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SEARCH ROOM

United States Patent

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[33] **Germany**
[31] **P 17 97 051.3**

[54] **PLASTICS SOCKET ARRANGEMENT FOR OBJECTIVE LENSES WITH DISTANCE ADJUSTMENT FOR CAMERAS**
11 Claims, 6 Drawing Figs.

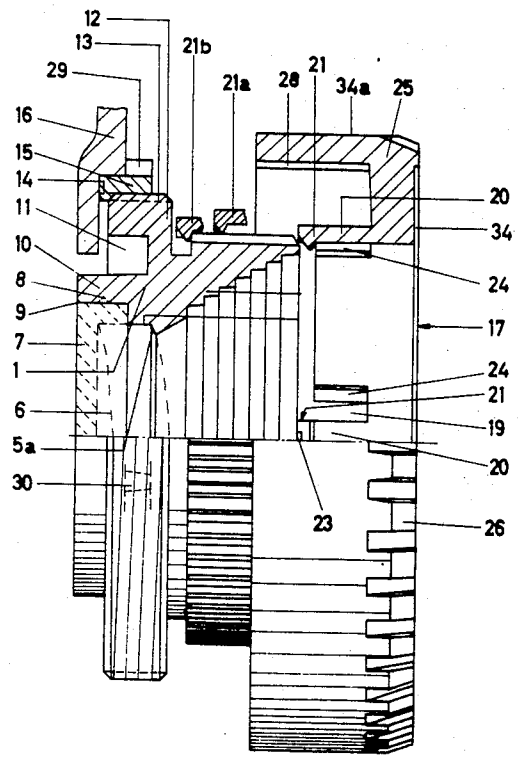
[52] U.S. Cl. 350/255
[51] Int. Cl. G02b 7/02
[50] Field of Search 350/252, 253, 256, 257

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ABSTRACT: An improved plastic-produced fitting of special construction of objective lenses of cameras with distance adjustment, simplifying the production and avoiding lathe-work, milling, boring a.s.o. but being instantly ready for assembly and a process of mounting and demounting for it.



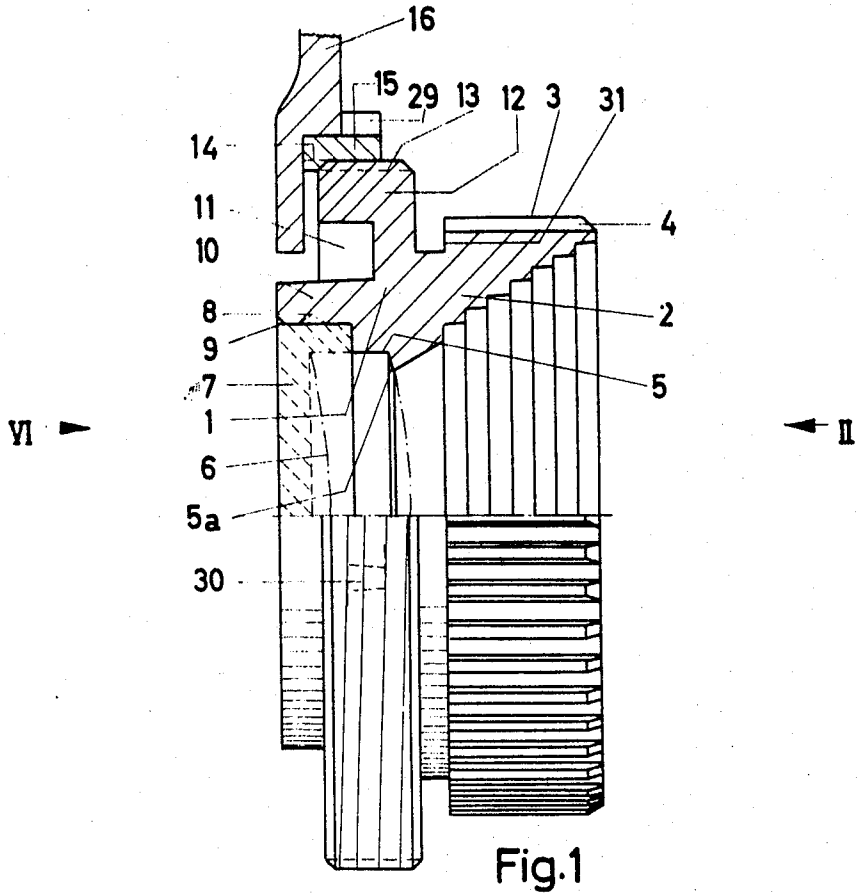


Fig.1

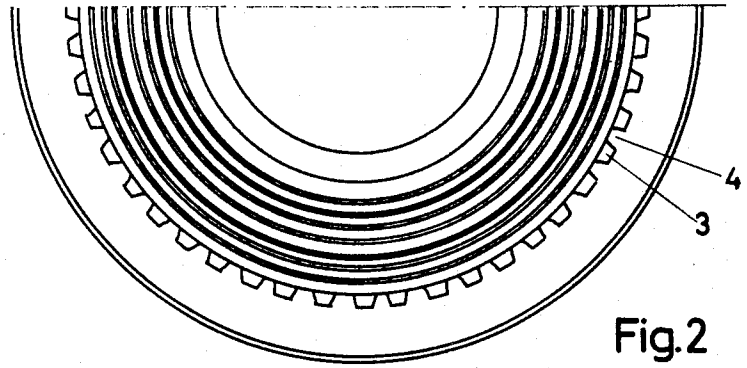


Fig.2

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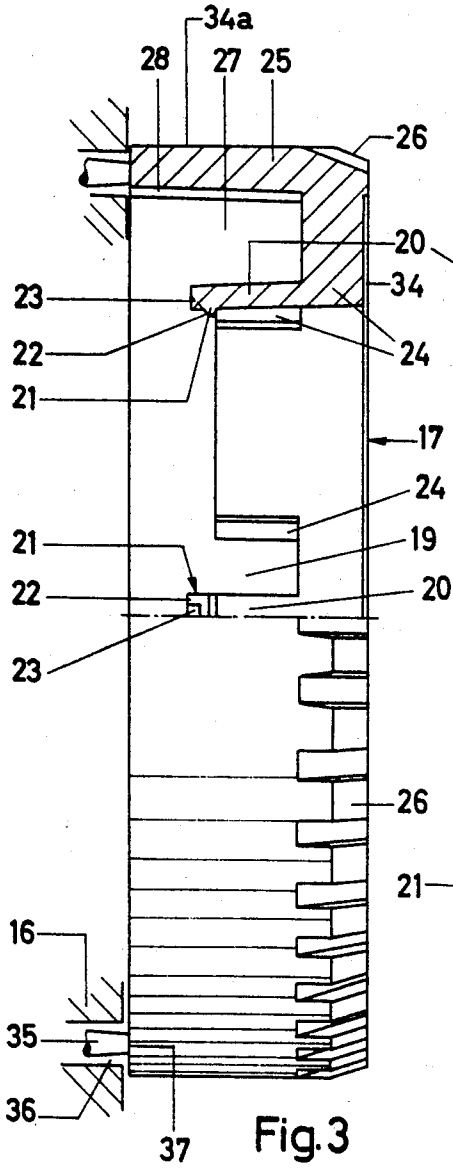


Fig.3

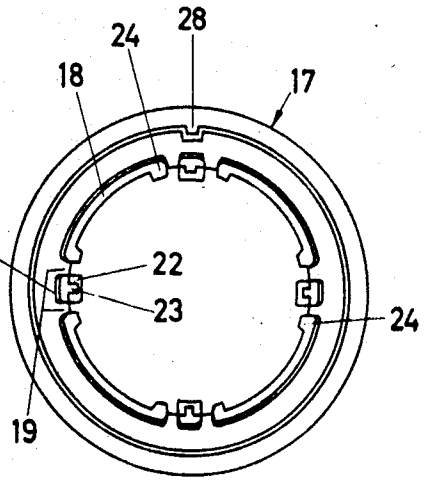


Fig.4

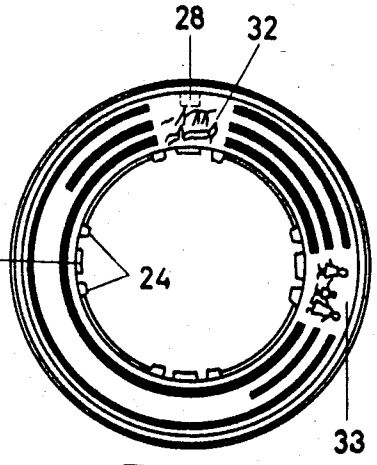


Fig.5

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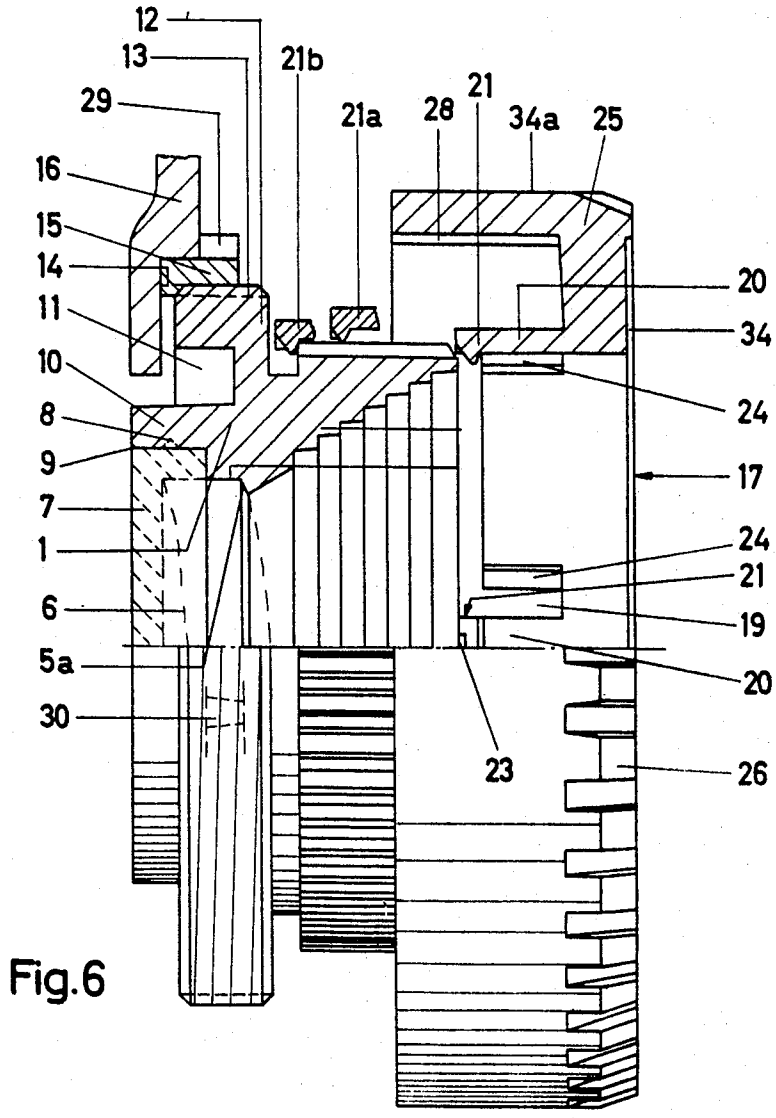


Fig.6

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PLASTICS SOCKET ARRANGEMENT FOR OBJECTIVE LENSES WITH DISTANCE ADJUSTMENT FOR CAMERAS

BACKGROUND OF THE INVENTION

This invention relates to fittings for objective lenses in cameras with distance adjustment and to improvements in such fittings in particular pertaining mainly to simplified assembly means by which an easier assembly working process for the camera is attained in view of former constructions.

It is known to mount camera lenses in the camera by means of screws and similar means and arrangements. But this is expensive and assiduous. Lenses without adjusting possibility have already been riveted or welded but apart from the missing of distance adjusting the riveting or welding process also is expensive.

SUMMARY

It is an object of the present invention to overcome the mentioned disadvantages and difficulties and to provide an improved construction consisting of two fitting parts the one of which surrounding the other concentrically, the inner one serving as the actual lens supporting part and having a cylindrical fitting surface and abutment for a precise reception of a lens or double lens. On the outer surface this part is provided with a thread of the camera front part for the distance adjusting of the lens and furthermore provided with a fitting cylinder which is axially profiled on which cylinder the other part in the form of an outer fitting part provided with engaging noses for the profiled fitting surface can be shifted as an operating ring in a desired position of the lens, adapted to the associated object distance. This operating ring is provided with resilient resting or catching noses which in the desired rotary position of the true lens fitting in view of the operating ring engages a resting face of the inner fitting part and thereby firmly secures the mutual rotary position and effects the force- and form-locking connection.

Various further and more specific purposes, features and advantages will clearly appear from the detailed description given below taken in connection with the accompanying drawings which form part of this specification and illustrate merely by way of example embodiments of the device of the invention.

BRIEF DESCRIPTION OF DRAWING

In the following description and in the claims, parts will be identified by specific names for convenience, but such names are intended to be as generic in their application to similar parts as the art will permit. Like reference characters denote like parts in the several figures of the drawings, in which

FIG. 1 shows in enlarged scale (5:1) a section of the true lens fitting part with indicated lens and lens clamping ring,

FIG. 2 is a view of the part according to FIG. 1 in direction of arrow II of FIG. 1,

FIG. 3 is a cross section of the operating ring partly as a view,

FIG. 4 is in a somewhat smaller scale (2:1) the inner view of the operating ring,

FIG. 5 is the outer view of the operating ring,

FIG. 6 shows the lens supporting part and the operating ring at the start of the assembly process just prior to the assembling of the two parts.

DESCRIPTION

In the Figures, there is a lens supporting part or socket with a usual grooved light entrance hopper **2**, additionally serving as a fitting cylinder and at its outer cylindrical surface being provided with axial ribs **3** and thereby created grooves **4**. Supporting part **1** contains a lens fitting surface **5** and abutting surface **5***a* for a correct reception of a lens or double lens **6**, secured by a clamping ring **7** which either is inserted with friction or rests by means of a bead **8**. Instead of this or additionally also an adhesive lump or spot **9** for securing ring **7** may be used. The clamping ring **7** is embraced by a bushinglike part **10** which through a recess **11** changes over into an outer ring **12** which at its circumference is provided with an adjusting thread **13** engaging a corresponding inner thread **14** which can be screwed into a cylindrical socket **15** which may be integral with the camera front wall **16**.

The FIGS. **3**, **4** and **5** show the operating ring **17**. It comprises a inner cylindrical part **18** (FIG. **4**) which at four points of its circumference is provided with double recesses **19** leaving between each pair of recesses a resilient tongue **20**, which at its free end is provided with an inwardly protruding locking-nose **21** (FIG. **3**), on the oblique entrance surfaces **22** each of which having furthermore an auxiliary guiding and locking nose **23**, the width of which in circumference direction is so dimensioned that it fits conveniently in one of the grooves **4** of the lens supporting part **1**. Two additional inwardly directed noses **24** associated to each of the resilient tongues **20** engage, if locking noses **23** are introduced, engage grooves **4** of lens supporting part **1**. The outer cylindrical part, that is operating ring **17**, has furthermore an outer cylindrical part **25** serving as a handle and near its front side provided with gripping noses **26**. Between inner cylindrical part **18** and outer socket **25** there is a cylindrical recess **27** into which protrudes a single abutting nose **28** of the outer cylindrical part **25**. The recess **27** serves the purpose of saving material as well as of receiving the preferably integral screw socket **15** of the camera front wall **16** and of covering the latter. Integral with the otherwise smooth front side of the screw socket **16** are two further abutting noses **29** and **30** between which the nose **28** fits loosely. The adjusting area of lens **6** therefore is limited according. A resting surface **31** is arranged for engagement with locking noses **21** (FIG. **1**).

Referring now to FIG. **6**, there is mounting effected in such manner that at first lens **6** is placed into the clamping ring **7** and together with the latter is shifted into lens supporting part **1** so that clamping ring **7** either rests at **8** by friction or is maintained in its final position by a glue spot **9**. The lens supporting socket part **1** is screwed by means of the adjusting thread **13** into the cylindrical socket **15** of the camera front wall **16**, especially so far that an optic testing instrument for a certain object-distance adjustment, preferably focused for infinity, shows the right distance of the lens from the film plane. In this position the outer socket part, that is, operating ring **17** in FIG. **6** is shifted from the right, the fixing noses **23** of the resilient tongues **20** are sliding on the oblique surface **22** searching automatically the engagement of one of the grooves **4**, and there each one of the further noses **24** of inner cylindrical socket **18** associated to the tongues **20** enters also a groove of inner cylindrical part **1**. Operating ring **17** at this operation will be held so that the abutment **28** is situated close to the one abutting nose **29** of the cylindrical socket **15** while the other abutting nose **30** limits the clearance of lens supporting part **1**. The necessary setting of operating ring **17** during the insertion thereof is facilitated by corresponding symbols **32** (for landscape) and **33** (for a group of persons) corresponding to abutments **29** and **30** and situated at the front side **34** or at the circumference of operating ring **17**, small angle differences being irrelevant because of being within the allowed tolerance. The abutment **29** in this embodiment is situated in the center of the landscape symbol and at insertion in the front view to the left close to the abutment **29** of cylindrical socket **15**. As soon as fixing noses **23** and noses **24** have entered the grooves **4**, the relative rotary position between parts **1** and **17** is defined and further does not have to be observed except that the abutment must be situated between the abutments **29**, **30** of the camera front wall **18**. If now operating ring **17** is fully shifted on, finally resting noses **21** engage from their position **21***a* during the assembly process behind the resting surface **31** of the lens supporting part **1** as indicated by the numeral **21***b*. By this operation the mounting is finished. Now parts **1**, **16**, **17** are rigidly and operably connected together because in view of the fact that abutment **28** of the operating ring is situated between abutments **29** and **30** of the camera front wall **18** and

therefore in view of the limited rotary range and locking connection of lens supporting part 1 and operating ring 17, the former cannot be screwed out.

The dismantling of parts 1, 16, 17 during a necessary repair may be effected by a special tool provided with two pins 35, the latter being inserted from behind into corresponding openings 36 of the camera front wall 18 when said front part is removed. By pressing at the ring surface 37 of operating ring 17 the resilient tongues 20 with resting noses 21 are forced to yield resiliently so that operating ring 17 can be removed.

What we claim is: cm 1. Lens mounting device for an objective of a camera, said camera having a front part, said device having distance adjustment means, said device comprising an axially symmetric lens supporting part having a cylindrical fitting surface for fitting of said lens, said supporting part having a distance focusing thread, an outer axially grooved fitting cylinder and a resting surface disposed at one end of said fitting cylinder, as female thread on said front part of said camera, said female thread engaging said distance focusing thread and securing adjustably said supporting part of said lens on said front part of said camera, an operating ring having an inner cylindrical fitting surface, said fitting surface having a plurality of both axially and radially extending engaging noses and having a plurality of resilient locking noses, said fitting surface of said operating ring embracing said axially grooved fitting cylinder and said resting surface of said supporting part of said lens, said engaging noses engaging said grooves of said fitting cylinder in a desired relative position of said operating ring, said supporting part of said lens and said locking noses engaging said resting surface for preventing said operating ring from being retracted from said supporting part of said lens without a tool, and an abutment on said operating ring and corresponding counter abutments on said front part of said camera, said counter abutments disposed for limiting the range of movement of said abutment on said abutment ring according to said distance adjustment of said operating ring.

2. Device according to claim 1, and a substantially tubular section having a substantially hopper-shaped light-entering opening on said supporting part of said lens at said front part of said camera, said tubular section having an outer surface constituting said axially grooved fitting cylinder and having said resting surface on said cylinder directed toward said camera.

3. Device according to claim 2, said locking noses, said engaging noses and said fitting surface being integrally formed with said operating ring.

4. Device according to claim 3, and two concentrically arranged cylindrical parts on said operating ring, said parts consisting of an outer cylindrical part and an inner cylindrical part, and an annular front side section on said operating ring, said annular front part integrally connecting said cylindrical parts, said outer surface of said outer cylindrical part serving as a handle and said inner surface of said inner cylindrical part serving as said cylindrical fitting surface of said operating ring, said inner cylindrical part having double recesses and resilient tongues disposed between the two recesses of said double recesses, each one of said tongues extending axially of said inner cylindrical part and having one of said locking noses thereon, said locking noses engaging said resting surface of said supporting part of said lens, and said inner cylindrical part of said operating ring having said engaging noses thereon, said engaging noses engaging said grooves of said axially grooved fitting cylinder of said supporting part of said lens.

5. Device according to claim 4, and a cylindrical socket on said front part of said camera, said socket being disposed concentrically of the optical axis of said objective of said camera, said socket having said female thread thereon engaging said focusing thread of said supporting part of said lens, and said socket being covered by being surrounded by said outer cylindrical part of said operating ring after the finished assembly of said device.

6. Device according to claim 5, said socket on said front part of said camera having said counter abutments disposed at the outer surface of said front part, and said inner surface of said outer cylindrical part of said operating ring being provided with said abutment cooperating with said counter abutments.

7. Device according to claim 6, and distance symbols on said operating ring, said symbols associated to each one of said counter abutments on said cylindrical thread socket, and reading marks in the end positions of said abutment of said operating ring, said symbols meeting with said marks thereby indicating the adjusted distance range.

8. Device according to claim 7, and hopper-shaped distributed oblique insert surfaces on said resilient locking noses, each one of said surfaces having an integral auxiliary leading nose thereon, said leading noses being disposed for being shifted into a groove of said axially grooved fitting cylinder of said supporting part of said lens at the start of the assembly of said objective of said camera.

9. Device according to claim 8, said lens supported by said supporting part thereof being fixedly attached by a glue spot in said cylindrical fitting surface.

10. Device according to claim 8, and a clamping ring being disposed for holding said lens by an over dead center engagement.

11. Device according to claim 4, said device substantially consisting of precision-molded plastic parts.

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