camera as claimed in claim 3, wherein said pattern
30 filter further has separating protrusions formed at both end portions of said pattern
filter, for separating said pattern filter from said first filter and said second filter at a
predetermined distance.

6. A filter assembly of a camera as claimed in claim 5, wherein a length of said separating protrusion is in the range of 0.1mm to 0.3mm.

7. A filter assembly of a camera as claimed in claim 3, wherein said pattern
5 filter is comprised of glass.

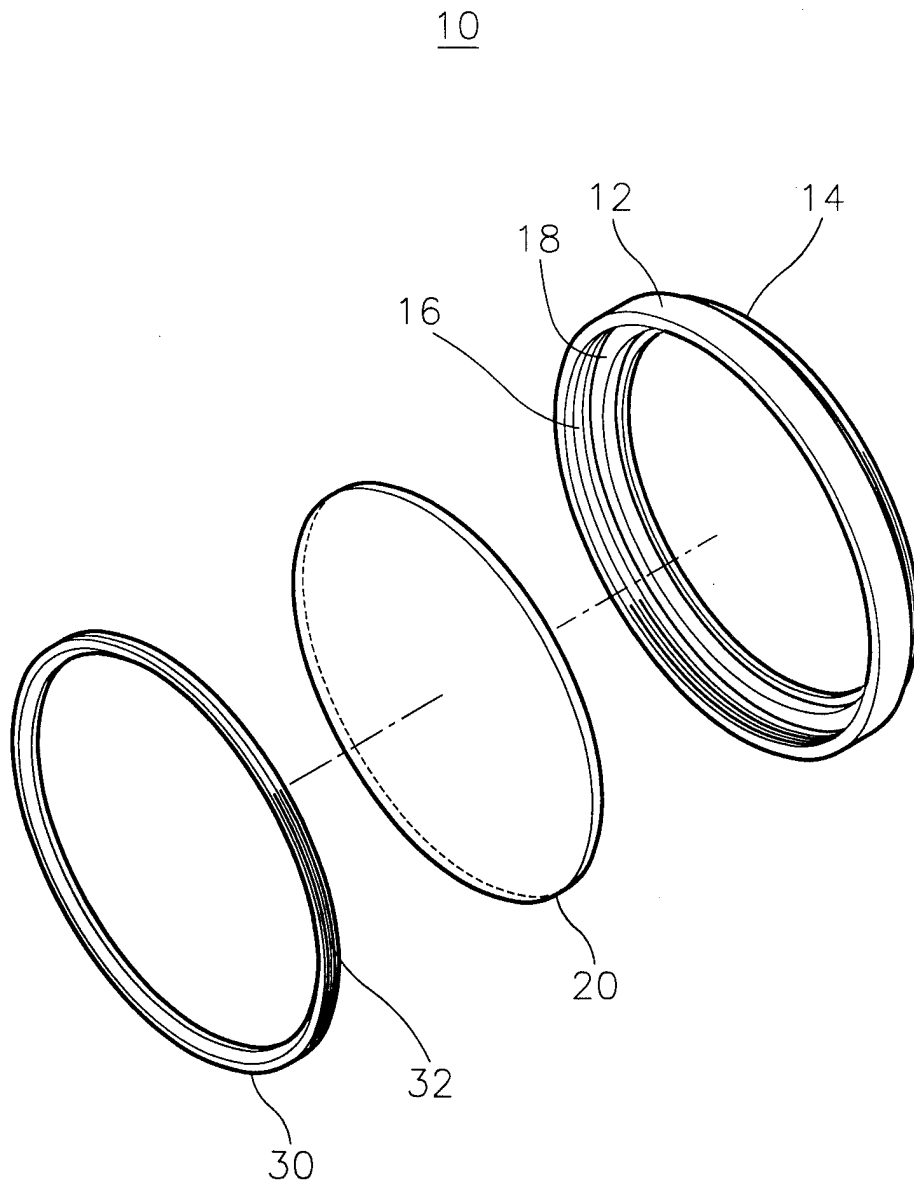
8. A filter assembly of a camera as claimed in claim 3, wherein said pattern filter is comprised of a synthetic resin.

9. A filter assembly of a camera as claimed in claim 1, wherein said frame
10 further has adhesive protrusions formed at a predetermined interval on said inner surface of said frame and said adhesive protrusions melts by ultrasonic waves to stick said inner surface of said frame to said outer surface of said fixing ring.

10. A filter assembly of a camera as claimed in claim 1, further comprising
15 a housing including a bottom plate having a through hole having the same diameter as a diameter of said receiving protrusion of said frame, and a receiving ring which rotatably receives said mounting protrusion of said frame and is fixed to said bottom plate.

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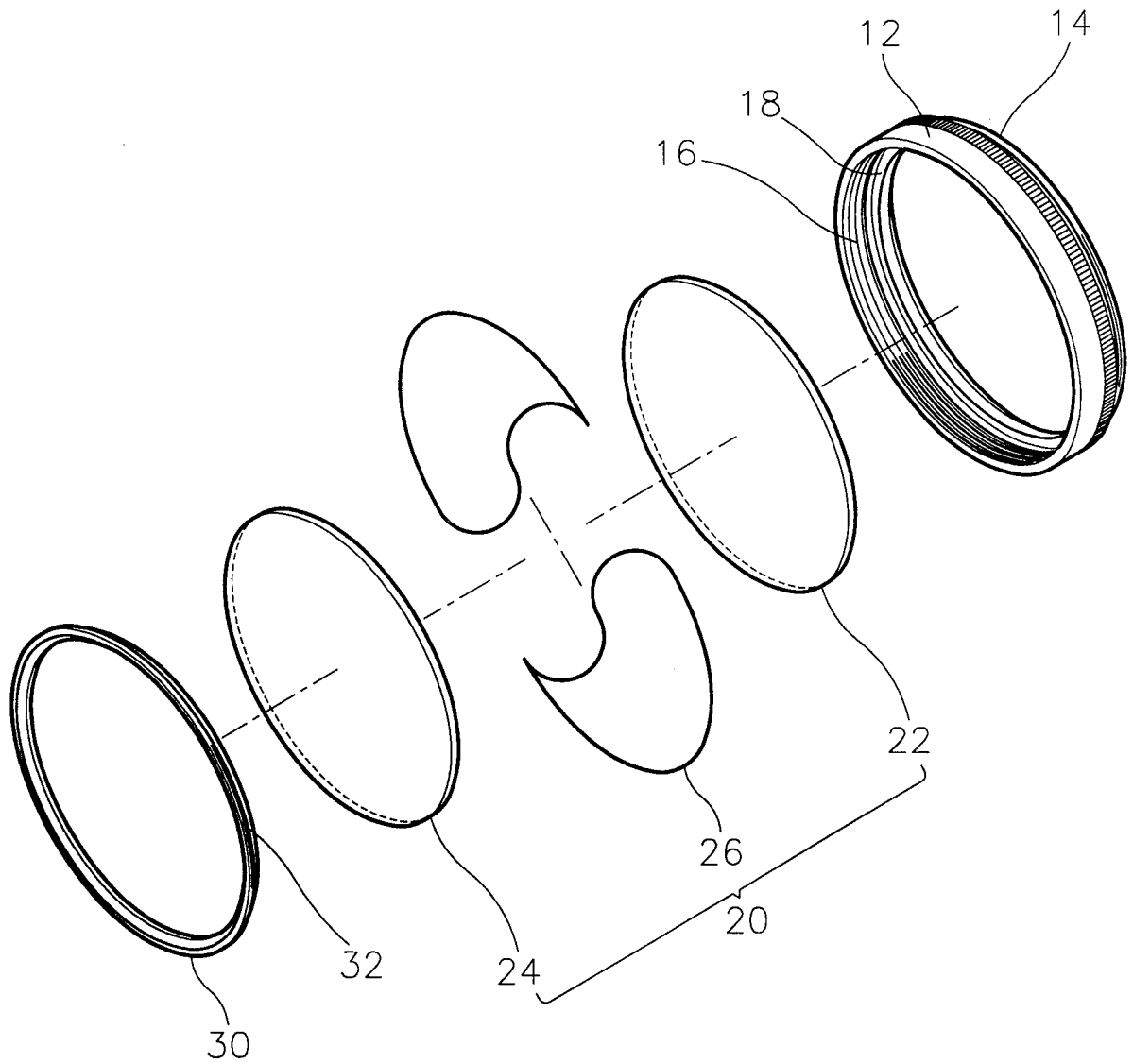
FIG. 1
(PRIOR ART)



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FIG. 2
(PRIOR ART)

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FIG. 3
(PRIOR ART)

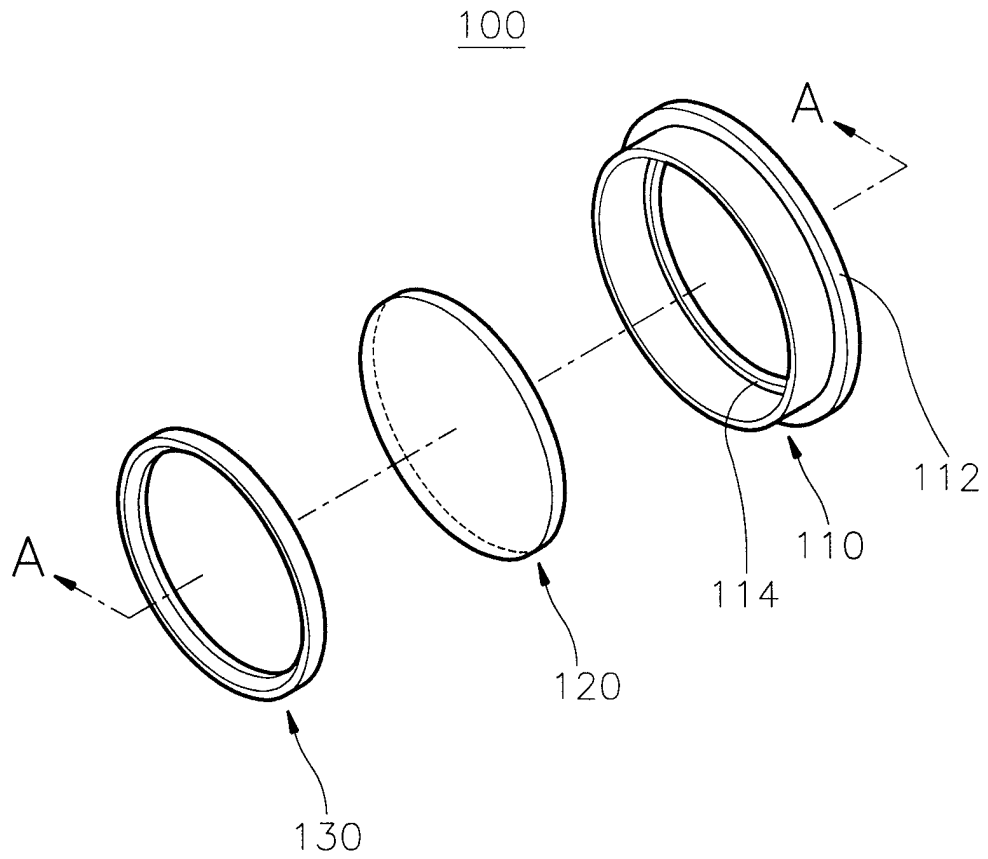
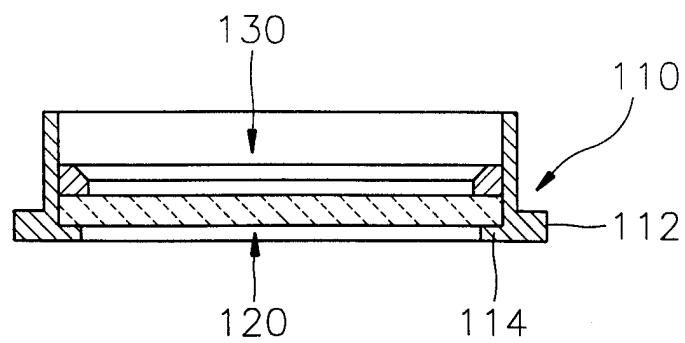


FIG. 4
(PRIOR ART)



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FIG. 5

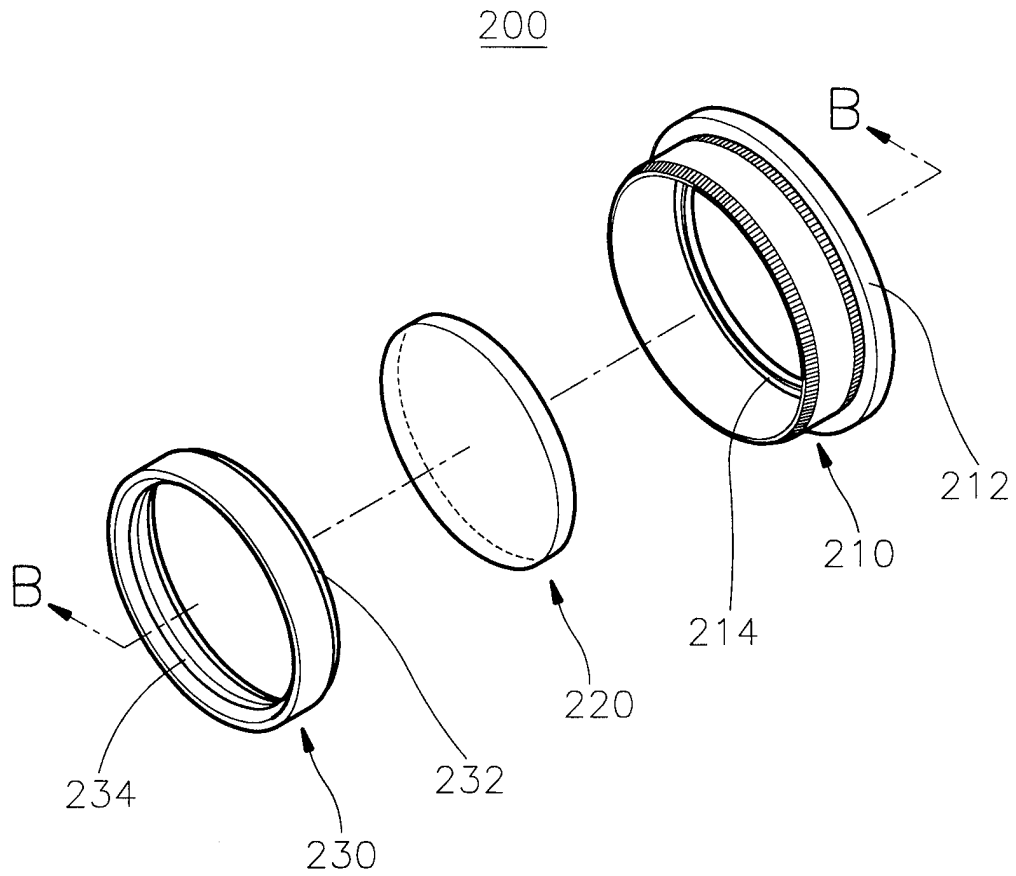
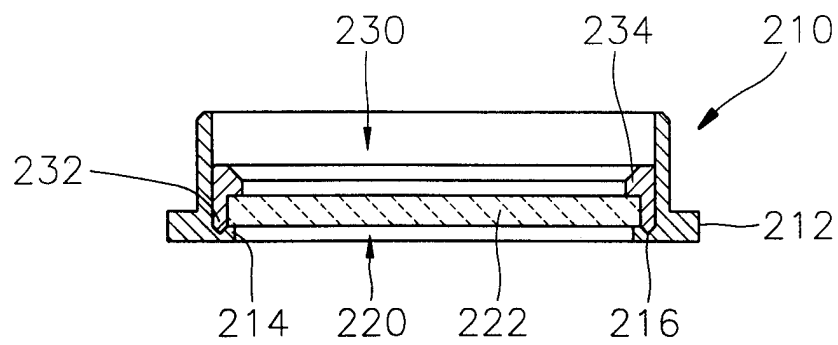


FIG. 6



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FIG. 7

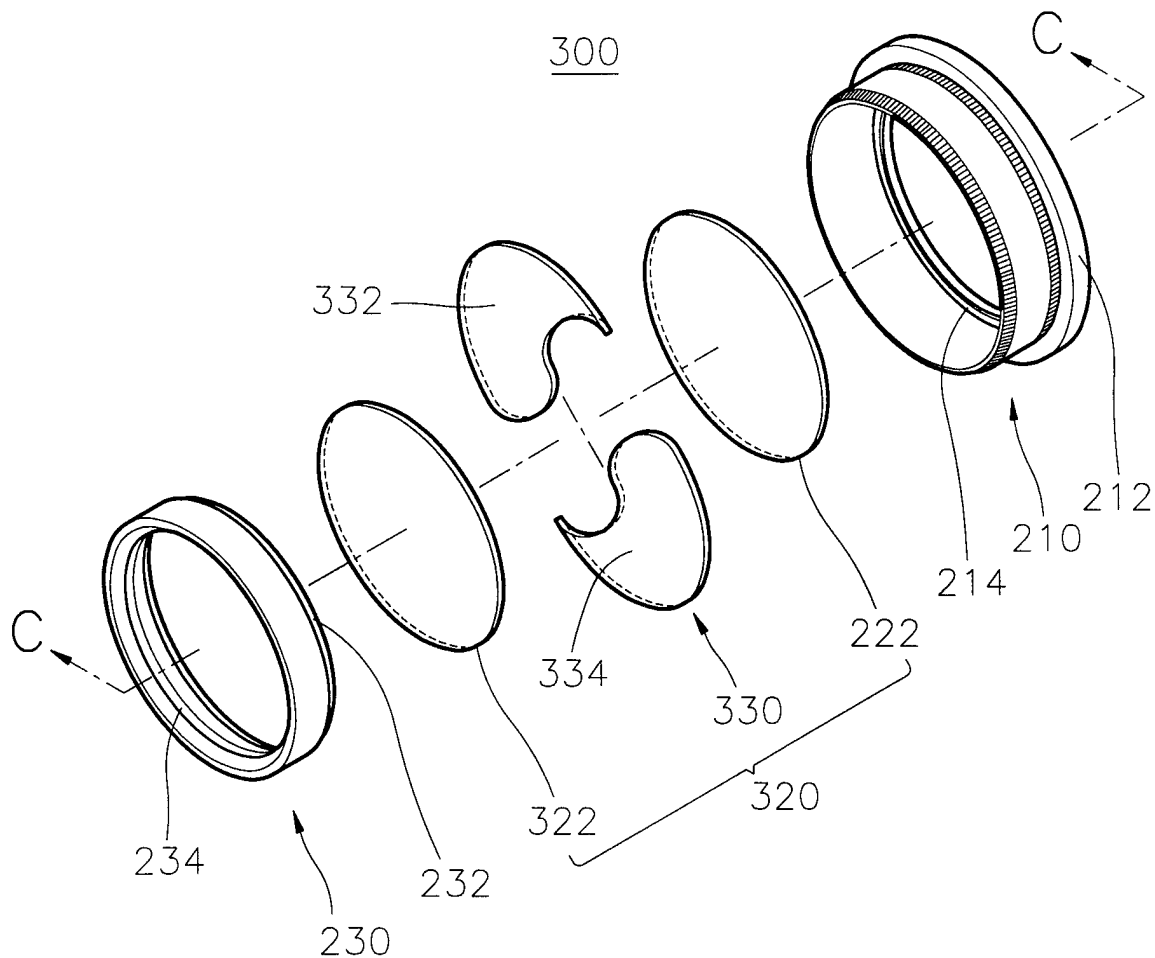
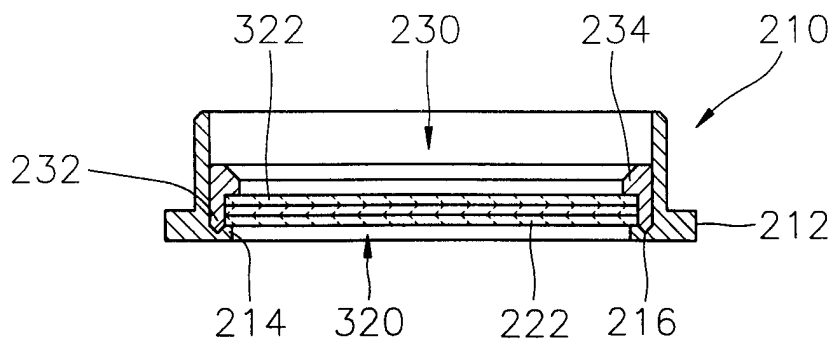


FIG. 8



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FIG. 9

330

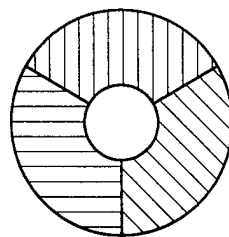
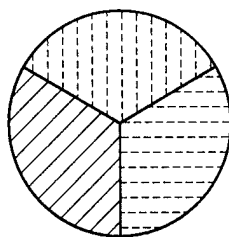
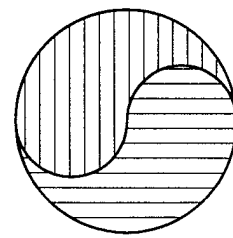
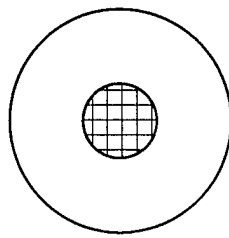
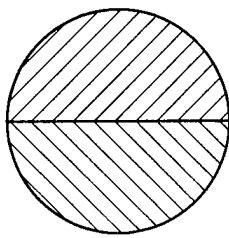


FIG. 10

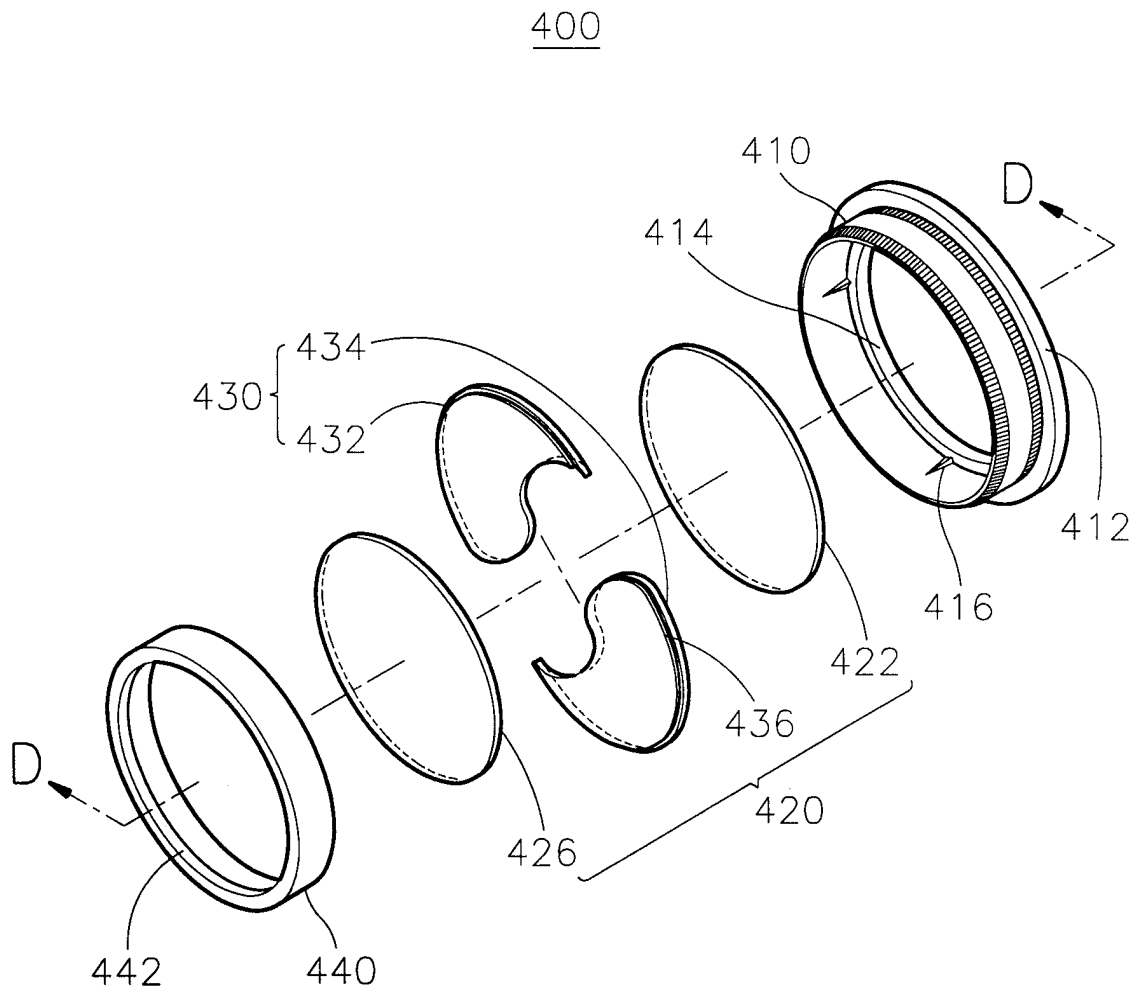


FIG. 11

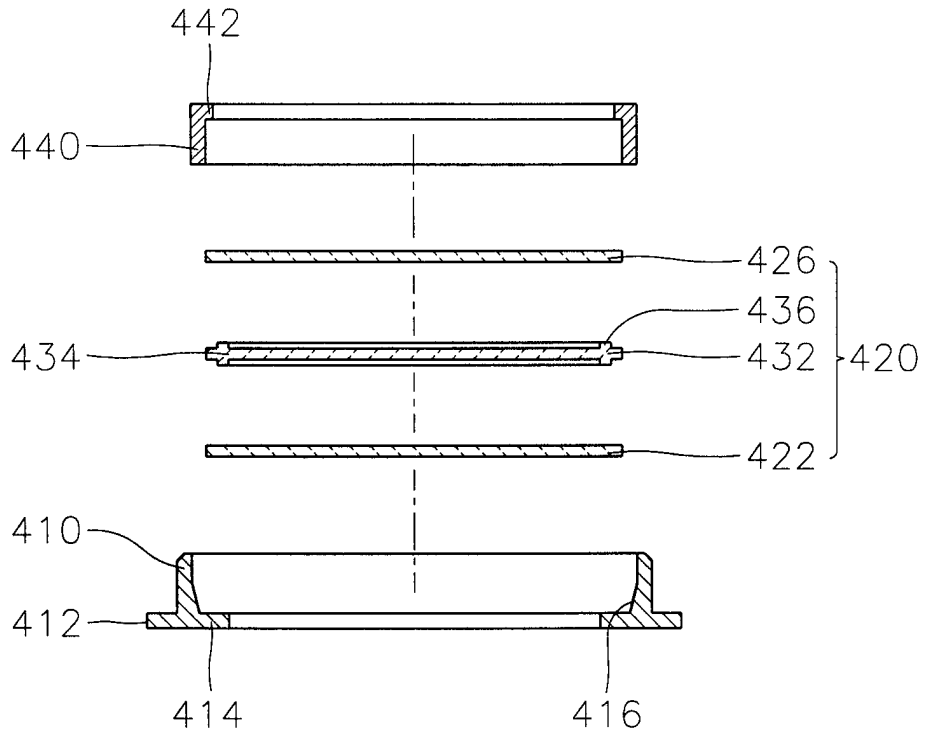


FIG. 12

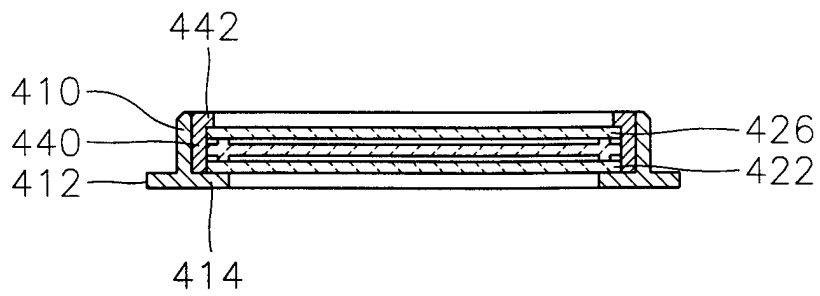


FIG. 13

500

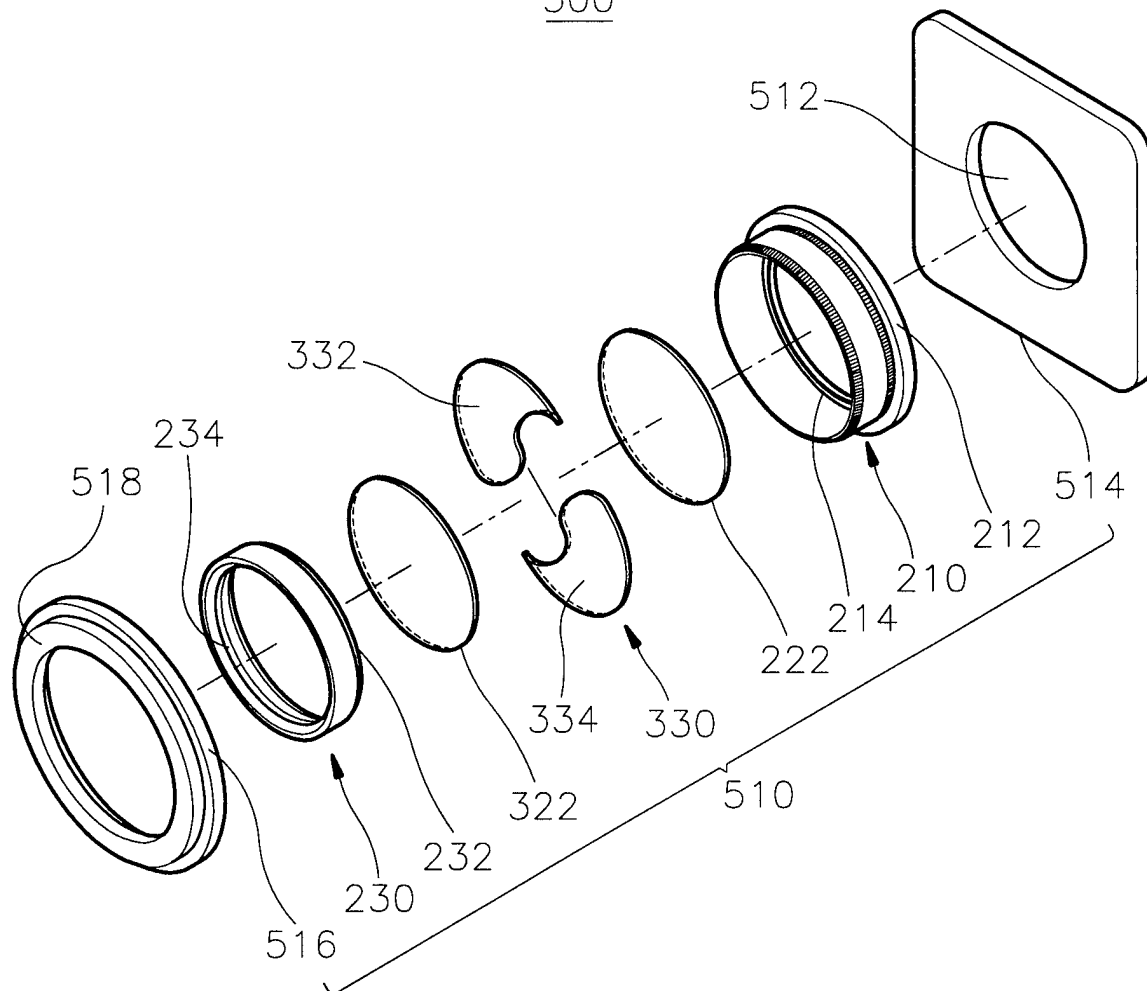


FIG. 14

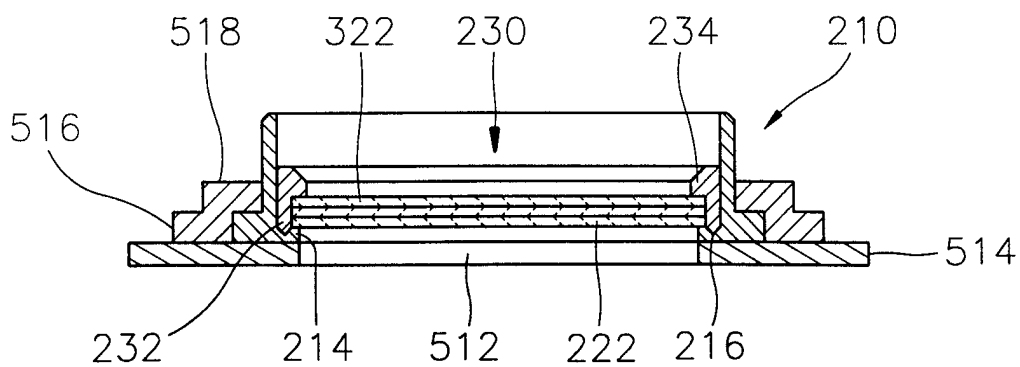
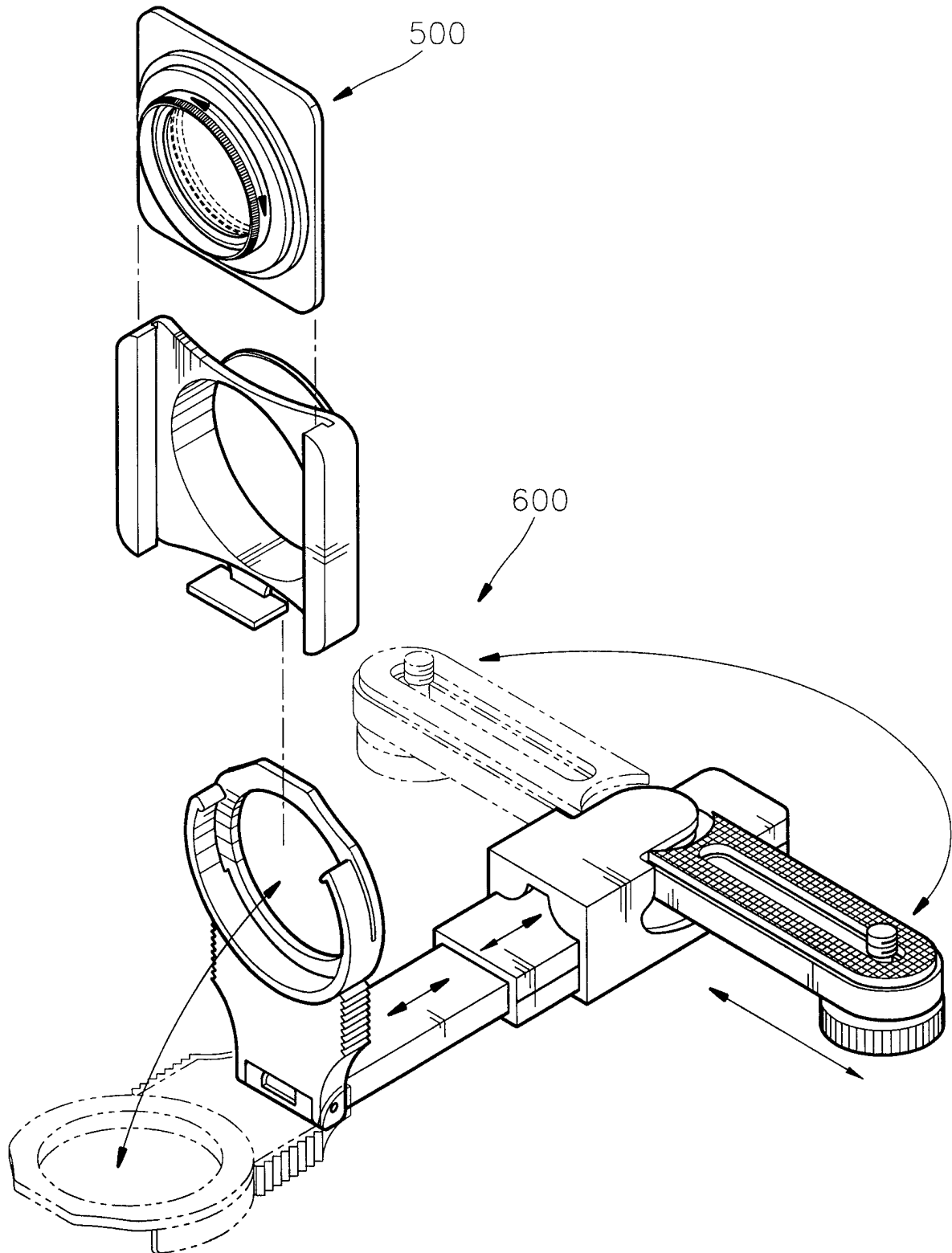


FIG. 15



INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR 97/00163

A. CLASSIFICATION OF SUBJECT MATTER
IPC⁶: G 03 B 11/00
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED
Minimum documentation searched (classification system followed by classification symbols)
IPC⁶: H 05 K 7/00; G 02 B 7/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPODOC, WPI

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X A	EP 0 004 246 A2 (COQUIN) 19 September 1979 (19.09.79), fig.; abstract; pages 7,8; claims.	1,3,4 2,7,8,10
X Y A	FR 2 524 152 A1 (ALFILLE) 30 September 1983 (30.09.83), fig.; page 11.	1 3,4 2,7,8,10
X Y A	DE 29 17 185 A1 (KOHLENBERG) 06 November 1980 (06.11.80), fig.; pages 4-7.	1 3,4 2,7,8,10
X A	US 4 533 212 A (SHIMIZU) 06 August 1985 (06.08.85), fig.; abstract; claims.	1 2,7,8,10

Further documents are listed in the continuation of Box C. See patent family annex.

- * Special categories of cited documents:
- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed
- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
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- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
- "&" document member of the same patent family

Date of the actual completion of the international search 31 October 1997 (31.10.97)	Date of mailing of the international search report 05 January 1998 (05.01.98)
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Name and mailing address of the ISA/AT AUSTRIAN PATENT OFFICE Kohlmarkt 8-10 A-1014 Vienna Facsimile No. 1/53424/535	Authorized officer Kral Telephone No. 1/53424/335
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INTERNATIONAL SEARCH REPORT
Information on patent family members

International application No.

PCT/KR 97/00163

In Recherchenbericht angeführtes Patentedokument Patent document cited in search report Document de brevet cité dans le rapport de recherche	Datum der Veröffentlichung Publication date Date de publication	Mitglied(er) der Patentfamilie Patent family member(s) Membre(s) de la famille de brevets	Datum der Veröffentlichung Publication date Date de publication
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