

# PHOTOMACROGRAPHIC SYSTEM

# MODELS **PMT-35TA** **PMT-35RA**

## INSTRUCTION MANUAL

*This instruction manual is for use of the Photomacrographic System Model PMT-35A. We recommend you read the manual carefully in order to familiarize yourself fully with the use of this system so that you can obtain maximum performance. The photomacrographic system PMT-35A is divided into two types, including Model PMT-35TA (for transmitted light) and Model PMT-35RA (for reflected light).*

# OLYMPUS

# BEFORE USE

Observe the following procedures:

## 1 Operation

1. The photomacrographic system PMT-35A is a precision instrument. Always handle the PMT-35A with the care it deserves, and **avoid abrupt motions and shock.**
2. Avoid exposure to **direct sunlight, high temperature and humidity, dust and vibration.**
3. Use the macro lenses as designated by Olympus (see the specifications on page 4); Use of macro lenses other than designated will result in unsatisfactory performance of the system.
4. Use an OM system camera back in conjunction with this photomacrographic system. Especially the OM system "automatic" exposure camera backs, compatible with the OM system interchangeable focusing screens\* are recommended.

\*OM system interchangeable focusing screens most suitable for macro lenses are as follows:

Macro lenses	Focusing screen Nos.
Zuiko Macro 80 mm F4 M80MC-2U	1-4, 1-10, 1-11
Zuiko Macro 38 mm F2.8 M38MC-2	1-4, 1-10, 1-11, 1-12
Zuiko Macro 20 mm F2 M20MC-2	1-11, 1-12

## 2 Maintenance

1. Lenses must always be kept clean. If they are smudged with oil, fingerprints, etc., carefully wipe them off the lens surfaces with gauze moistened with a small amount of alcohol-ether mixture (3 : 7) or xylene.
2. Do not use organic solutions to wipe the surfaces of various components. Plastic parts, especially, should be cleaned with neutral detergent.
3. When not in use, the PMT-35A should be covered with the vinyl dust cover provided.



# CONTENTS

<b>1. STANDARD EQUIPMENT</b> .....	<b>1</b>	<b>1</b>
<b>2. SPECIFICATIONS</b> .....	<b>4</b>	<b>2</b>
<b>3. NOMENCLATURE</b> .....	<b>5</b>	<b>3</b>
<b>4. ASSEMBLY</b> .....	<b>9</b>	<b>4</b>
<b>5. SUMMARY OF PUTTING THE PMT-35A IN OPERATION</b> .....	<b>12</b>	<b>5</b>
<b>6. PHOTOGRAPHIC PROCEDURES</b> .....	<b>13</b>	<b>6</b>
6-1 Photomacrography with Transmitted Light .....	13	
6-2 Photomicrography .....	16	
6-3 Photomacrography with Reflected Light .....	18	
<b>7. CONDITIONS FOR TAKING GOOD PICTURES</b> .....	<b>20</b>	<b>7</b>
7-1 Environmental Factors .....	20	
7-2 Specimens .....	20	
7-3 Selection of Films and Filters .....	20	
<b>8. TROUBLE SHOOTING</b> .....	<b>22</b>	<b>8</b>

# STANDARD EQUIPMENT

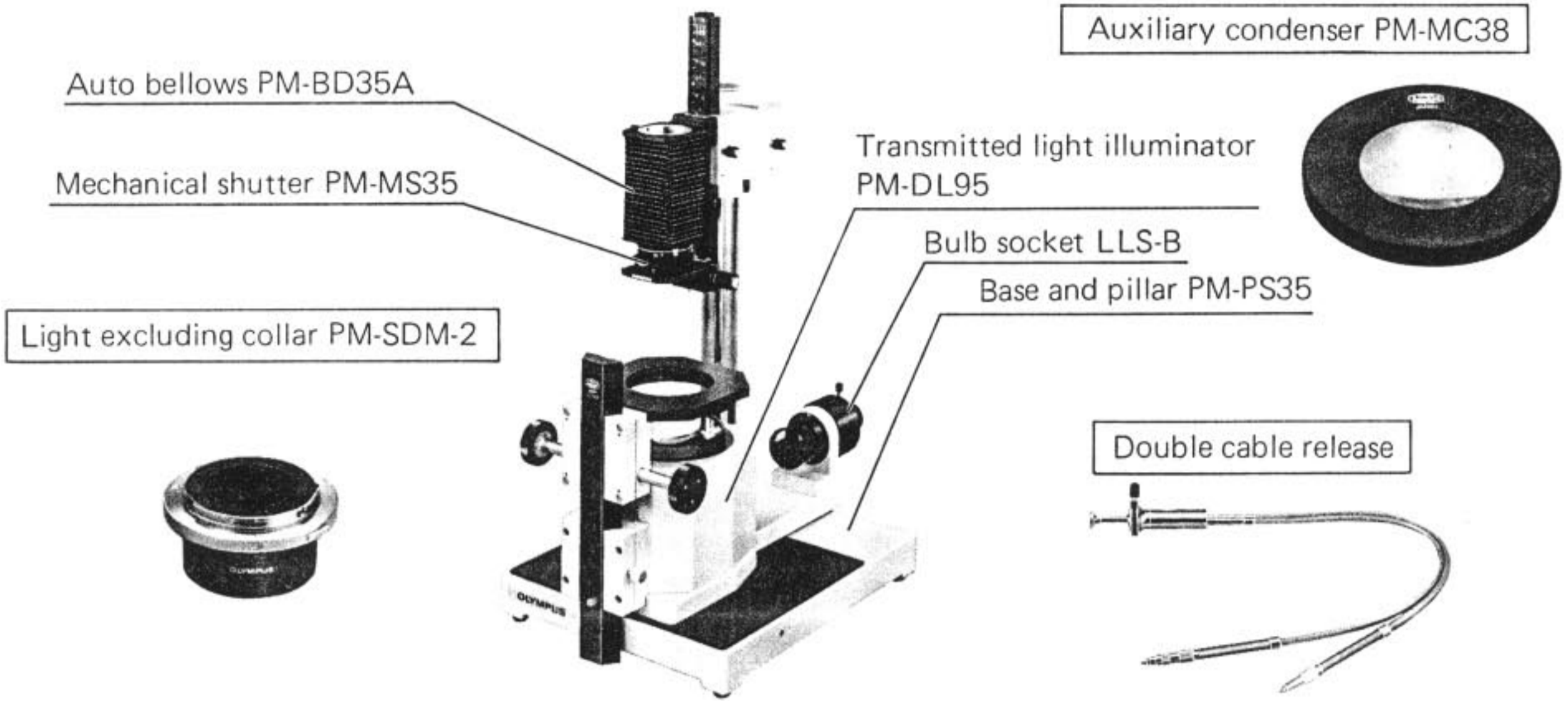
Component		PMT-	
		35TA	35RA
Photomacrographic outfits, consisting of: Base and pillar PM-PS35 Auto bellows PM-BD35A Mechanical shutter PM-MS35 Light excluding collar PM-SDM-2 Double cable release Transmitted light illuminator PM-DL95, consisting of lamp housing, mirror housing with condenser lens, stage, pillar and stage focusing mechanism and metallic stage insert plates (AA6585 and AA6587) Auxiliary condenser PM-MC38 Bulb socket LLS-B Stage clips, paired Tungsten bulb 6V5ATP-1 (3 pcs.) Accessory container PMT-35TA-WB Dust cover A031	PMT-35TA-F	1	0
Photomacrographic outfits, consisting of: Base and pillar PM-PS35 Auto bellows PM-BD35A Mechanical shutter PM-MS35 Light excluding collar PM-SDM-2 Double cable release Accessory container PMT-35TA-WB Dust cover A031	PMT-35RA-F	0	1
Universal illuminator, consisting paired light sources	PM-LSD-W	0	1
Stage plate (clear)	SP-C	1	0
Filter set for color film (consisting of 45LBD2N, 45LBTN, 43ND6-W45 and 43ND25-W45, one each)	PM-FIL-C	1	1
Filter set for black & white film (consisting of 45G-533, 450-560 and 43ND25-W45, one each)	PM-FIL-4	1	1
OM camera mount	PM-CAMS	1	1
Transformer	TGHM	1	2
Power cord	UYCP	1	2

## Optional Accessories

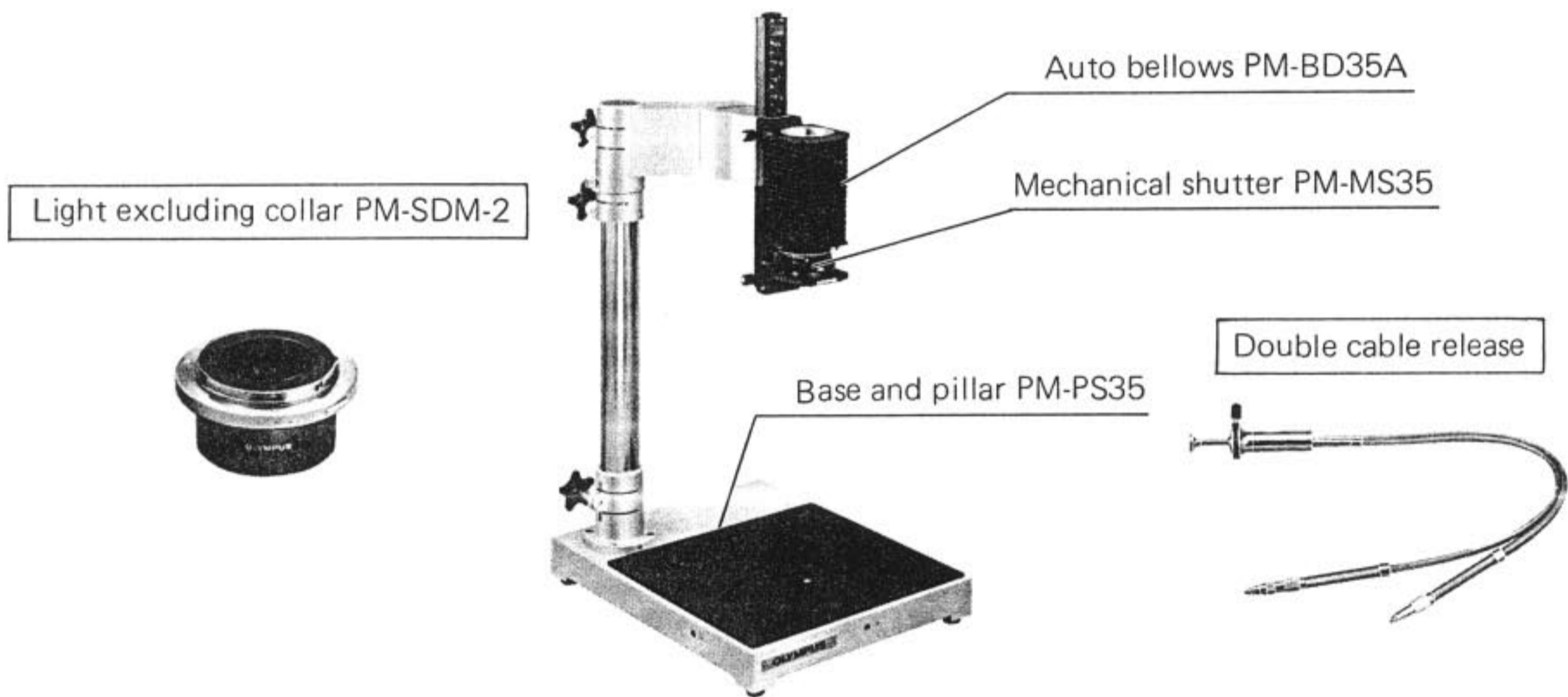
Zuiko macro lens 20 mm F2	M20MC-2
Zuiko macro lens 38 mm F2.8	M38MC-2
Zuiko macro lens 80 mm F4	M80MC-2U
Photomicrographic exposure meters	EMM-6, EMM-7
Adapter for EMM-7	PM-EA
Coaxial illuminator mirror housings	PM-EL20/-EL38/-EL80



**A. Setup of Photomacrographic Outfits PMT-35TA-F (For transmitted light illumination)**



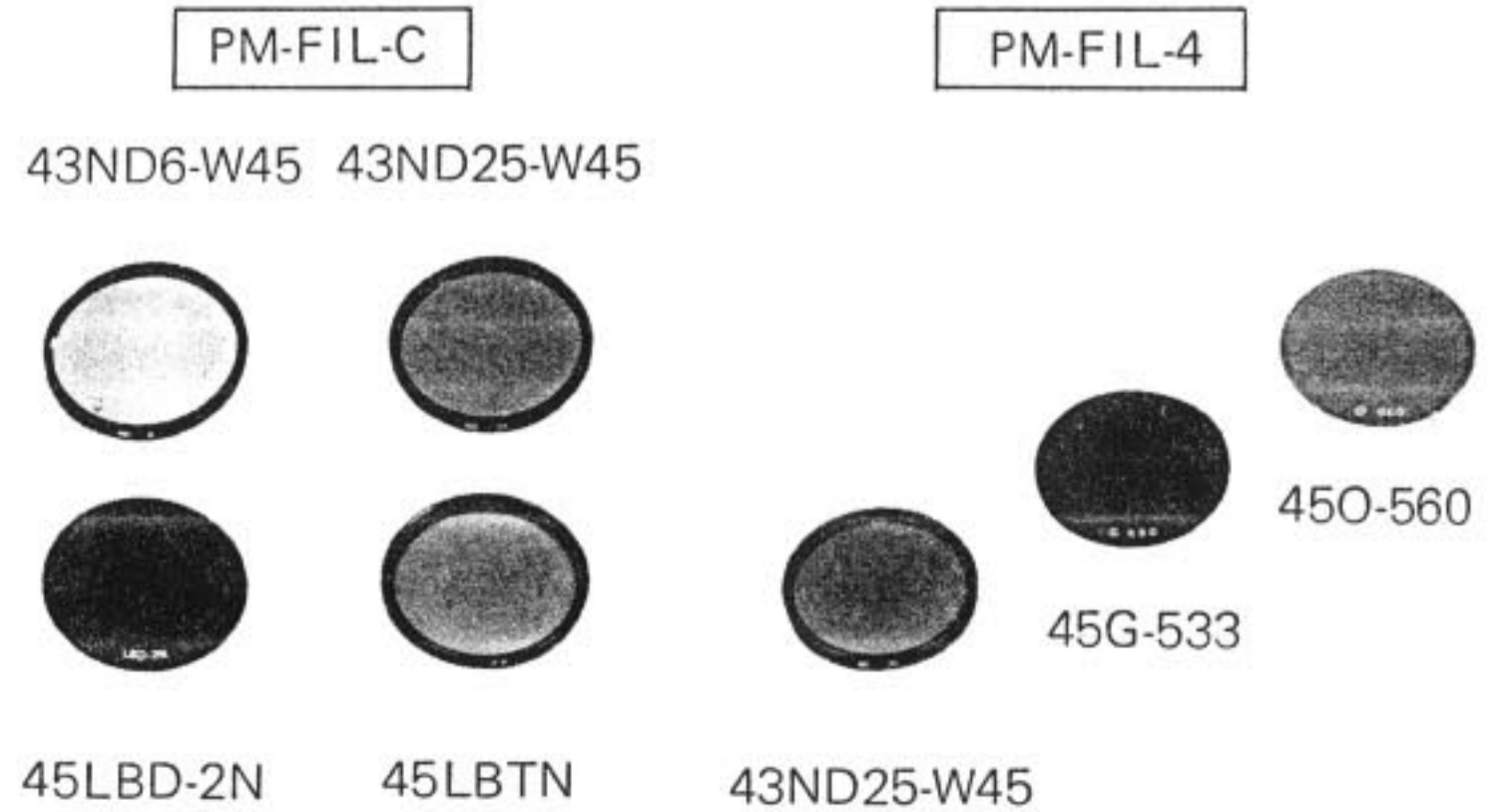
**B. PMT-35RA-F (For reflected light illumination)**



**C. Stage Plate SP-C**



**D. Filter Sets**





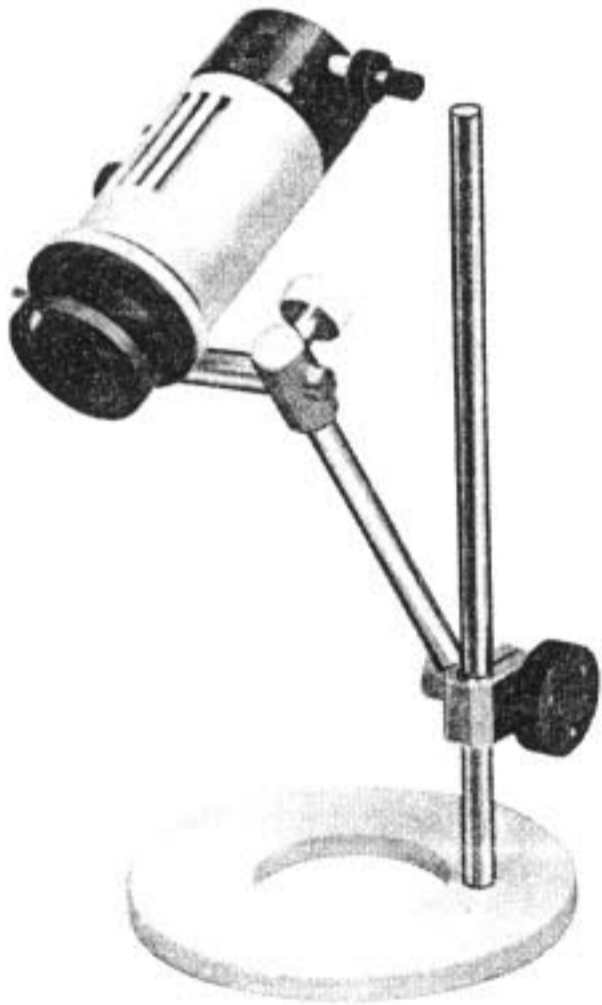
E. OM Camera Mount PM-CAMS

F. Transformer TGHM



G. Incident Light Illuminator PM-LSD-W

H. Power Cord UYCP



I. Macro Lenses (Optionally available)

Zuiko Macro lens 80 mm F4 M80MC-2U

Zuiko Macro lens 38 mm F2.8 M38MC-2



Zuiko Macro lens 20 mm F2 M20MC-2



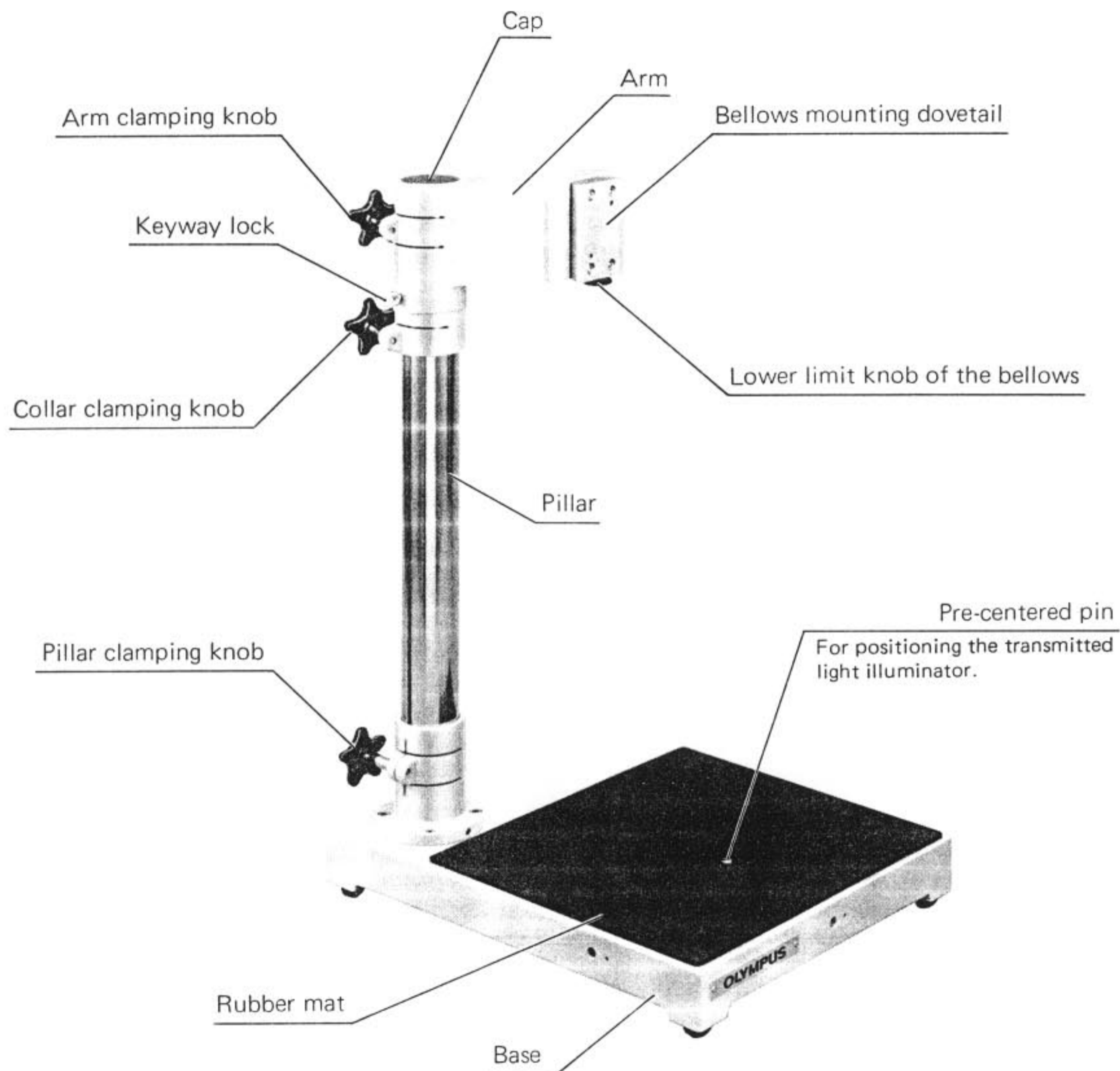
# 2

## SPECIFICATIONS

Item		Description
35 mm camera back, compatible		OM system camera bodies
Auto bellows PM-BD35A	Projection length (distance between flange of photo lens and film plane)	328.5 mm maximum. 94 mm minimum (with mechanical shutter detached).
	Magnification indication	Provided with graduations for magnification and bellows length on slideway.
	Lens mount	Olympus OM mount; bayonet mounting by turning 70°
	Diaphragm control	Lens and shutter diaphragms can be linked by the double cable release.
	Preset lever	For checking the depth of field by stopping down diaphragm aperture to the lens working aperture without shutter release.
	Focus adjustment	By lens movement on rack and pinion.
Mechanical shutter PM-MS35		#0 shutter (effective diameter: 24 mm). Shutter speeds 1 sec. ~ 1/500 sec. plus T and B. M-X synchronization. Preview lever for opening/closing the shutter at any time. Vibration preventive mount.
Base and pillar PM-PS35		Base surface: 320 mm x 395 mm; provided with pillar insertion sleeve, pre-centered pin for positioning the transmitted light illuminator and auto-bellows mounting dovetail. Pillar height: 580 mm
Photo lenses, compatible		Zuiko macro lens 80mm F4, bayonet mount (M80MC-2U) Zuiko macro lens 38 mm F2.8, bayonet mount (M38MC-2) Zuiko macro lens 20 mm F2, bayonet mount (M20MC-2)
Transmitted light illuminator PM-DL95	Effectively illuminated area maximum	95 mm dia.
	Iris diaphragm	10 mm ~ 95 mm dia.
	Vertical movement of stage	Total range: 170 mm (Including 100 mm on rack and pinion and 70 mm by manual dovetail movement)
	Stage	160 mm x 175 mm Opening for stage insertion plate: 100 mm dia.
	Stage plates	Glass plate (clear) SP-C Metal plate with 45 mm-dia. opening. Metal plate with 28 mm-dia. opening, compatible with the mechanical stage on it.
	Condensers	Built-in condenser for 80 mm macro lens; plus built-on auxiliary condenser (PM-MC38) for 38 mm and 20 mm macro lenses.
	Filter mount	Accepts 45 mm-dia. filters up to 4 in all.
	Light source	Pre-centered 6V30W tungsten bulb. (6V5ATP-1)
	Transformer	For 6V30W; voltage variable. (TGHM)
Light excluding collar PM-SDM-2		For connecting the auto bellows to the photo tube of a microscope; OM mount bayonet mounting; in conjunction with PM-ADF photo eyepiece adapter.
Incident light illuminator PM-LSD-W	Stand	Height 460 mm maximum, provided with universal joint.
	Lamp housing	Coaxial centering knob provided.
	Light source	6V30W tungsten bulb TB-1
	Collector lens	Focusing knob provided.
	Filter mount	Accepts 45 mm-dia. filters up to 2; provided with screw mount for camera filters (49 mm dia., pitch 0.75 mm)
	Transformer	6V30W; voltage variable.

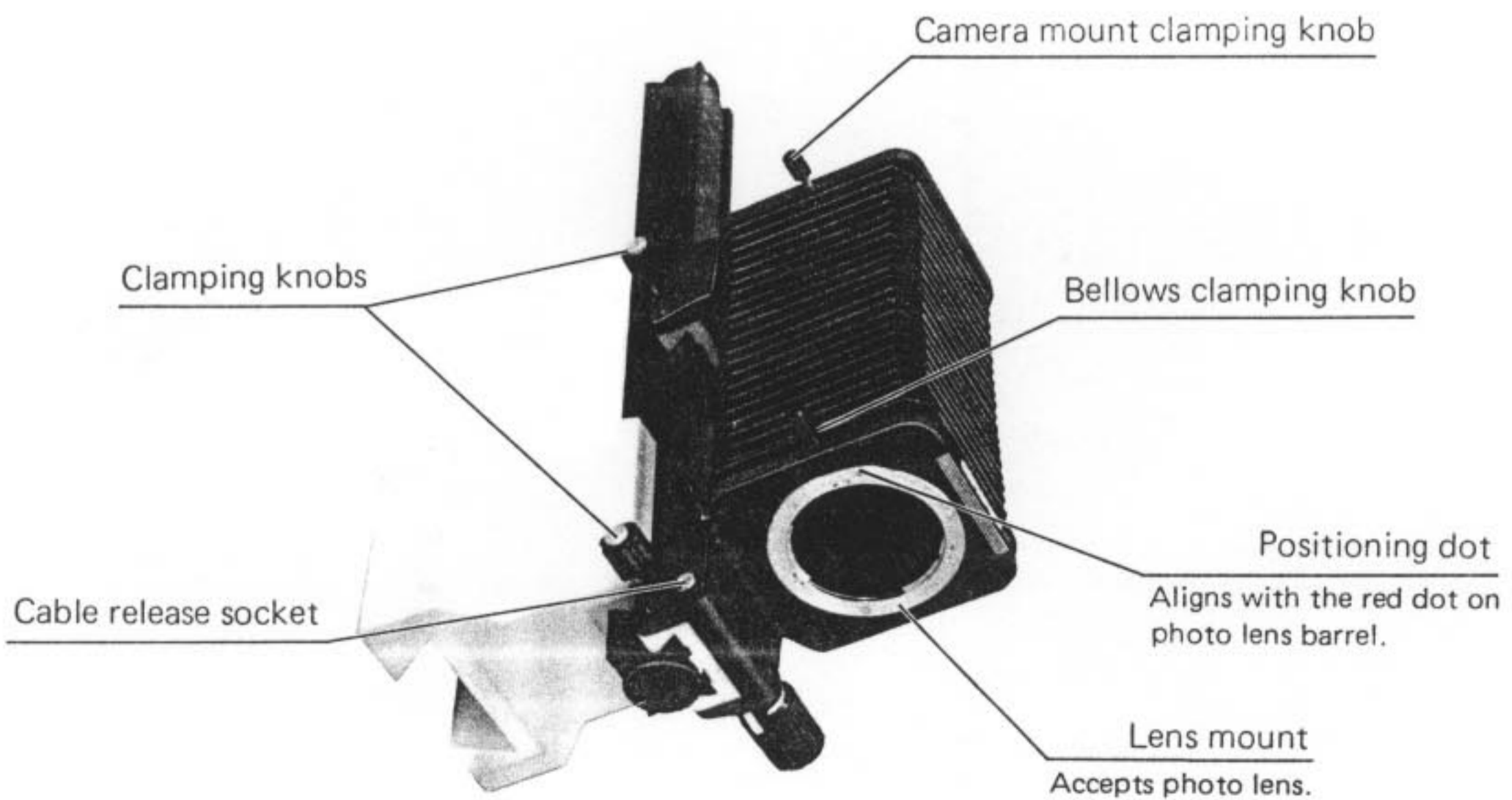
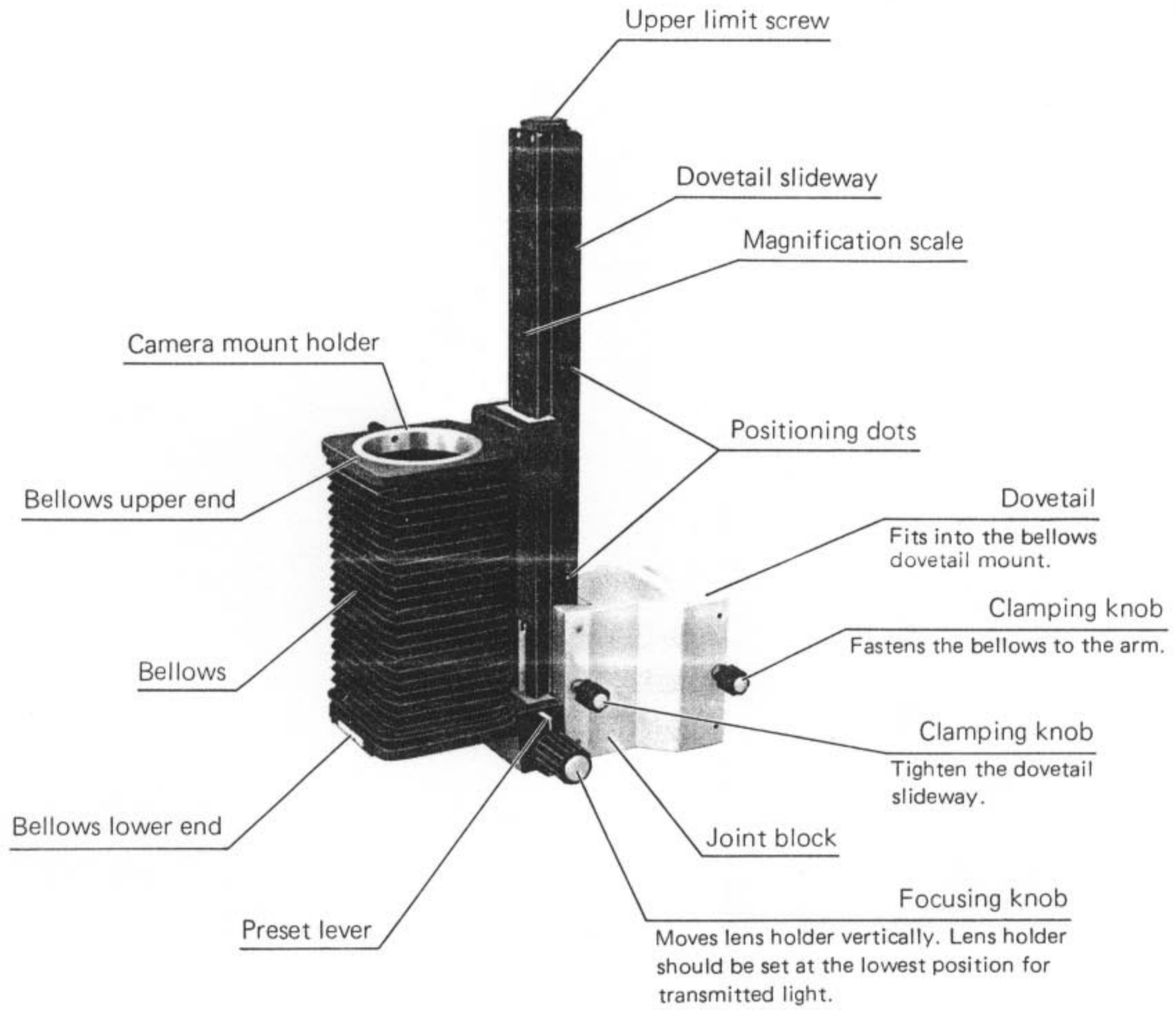
# 3 NOMENCLATURE

## A. Base and Pillar PM-PS35





B. Auto Bellows PM-BD35A

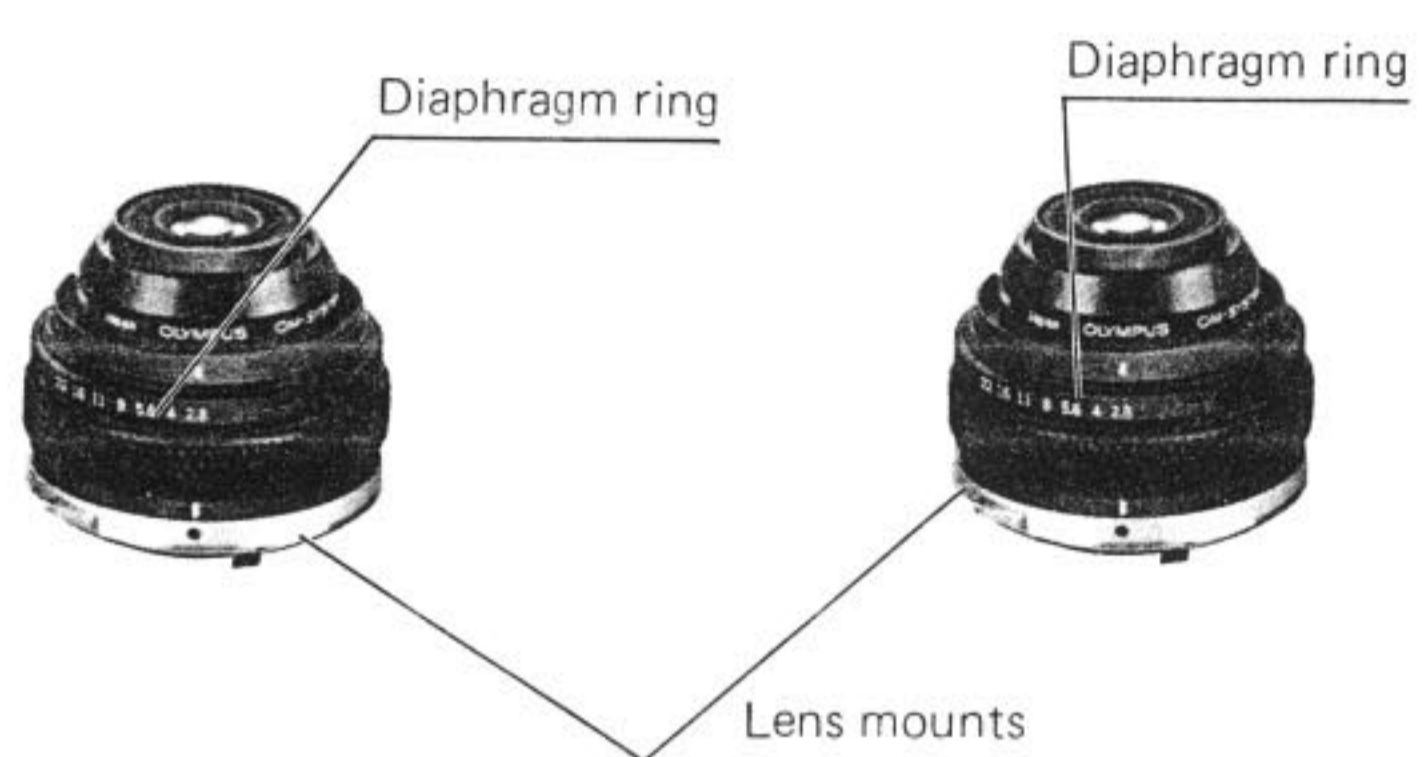
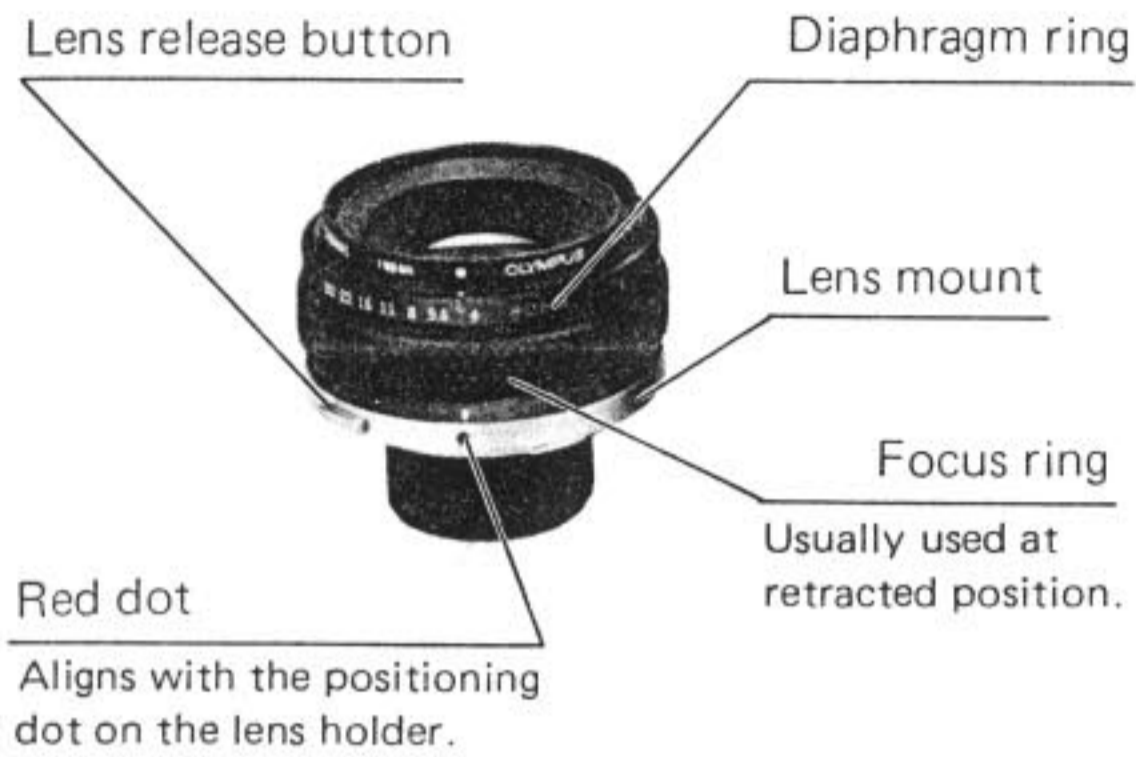


**C. Photo Lenses**

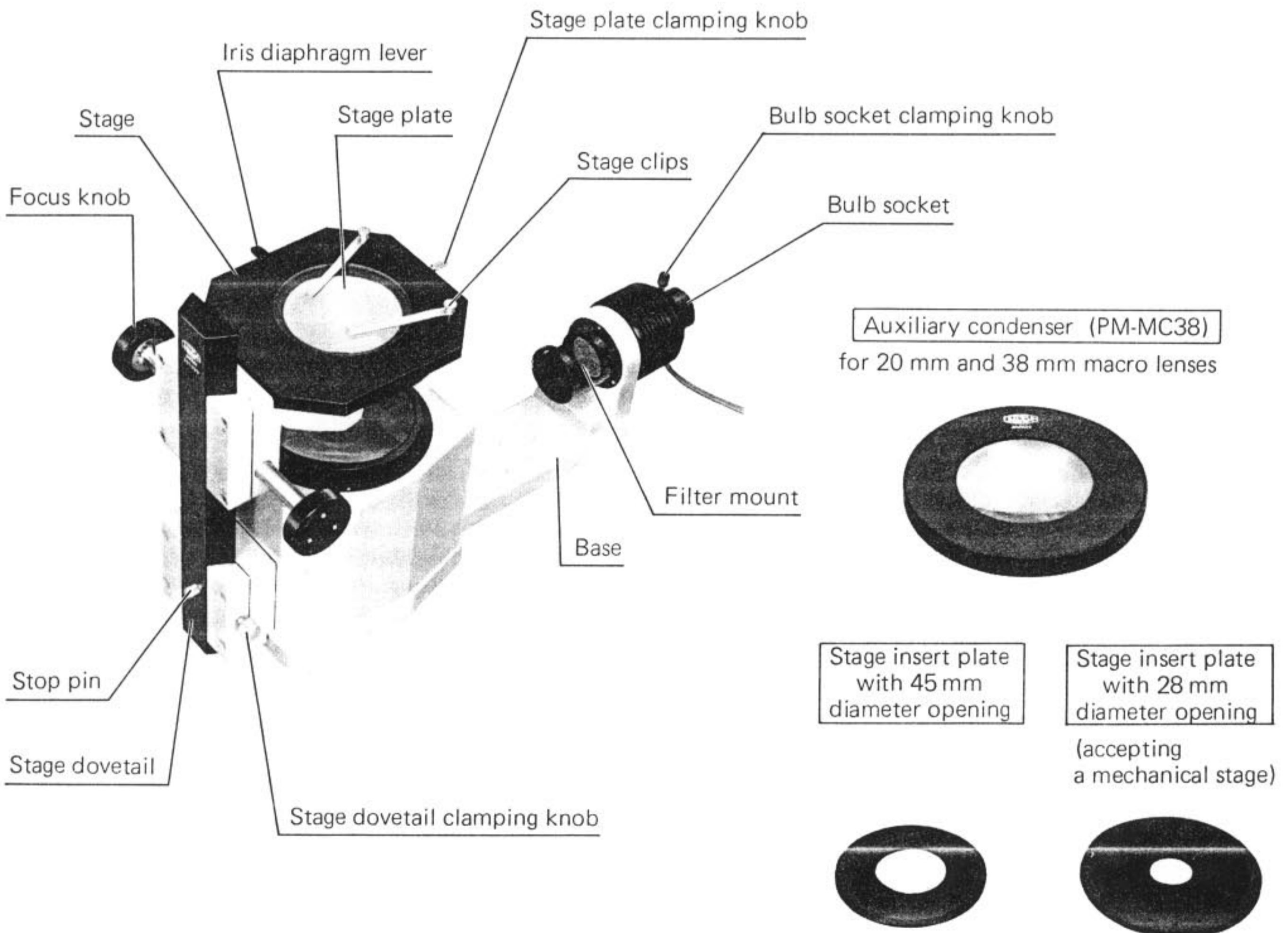
Zuiko macro lens 80 mm F4  
(M80MC-2U)

Zuiko macro lens 38 mm F2.8  
(M38MC-2)

Zuiko macro lens 20 mm F2  
(M20MC-2)

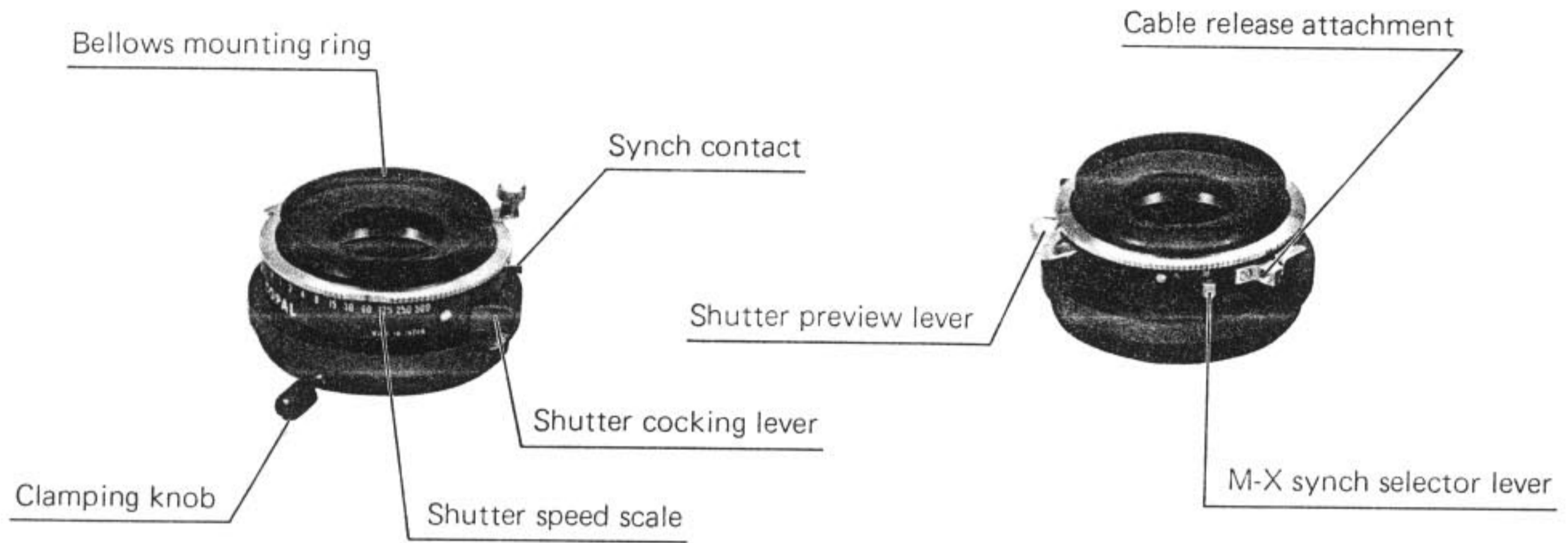


**D. Transmitted Light Illuminator PM-DL95**

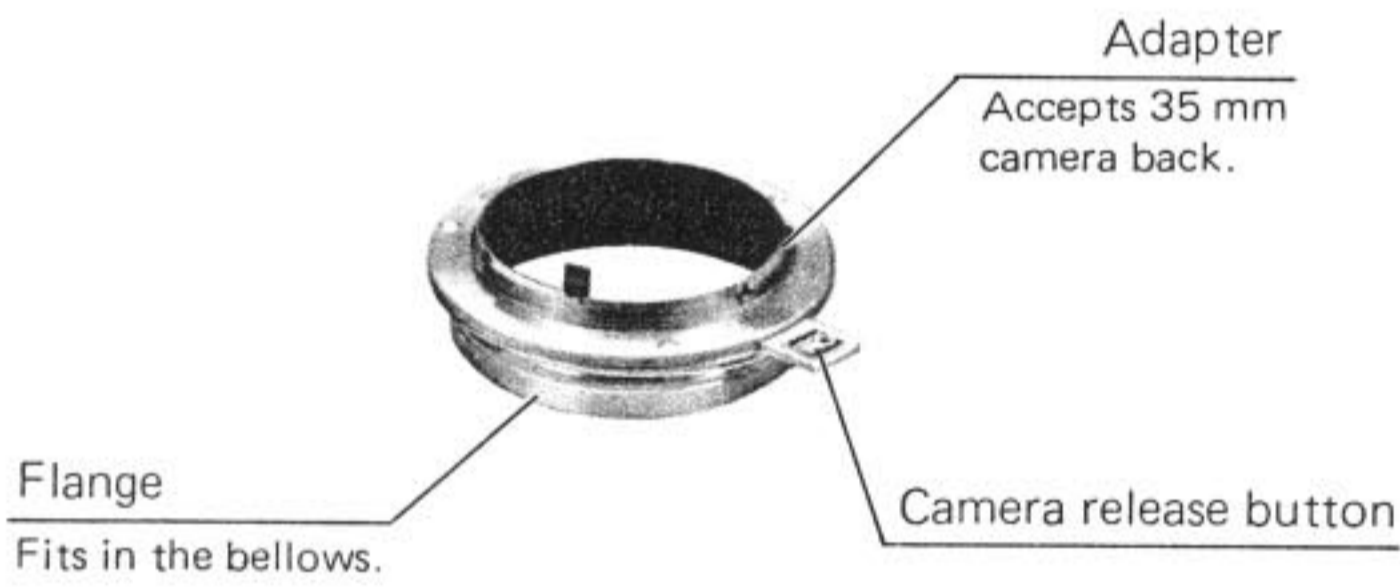




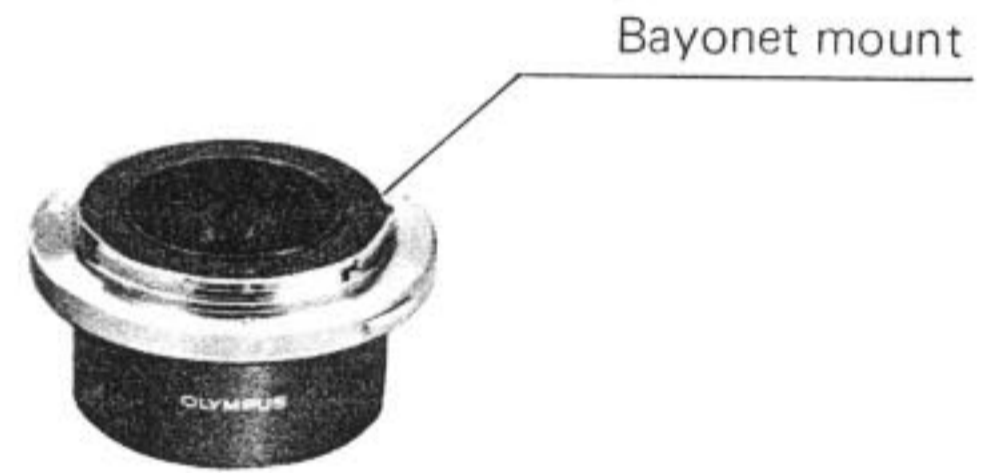
E. Mechanical Shutter PM-MS35



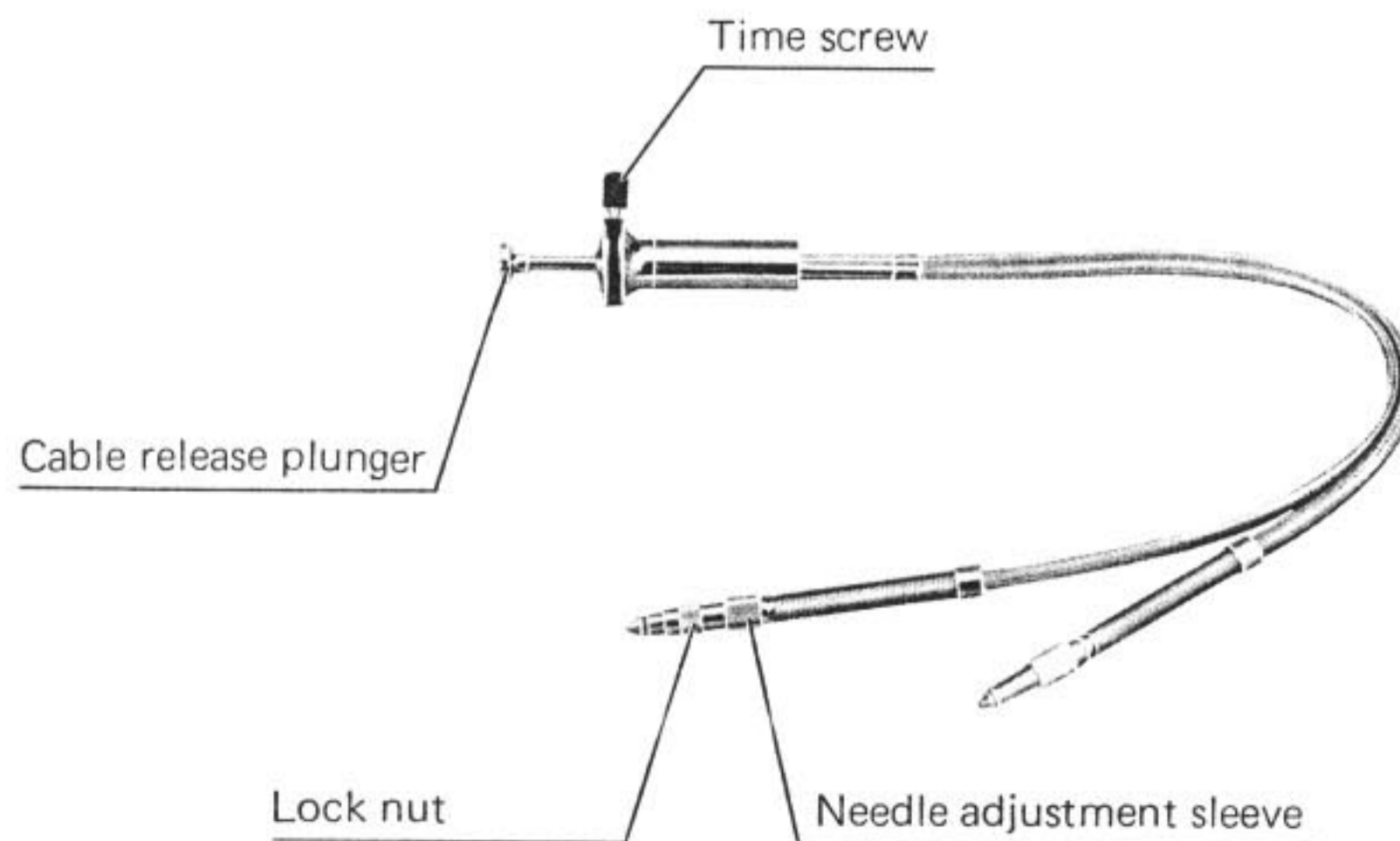
F. OM Camera Mount PM-CAMS



G. Light Excluding Collar PM-SDM-2



H. Double Cable Release





# 4 ASSEMBLY

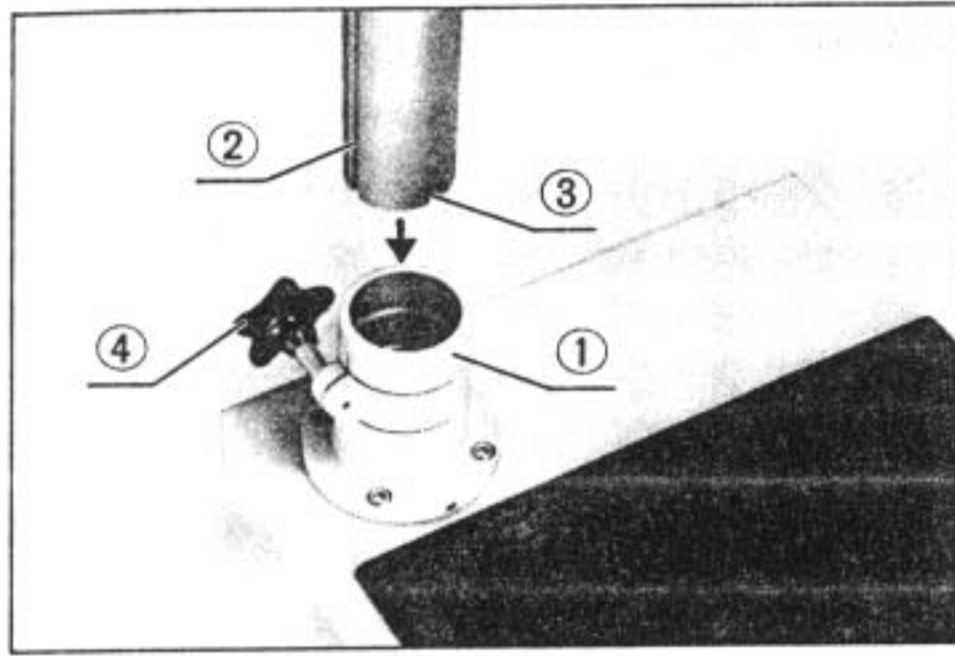


Fig. 1

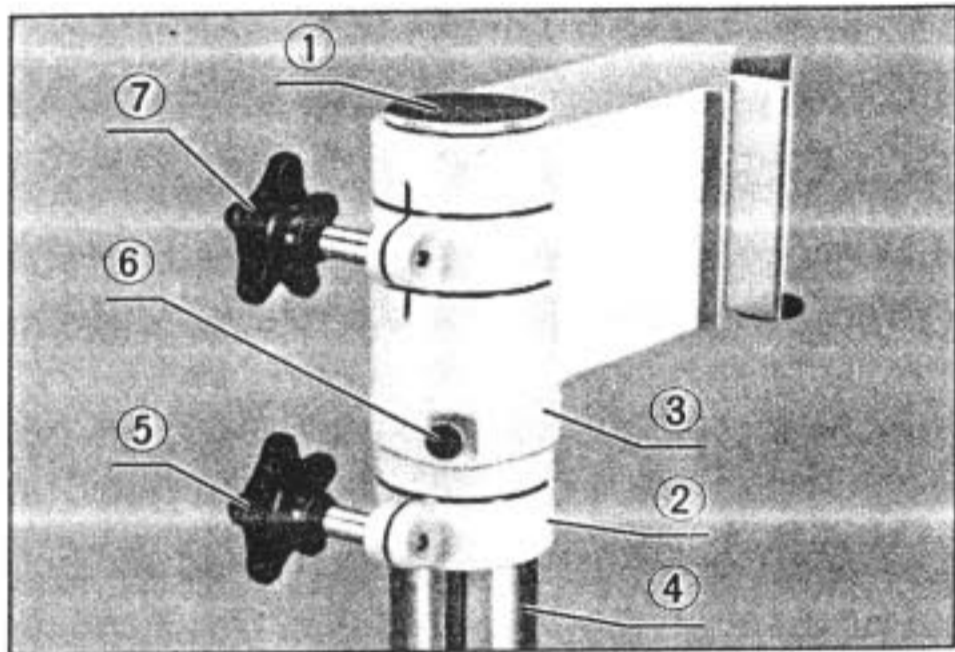


Fig. 2

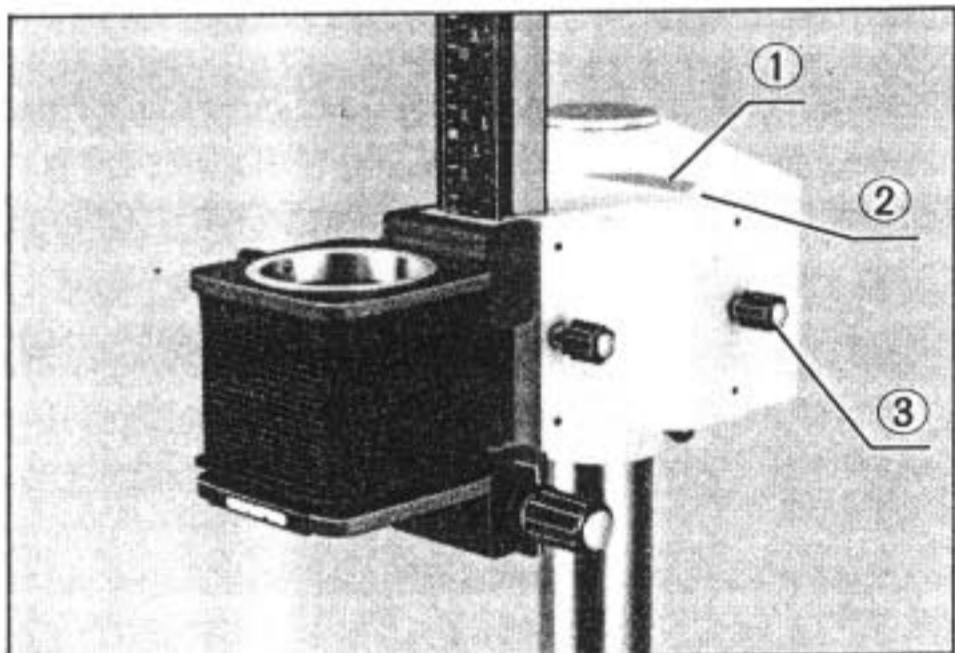


Fig. 3

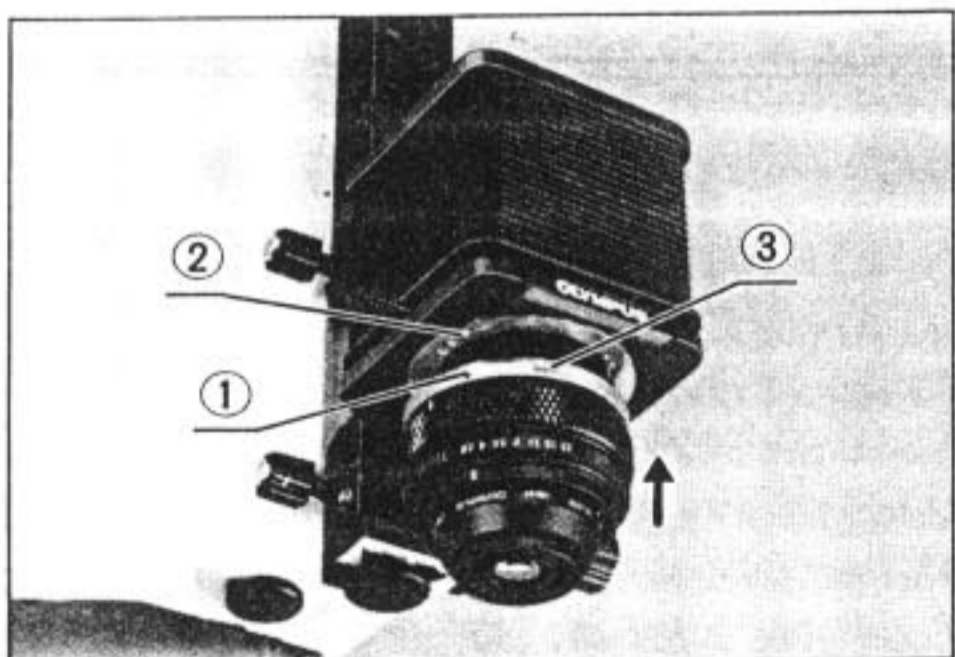


Fig. 4

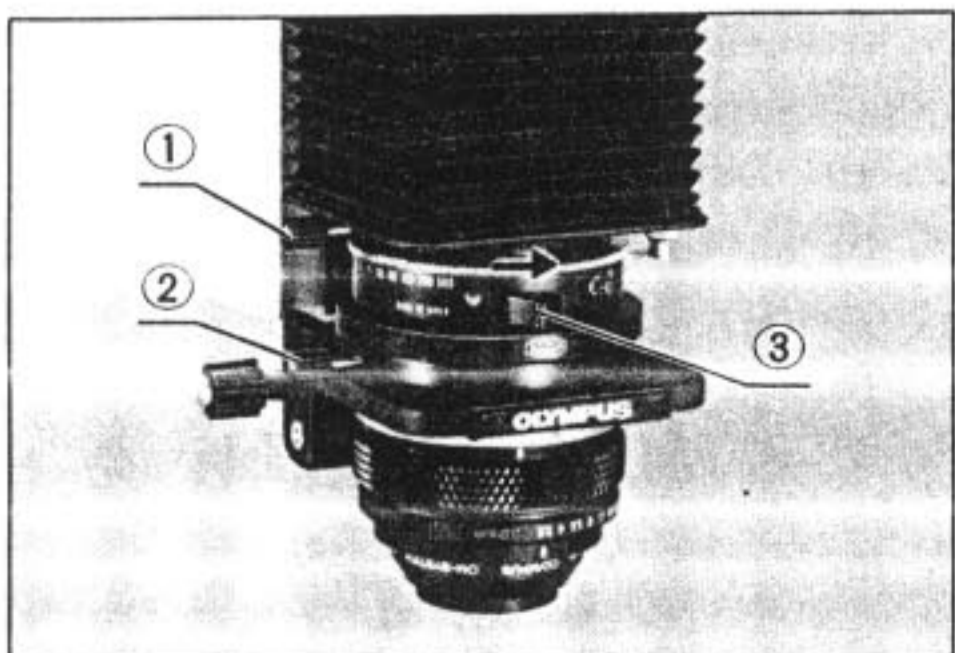


Fig. 5

## 1 Set up the pillar.

Insert the pillar ② into the pillar sleeve ① on the base, aligning the notch ③ at the lower end of the pillar to the guide pin at the bottom of the sleeve so that the keyway comes to the operator's left hand side. Tighten the pillar clamping knob ④. (Fig. 1)

## 2 Attach the collar to the pillar.

Unscrew the cap ① from the top of the pillar and slide the collar ② onto the pillar. Clamp the collar on the pillar at a proper height so that the arm can be attached on the pillar in the following step. (Fig. 2)

## 3 Attach the arm to the pillar.

Attach the arm ③ on the pillar ④, sliding it down until it comes next to the collar ②. Rescrew the cap ① at the pillar top. Loosening the collar clamping knob ⑤ (take care never to drop the collar), lift the collar and arm together until the upper surface of the arm comes next to the cap. Clamp the collar again. Screw the keyway lock ⑥ into the groove and tighten the arm clamping knob ⑦. (Fig. 2)

## 4 Mount the auto bellows.

Insert the dovetail ① of the bellows into the arm ② slowly, until the dovetail comes next to the lower limit knob, and tighten the dovetail clamping knob ③. (Fig. 3)

## 5 Mount a photo lens or the light excluding collar.

To attach a choice of photo lens or the light excluding collar on the lens mount of the bellows, align both red dots ① & ② on lens barrel (or collar) and lens mount respectively, insert the lens (collar) into the lens mount and turn the lens clockwise until it clicks in position. (Fig. 4)

To unlock, depress the lens release button ③ and rotate the lens counterclockwise.

★ The light excluding collar can be mounted on the bellows in the same manner as mentioned above.

## 6 Attach the OM camera mount to the OM camera back.

Then insert the mount into the camera mount holder in the upper end of the bellows, and clamp.

## 7 Attach the mechanical shutter (not necessary for macro lens M80MC-2U).

Be certain to use the mechanical shutter instead of the camera shutter to avoid shutter vibrations, especially in the case of high magnification photography.

Loosen the bellows clamping knob ① and remove the bellows; then insert the shutter between the bellows lower end and the photo lens holder. Tighten the clamping screw ② which should be positioned at your left hand side. Leave the shutter open by turning the shutter lever ③ to the right (in the direction of the arrow). (Fig. 5)



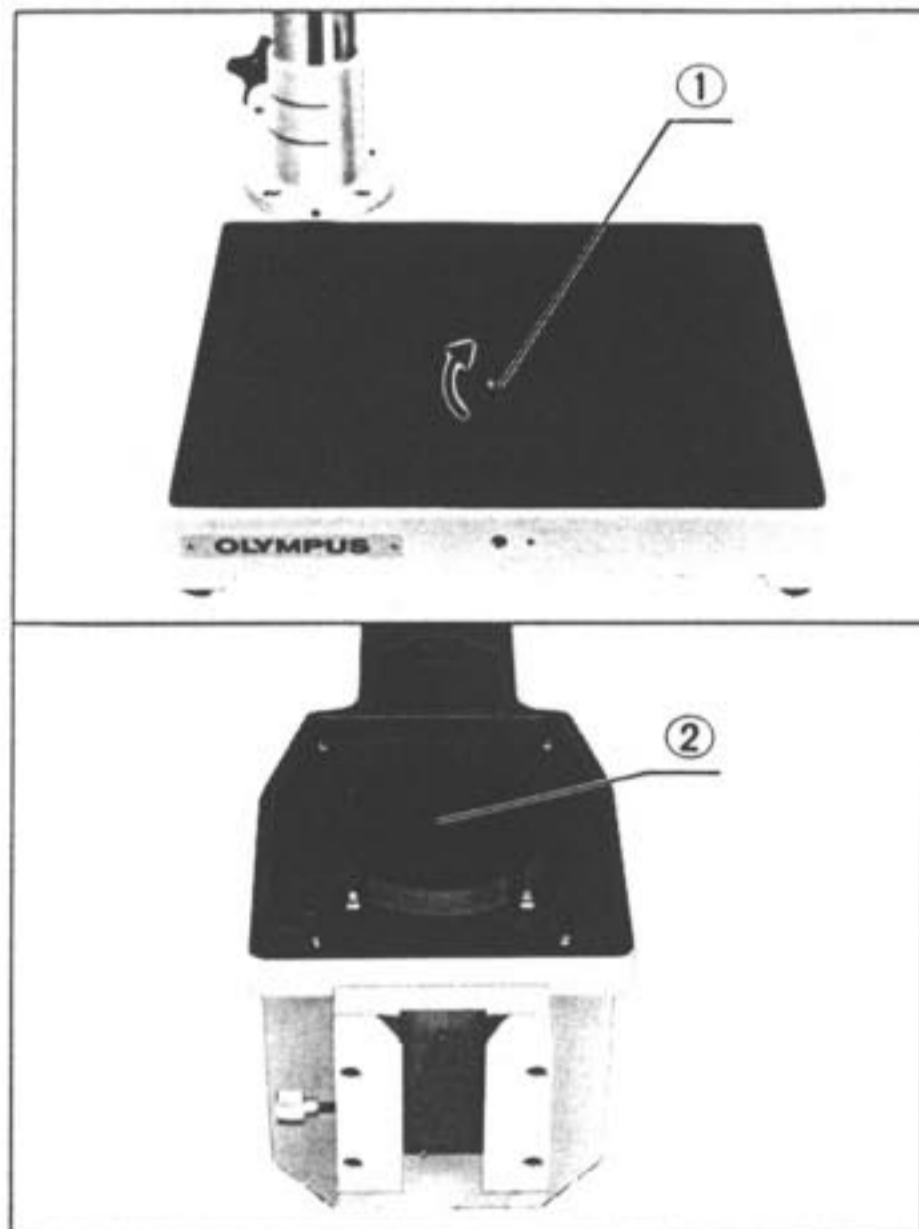


Fig. 6

**8 Place the transmitted light illuminator on the base.**

Loosen the pre-centered pin ① on the base with a coin until it stops. Insert the pin head into the positioning hole ② at the bottom of the illuminator base. This will align the center of the light path between the illuminator and photographic equipment. (Fig. 6)

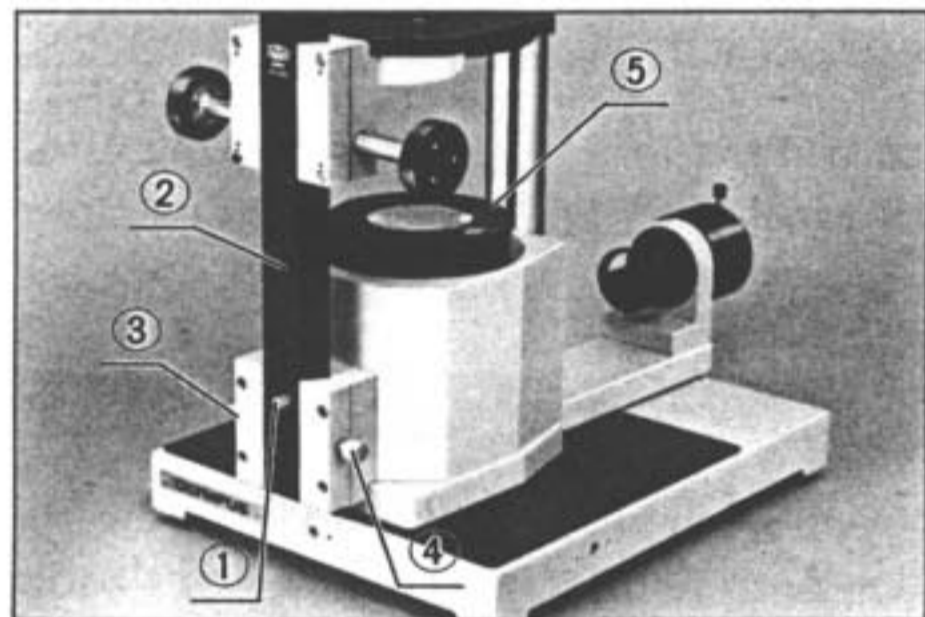


Fig. 7

**9 Attach the stage.**

- 1) Insert the stage dovetail ② into the illuminator base ③ and screw the stop pin ① and tighten the stage dovetail clamping knob ④. (Fig. 7)
- 2) When using the 38 mm or 20 mm macro lens, add the auxiliary condenser ⑤ on the condenser lens built in the illuminator (not necessary for the 80 mm macro lens). (Fig. 7)
- 3) Insert the bulb socket ② into the rear sleeve ① of the lamp housing all the way and clamp the knob ③. (Fig. 8)

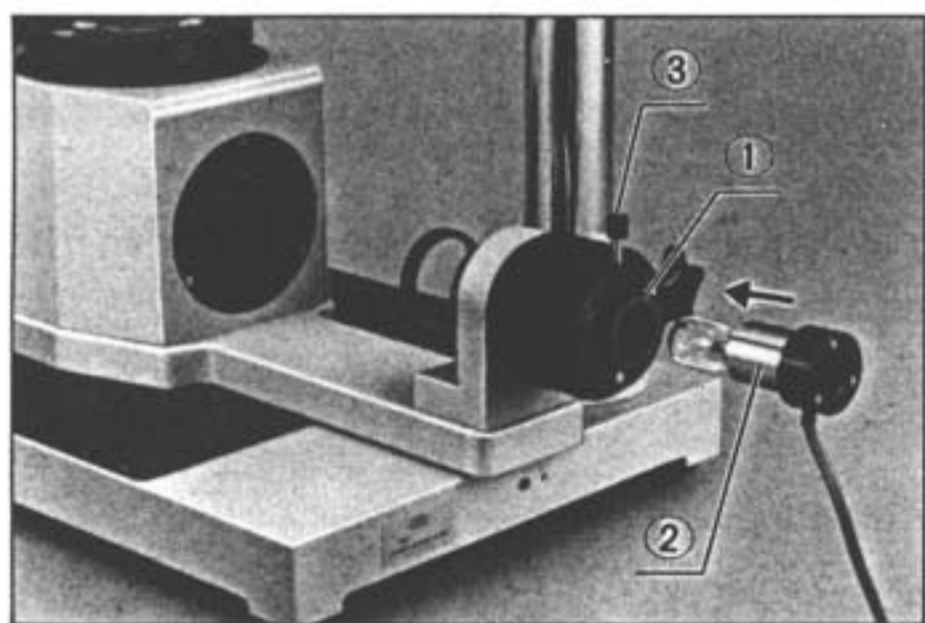


Fig. 8

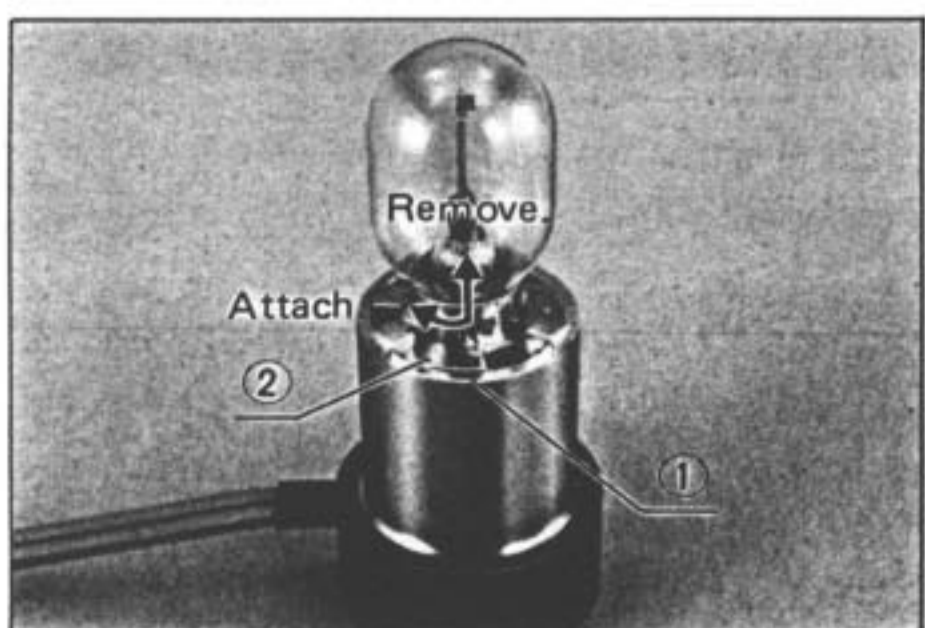


Fig. 9

**■ Bulb replacement:**

(Make sure that the old bulb has cooled before replacement.)

- 1) Loosen the socket clamping knob ③ and slide out the socket. (Fig. 8)
- 2) Remove the defective bulb by slightly depressing it against the seat and rotating counterclockwise. (Fig. 9)
- 3) Insert the replacement bulb in reversed order and rotate the bulb clockwise all the way, until the red dots ① & ② are aligned with each other. (Fig. 9)
- 4) Before use, wipe any fingerprints or smudges off the bulb surface.



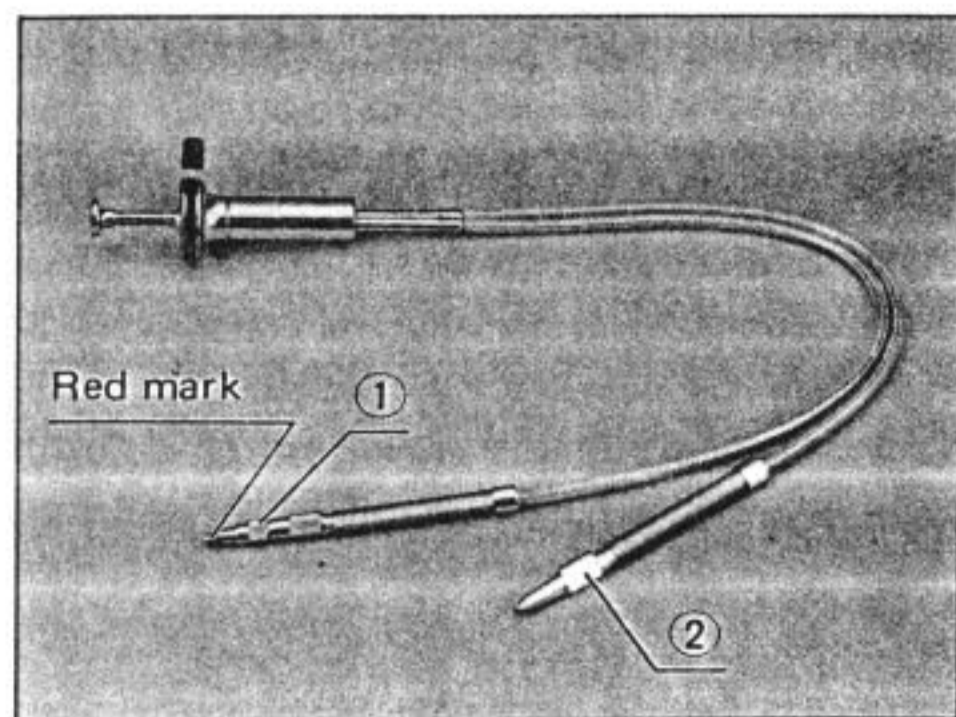


Fig. 10

## 10 Adjustment of the double cable release

### A. Synchronization of the auto iris diaphragm and camera shutter

The auto iris diaphragm built in each macro lens can be automatically synchronized with the camera shutter by means of the double cable release. The two needles at the double cable release must be adjusted before loading the film so that the longer needle ①, marked red, that screws into the socket on the bellows comes earlier than the other needle ② that screws into the shutter release button of the camera back; otherwise, both needles simultaneously actuate so that the shutter is open before the diaphragm blades stop down all the way to the preset aperture. (Fig. 10)

★ Make this adjustment before film loading.

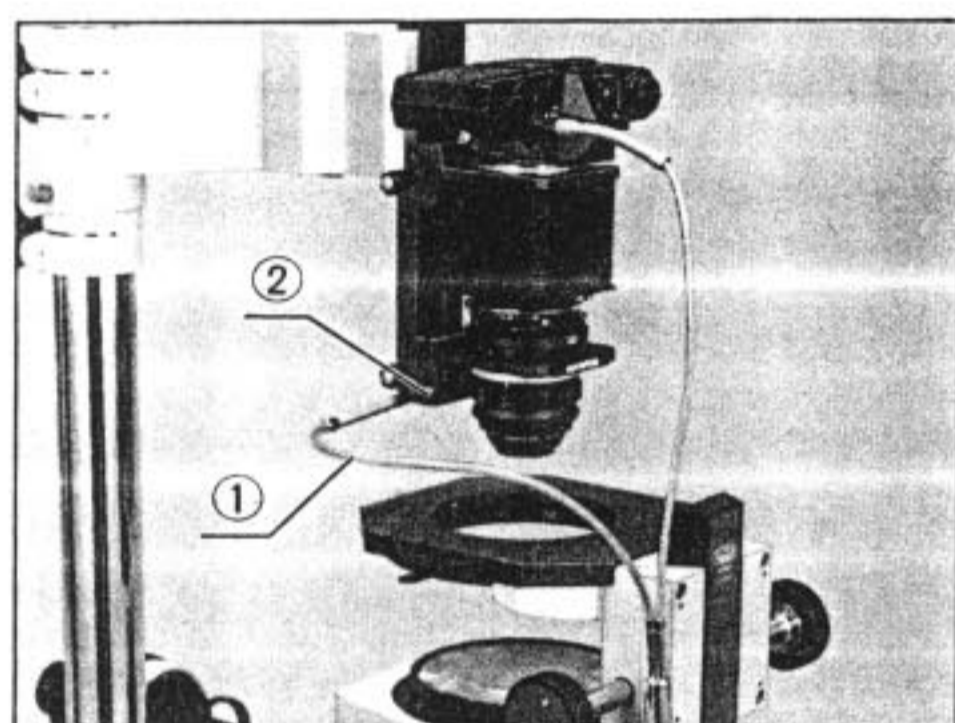


Fig. 11

- 1) Screw the shorter cable release needle into the camera's release button, and the longer needle ① into the socket ② of the bellows. (Fig. 11)
- 2) Loosen the bellows clamping knob and remove the bellows lower end from the lens mount so that you can observe the lens diaphragm from above. At the same time, open the back cover of the camera so that you can observe the shutter inside the camera.
- 3) Loosen the lock nut ① and you can rotate the needle adjustment sleeve ② either direction. Charge the camera shutter, and press the cable release plunger while observing the diaphragm blades inside the bellows. You will probably see the diaphragm blades move through the full path before the shutter is released; then, tighten the lock nut ① and clamp the adjustment sleeve ② again. (Fig. 12)

★ For long time exposures, set the shutter speed at the position "B" and after depressing the plunger, lock the plunger in the depressed position by tightening the time screw. Slacking off the screw allows the shutter to close after the elapse of exposure time desired.

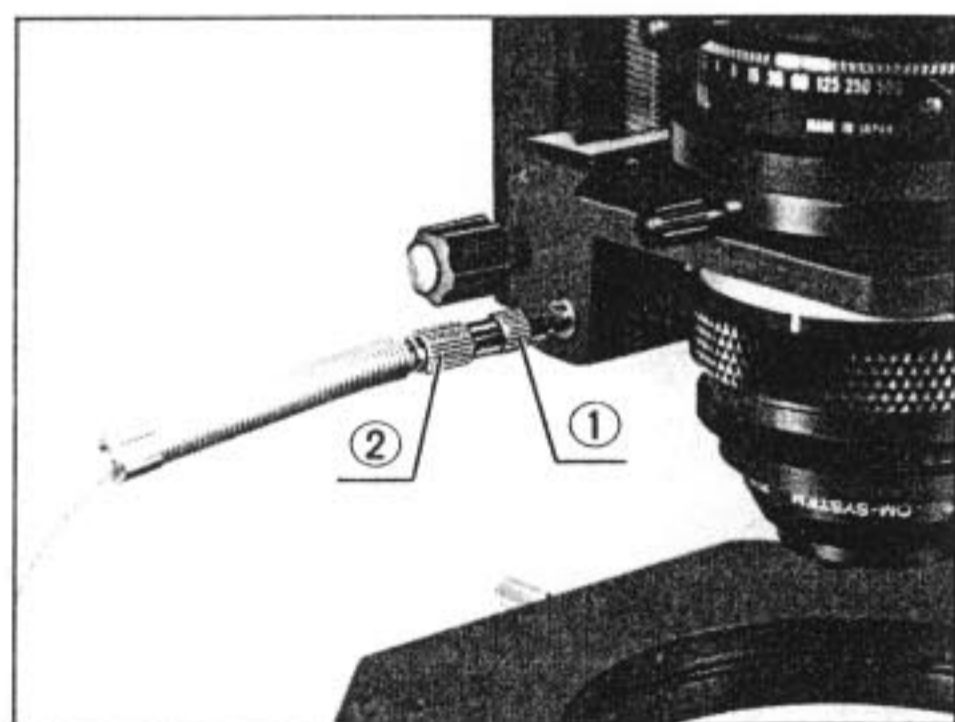


Fig. 12

### B. Synchronization of the mechanical shutter and camera shutter

The double cable release must be adjusted so that the mechanical shutter will be open after the camera shutter opened:

- 1) Make this adjustment before film loading.
- 2) Screw the shorter cable needle into the mechanical shutter ①, and the longer cable needle ② into the socket of the bellows. (Fig. 13)
- 3) Loosen the lock nut so that you can rotate the knurled adjustment sleeve.
- 4) Charge both shutters.
- 5) Rotate the knurled adjustment sleeve either direction until the camera shutter can be opened before the mechanical shutter is released. The shutter should be released without too much pressure on the plunger.

★ Start this adjustment with the minimum length of the cable needle.

- 6) For actually taking a picture, the camera shutter will be set at position B.

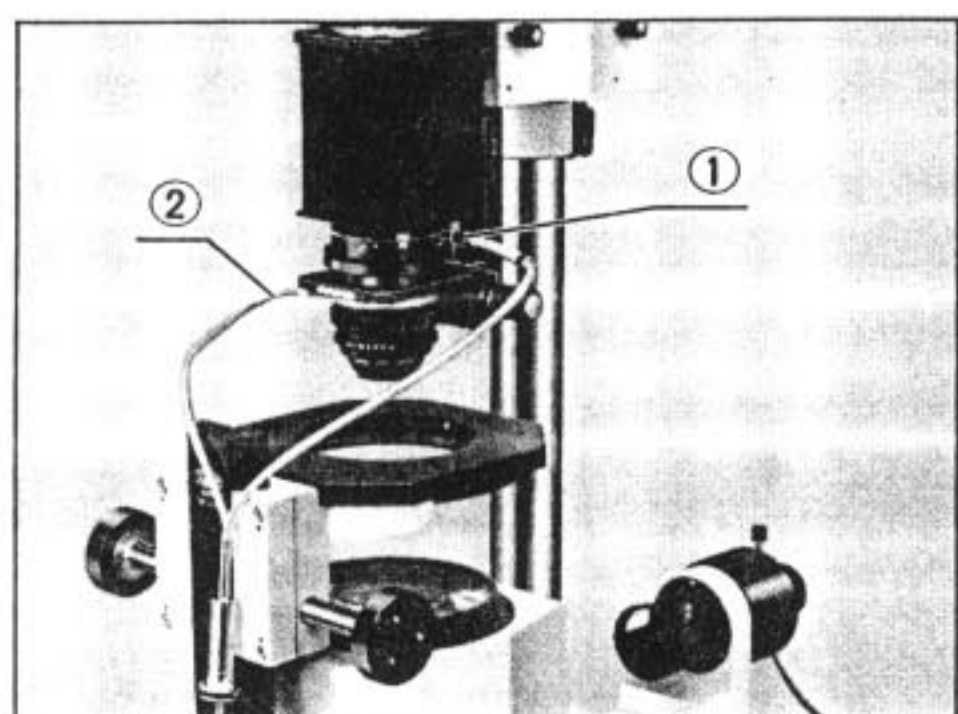
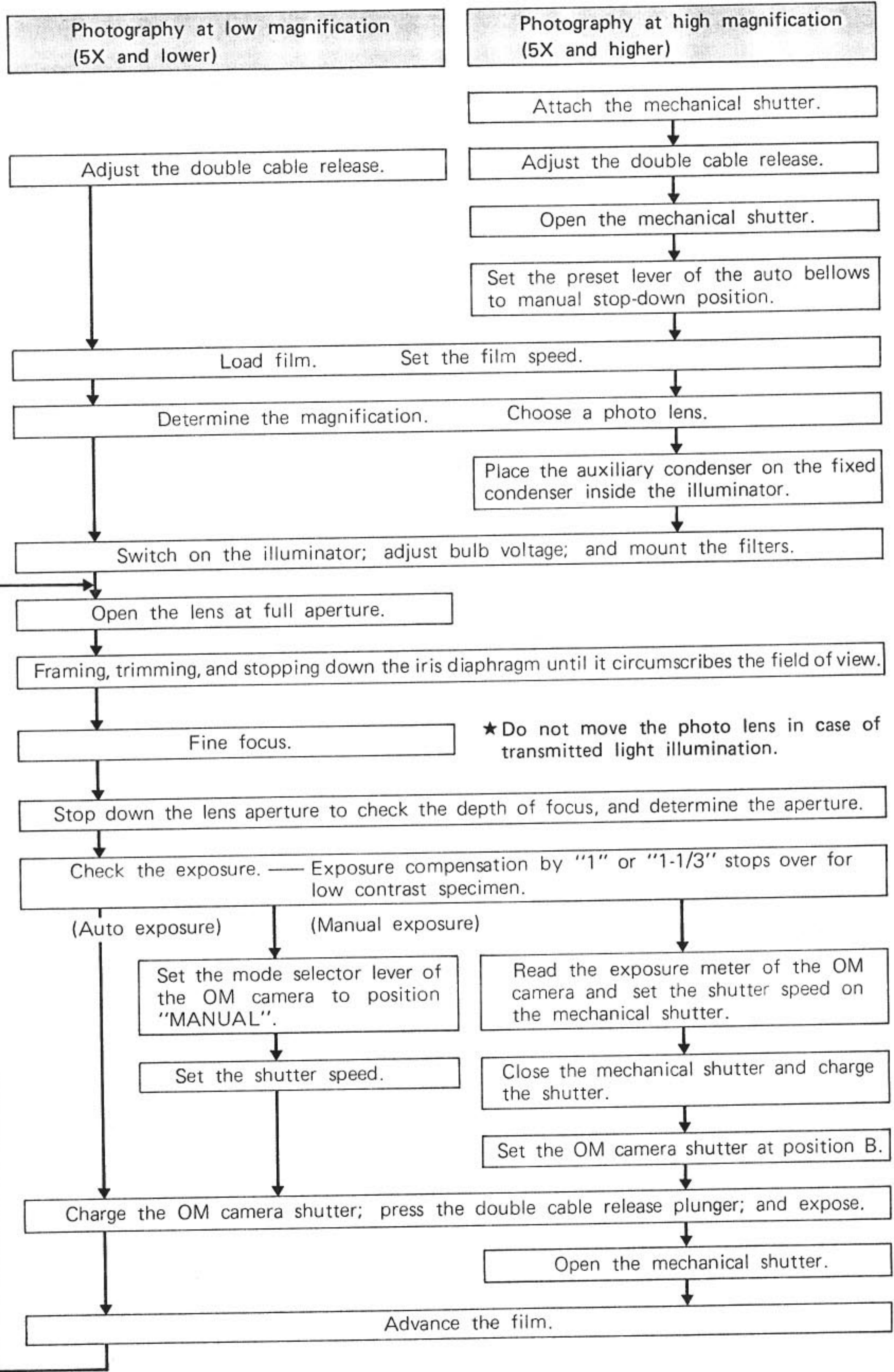


Fig. 13



# 5

## SUMMARY OF PUTTING THE PMT-35A IN OPERATION





# 6 PHOTOGRAPHIC PROCEDURES

## 6-1 Photomacrography with Transmitted Light

The PMT-35TA employs a lantern-type illumination system for its light source, which enables the light beam emitted from the tungsten bulb to pass through the collector lens so as to dispersedly illuminate the wide area on the specimen by means of a condenser lens; then the light collects at the objective pupil (or at the diaphragm position). By matching the condenser lens with the photo lens, even illumination can be obtained throughout the entire range of magnifications.

Since the photo lens must be positioned at the collecting point of the light beam after passing through the condenser, the stage is designed to move vertically until correct focus is obtained.

The essential point of this illuminator, therefore, is to converge the illuminating light at the photo lens by vertical movements of the stage. This optical system needs no centering adjustment since the illuminator and auto bellows are correctly aligned by fitting the illuminator onto the pre-centered pin on the base, and in addition, due to the pre-centered bulb, the PMT-35TA does not require any further centering adjustment.

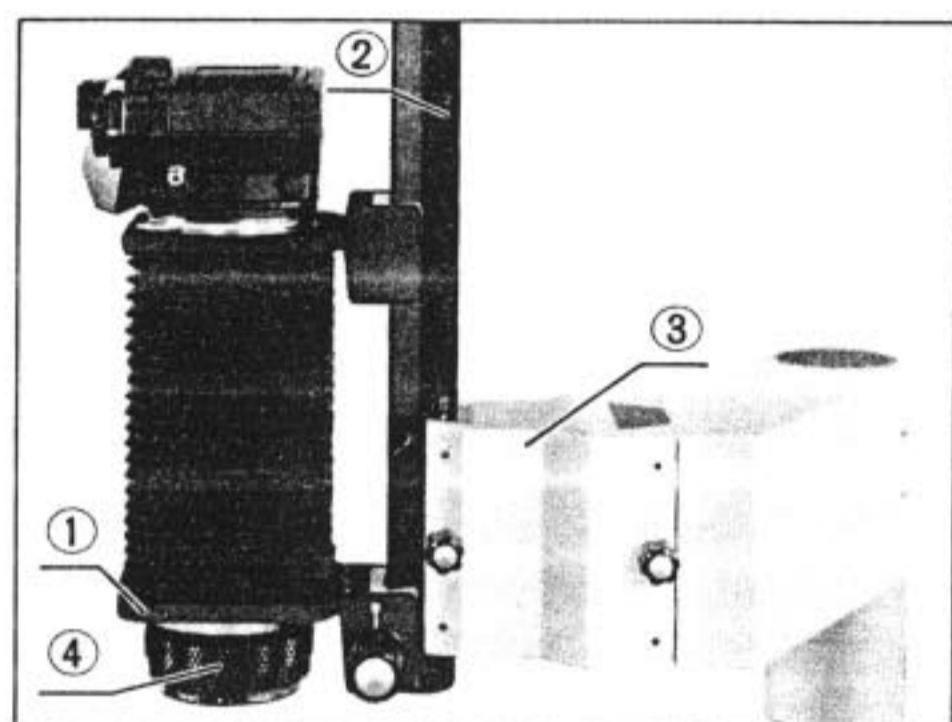


Fig. 14

### 1 Positioning of the photo lens

Securely clamp the photo lens holder (1) to the lower end of the dovetail slideway (2) by means of the clamping knob. (Fig. 14)

The position of the bellows joint block (3) on the slideway varies according to the macro lens in use. Proper position is indicated by different color dots on the slideway to converge the light beam at the pupil of the respective macro lenses:

Color of dots on slideway	Macro lens
Yellow	Zuiko Macro 80 mm
Green	Zuiko Macro 38 mm
Light blue	Zuiko Macro 20 mm

\*Adjustment of the lens position is not necessary for reflected light illumination.

★ Use the focus ring (4) of each macro lens at most retracted position.



Fig. 15

### 2 Use of the iris diaphragm ring

Each macro lens, optionally available, provides fully automatic diaphragm control, which allows the operator to focus and compose a picture with the lens fully opened. This diaphragm will automatically close to the preselected aperture at the moment of exposure. To check the depth of focus before shutter release, press the preview lever (1) and look through the viewfinder of the camera. (Fig. 15)

If a specimen has a flat surface (e.g. stained specimen), the stopped-down aperture by about 1/2 ~ 1 stop is preferable to the fully-opened aperture.

### 3 Mounting the auxiliary condenser

(For use of the 20 mm and 38 mm macro lenses)

Place the auxiliary condenser (2) on the fixed condenser built in the transmitted light illuminator. (Fig. 15)





Fig. 16

#### 4 Use of the stage plates

Three stage plates are available, including one glass plate (clear) and two metal plates (one with a 45 mm-dia. opening and the other with a 28 mm-dia. opening). Use of them depends on the size of the specimen, purpose of photography, etc. (The 28 mm-dia. opening plate ① permits use of the mechanical stage FM-3, optionally available, at the tapped hole ②.) (Fig. 16)

★ When the glass plate is used, wipe it clean; otherwise, smudges on the surfaces will be photographed. The plate can be fixed to the stage by the stage plate clamping knob ③.

#### 5 Magnification and focusing adjustments

These adjustments can be made by vertical movements of the stage and camera back without moving the photo lens. If the photo lens is moved after these adjustments are complete, it may cause uneven illumination. The magnification scale on the slideway is identified by colors according to the macro lens in use:

Scale color	Macro lens
Yellow	Zuiko Macro 80 mm
Green	Zuiko Macro 38 mm
Blue	Zuiko Macro 20 mm
White	Projection length (between the flange of photo lens and the film plate in mm)

Looking through the camera viewfinder, bring the specimen into focus. If the Varimagni Finder, optionally available, is used, more accurate focusing can be easily obtained.

1) Coarse focus adjustment by the vertical movements of the stage and the arm ① upon which the camera back is mounted. (Fig. 17)

★ When the arm is vertically moved, be certain to clamp the drop prevention collar ② at the lowest possible position of the arm.

2) Clamp the arm and collar finally and touch up the stage only for fine focus adjustments, then clamp the stage, too.

★ Tension adjustment of the focus knobs of the stage

To adjust the tension, grasp the left-hand focus knob in one hand, and rotate the right-hand focus knob clockwise by the other hand, to tighten the focus knobs, or counterclockwise to loosen the knobs. Do not loosen the knobs too much; otherwise the knobs will slip. (Fig. 18)

★ As the 80 mm macro lens has a longer working distance, it is necessary to raise the stage dovetail ① to a higher position as shown in Fig. 18 for magnifications over 0.9X. (Fig. 18)

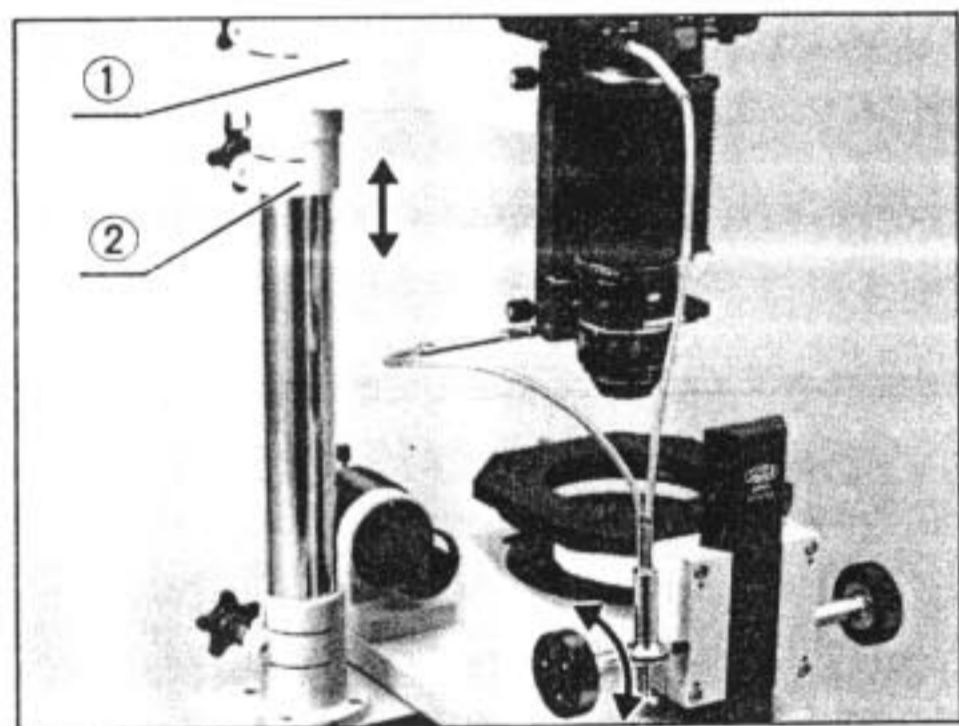


Fig. 17

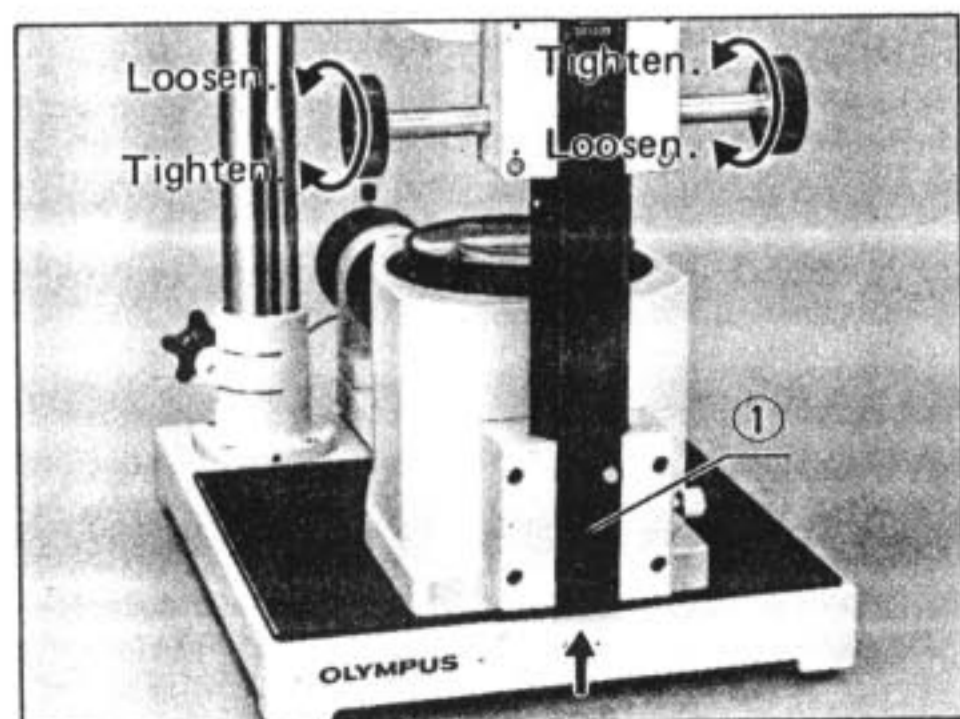


Fig. 18

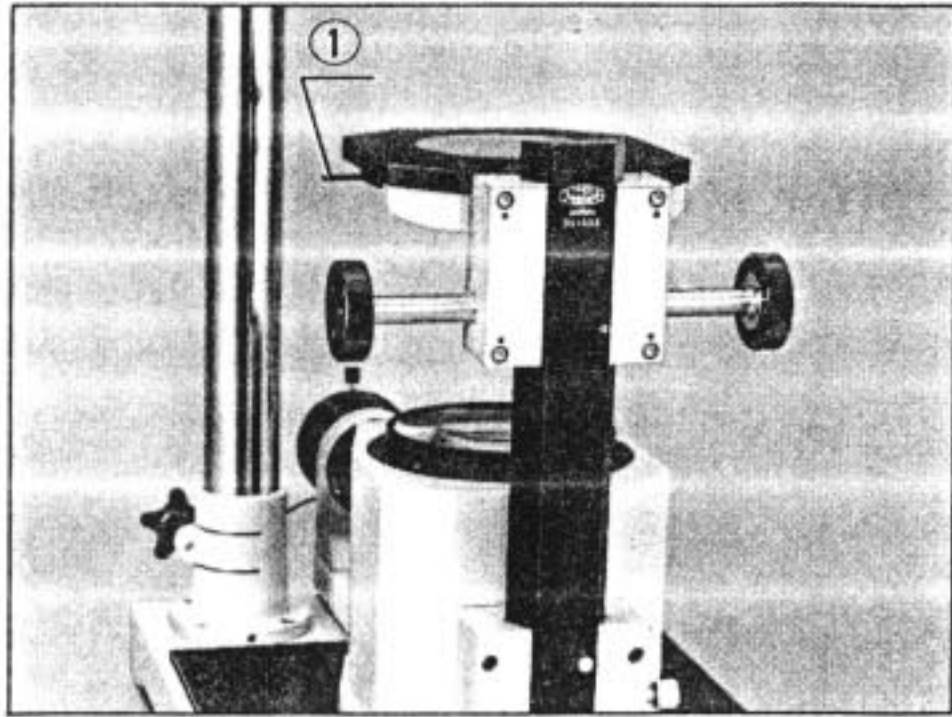


Fig. 19

## 6 Stop down the iris diaphragm.

The substage iris diaphragm is used as a field diaphragm which should be properly stopped down by the lever ① to cut off extraneous light entering from outside the field of view. (Fig. 19)

The visual field when looked through the viewfinder is generally smaller than the actual area in the picture. Therefore, it is preferable to enlarge the opening of the iris diaphragm by about 20% ~ 30% larger than the diagonal of the visual field.

## 7 Check the exposure.

To make good photography of a low contrast specimen with transmitted light, we recommend you to set the exposure compensation dial on the OM camera back to "1" ~ "1-1/3" stop over. An accurate exposure with crisply defined image can be obtained.

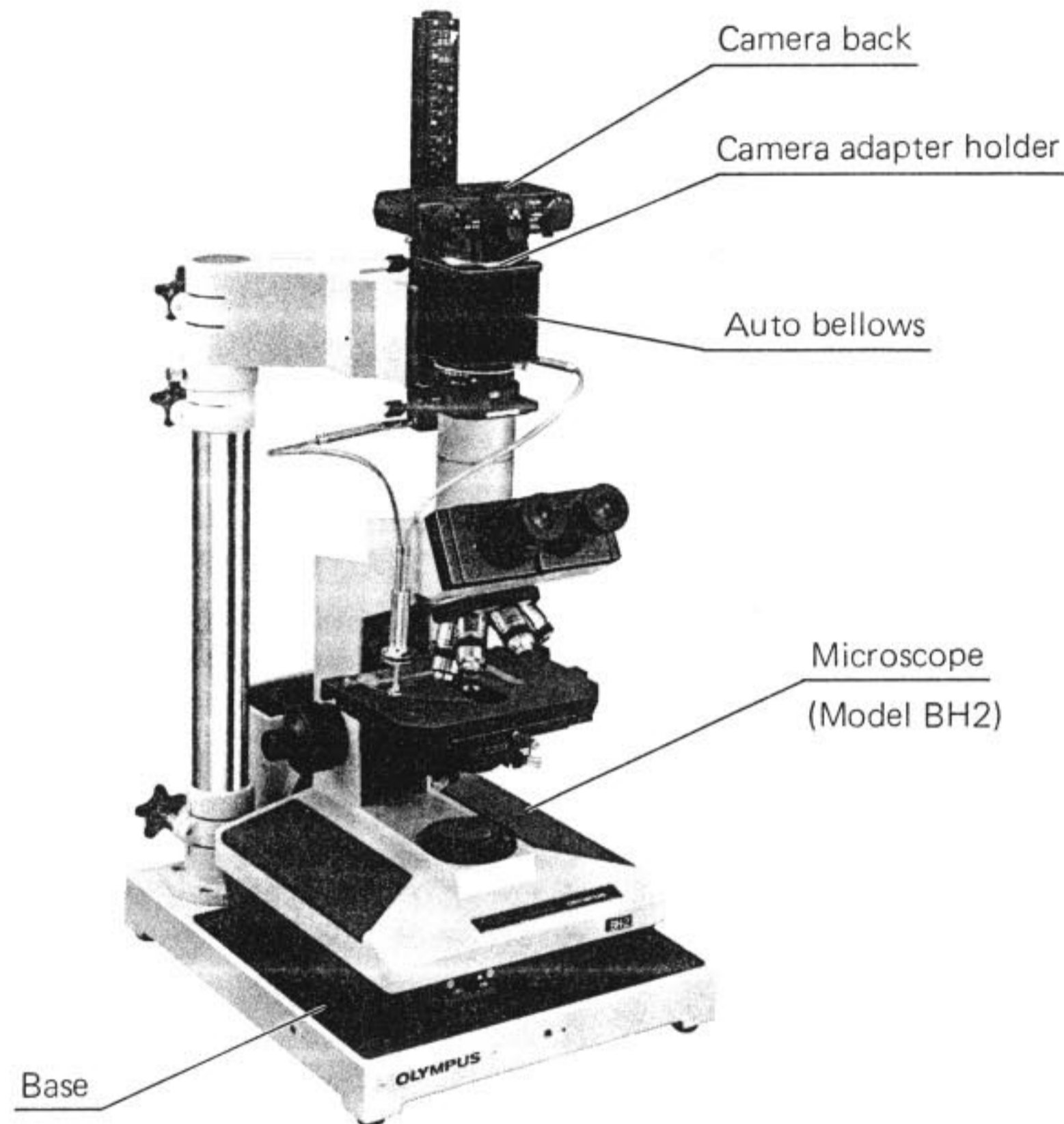
If the exposure meter indicates a faster shutter speed over 1/1000 sec., add an ND filter.



## 6-2 Photomicrography

The auto bellows can be used for photomicrography in conjunction with a microscope and vertical photo tube. This photographic method enables continuous change of magnifications, free of shutter vibration, since the auto bellows can hold the camera back detached away from the microscope.

### A. Setup of the PMT-35A and microscope



### B. Assembly

1. Place a microscope on the base.  
 Since the pre-centered pin is not needed in this use, screw the pin into the base with a coin and place the microscope in the center of the base, so that the optical axis of the photo tube is approximately aligned with the center of the auto bellows; then put the eyepiece adapter PM-ADF (optionally available) on the photo tube, and insert the photo eyepiece FK into the adapter.  
 ★ In the case of a BH2 microscope, insert the photo eyepiece directly into the photo tube.
2. Attach the light excluding collar to the bellows.  
 Connect the light excluding collar to the bellows' bayonet, lower the dovetail slideway until the light excluding collar covers the photo tube, leaving about 1 mm clearance between the light excluding collar and photo tube for prevention of the shutter vibration from transmitting to the camera back; then tighten the slideway.
3. Center the microscope accurately.  
 Looking at the specimen through the microscope eyepieces and the camera's viewfinder alternately, adjust the microscope position until the optical axis through the photo tube and auto bellows is correctly aligned.

### C. Procedure

The procedure for photomicrography is the same as indicated in the "Summary of Putting the PMT-35A in Operation" in page 12.

The left-side scale engraved on the dovetail slideway of the auto bellows indicates the projection length, from which you can obtain the magnification on the film plane by applying the formula below:

$$M = \text{mob} \times \text{moc} \times \frac{L}{250}$$

M: Magnification on the film plane  
mob: Magnification of the objective  
moc: Magnification of the photo eyepiece  
L: Projection length in mm.

For use of Olympus NFK photo eyepieces, the formula will be modified as follows since the image distance is 125 mm:

$$M = \text{mob} \times \text{moc} \times \frac{L}{125}$$

- ★ In case of NFK photo eyepieces, it is recommended to extend the projection length longer than 125 mm.
- ★ When objectives are changed at the longer projection lengths, however, check the focus, since parfocality may sometimes not be maintained; and when you rotate the nosepiece, be careful not to hit the objective front lens against the specimen.



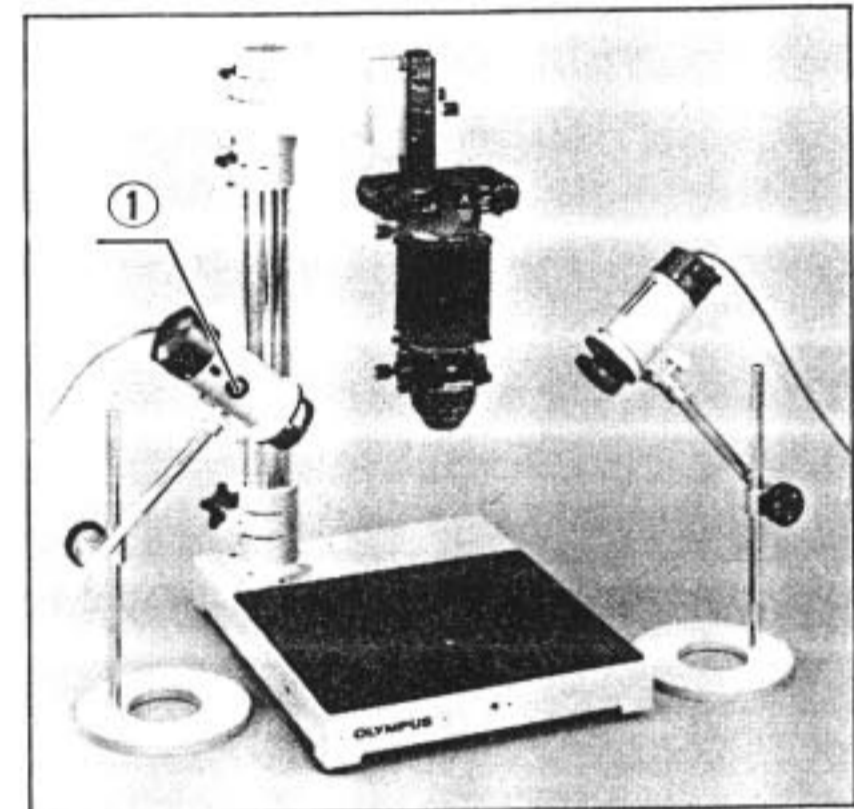
### 6-3 Photomacrography with Reflected Light

Reflected light can be employed in a wide range of photomacrographic applications, depending upon the various forms and conditions of specimens or photographic purposes. Some of the typical applications of this photomacrographic equipment (PMT-35RA), including standard or optional components, will be explained as follows:

#### 1 Oblique illumination

The universal illuminator PM-LSD-W, composed of paired light sources and transformers, can be used for oblique illumination. Each set, consisting of a tall pillar and long arm, can hold the light source to illuminate a specimen at various positions and angles. The built-in condenser lens travels by the focusing knob ① for convergence or divergence, as well as parallel, adjustments of the light beam, which makes it convenient to use them as a main illuminator and sub-illuminator. The latter can attenuate the shadow caused by the former.

To reduce highlight reflected from the specimen surface, polarizing filters (M 49 mm, pitch 0.75 mm), available at the market, can be mounted in the front holders of the light sources and photo lens respectively.



#### 2 Coaxial incident light mirror housings PM-EL20/38/80

These mirror housings are specially designed for photomacrography with macro lenses in conjunction with the auto bellows. They are effective when a specimen is flat and reflects light like a polished metal surface. When illuminated with oblique light, such a specimen seems in a lighting condition similar to darkfield. By the use of these mirror housings, however, the background can be illuminated as if in a bright field of a metallurgical microscope.

These housings ① are available in 3 sizes, a choice of which depends upon the macro lens in use. (Fig. 20)

The stage of the transmitted light illuminator PM-DL95 is convenient for magnification change or focus adjustment, since the specimen can be easily brought into focus by the vertical movement of the stage.

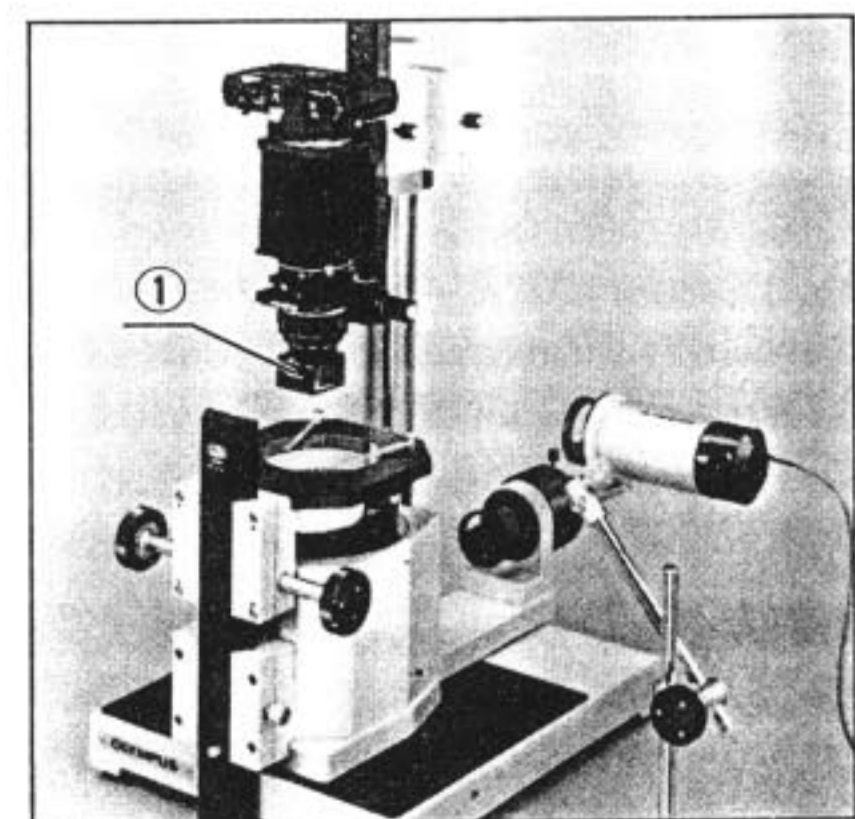


Fig. 20

### 3 Shadowless illumination

The Lieberkuhn reflectors PM-LM38 and PM-LM20, both optionally available, are used for photomacrography of a specimen within a diameter of 25 mm. The PM-LM38 ① mounted on the macro lens 38 mm, or the PM-LM20 mounted on the macro lens 20, receives parallel light from a substage mirror and directs to the specimen. The shadowless light reflected by the Lieberkuhn is soft with very little glare. (Fig. 21)

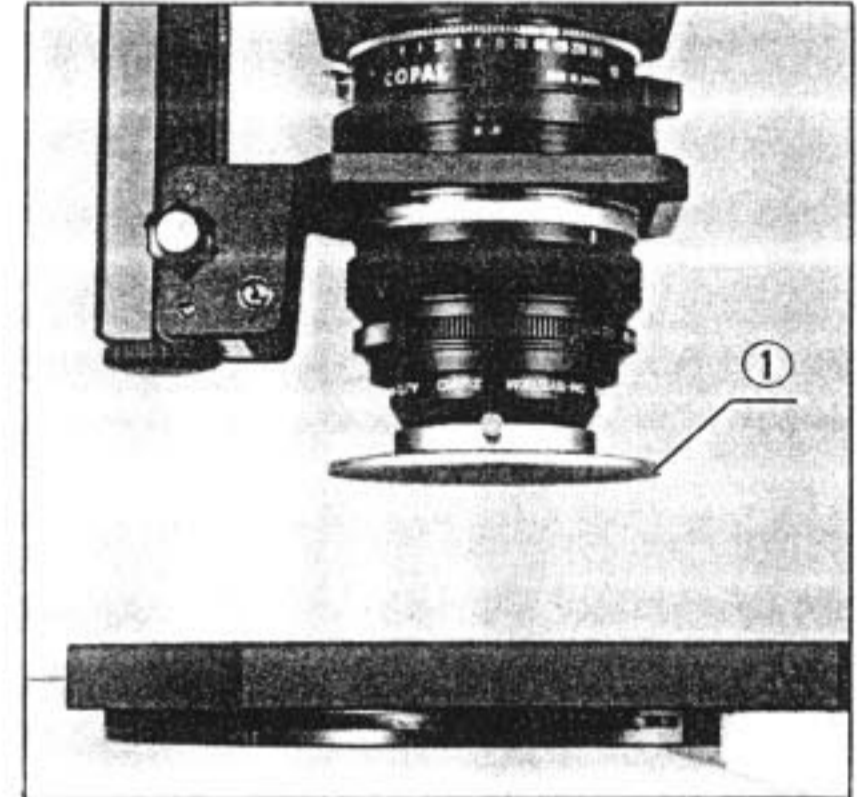


Fig. 21

### 4 Electronic flash lighting

The OTF (off-the-film) light measuring system adopted in the OM camera backs (automatic exposure version: e.g. OM-2, OM-2N, OM2-S/P, OM-4, etc.) facilitates photomacrography with electronic flash lighting. This lighting system permits simple, accurate automatic exposure without time-taking problems of calculating the exposure setting of a flash unit in use.

- ★ The macro lenses 20 mm and 38 mm are sometimes unable to automatically photomacrograph with effective flash lighting, because of their connecting restrictions.







## 5 Neutral density filters

It is necessary to reduce light intensity when illumination is too bright, especially when the transmitted light illuminator is used in low magnification. To avoid voltage change which affects color rendition, ND filters are preferable.

## 6 Color print

Color reversal film is suited to obtain color slides or transparencies; while color negative is used for duplicate color prints. When printing color duplicates from negative film the processing laboratory has wider latitude in reproducing color tones than with reversal film. The laboratory automatically adjusts color reproduction when printing familiar objects as landscapes, portraits, etc.

When processing photomicro or photomacrographic prints, however, the laboratory has no experience to guide them; and we therefore suggest a photomacrographer to simultaneously photograph the specimen on a color reversal exposed under identical conditions (including identical or suitably adjusted color temperature), and supply the laboratory with a transparency to guide them in the selection of the correct color hues of the print. Or it is also advisable to directly print from the reversal.





# TROUBLE SHOOTING

If you are unable to obtain a perfect performance from the PMT-35A because of unfamiliarity with the instrument, please use the table below as reminder of checking the instrument:

Trouble	Cause	Remedy
<b>1. Operation</b>		
a) Field of view is still dim even after switching on illuminator.	Mechanical shutter is closed.	Open shutter by lever.
b) Field of view is cut off at periphery, or not evenly illuminated.	Transmitted light illuminator is not correctly aligned with pre-centered pin.	Raise pre-centered pin and place illuminator on it.
	When setting up pillar and arm, guide pins and notches are not correctly aligned and deviated from center.	Correctly mount pillar and arm in place.
	Auxiliary condenser is not correctly used.	Use auxiliary condenser with macro lenses 38mm and 20mm (not necessary for macro lens 80mm).
	Bulb socket is not inserted into illuminator completely.	Push socket in completely.
	Field iris diaphragm is stopped down too much.	Open diaphragm more widely than frame reticle (by about 20-30%).
	Photo lens is not located in correct position.	Locate photo lens in correct position (refer to "positioning of the photo lens" at page 13).
c) Dust or dirt particles are visible in field of view.	Dust on condenser top lens.	Clean.
	Dirty specimen.	
	Dust on viewfinder.	
d) Specimen is hard to bring into sharp focus.	Focal depth of photo lens is too deep.	Try a Varimagni Finder, optionally available at the camera market, to facilitate focusing.  By moving stage up and down alternately, memorize two positions where image blurs equally; then bring stage to mid-position between them for optimum focus.
	OM system focusing screen is not matched with macro lens.	Use focusing screen matched with macro lens as follows: Focusing screen Nos. 1-4, 1-10, 1-11 for macro 80mm; 1-4, 1-10, 1-11, 1-12 for macro 38mm; and 1-11, 1-12 for macro 20mm.

Trouble	Cause	Remedy
<b>2. Photography</b>		
a) Poor color rendition.	Color temperature of light source is too low (or high) for color film in use.	Use LBD-2N filter for daylight type film or LBT filter for tungsten type film.
	Bulb voltage is too low (or high); tinted red (or blue) too much.	Raise (or lower) voltage. (Standard voltage: about 9V.) It is recommended to test at this standard voltage ( $\pm 1$ V) to obtain a guideline at initial stage of your photographing operation.
	Bulb has aged after long use.	Replace defective bulb.
	Spectral emission (or color balance) of light source is not properly compensated for film in use (e.g. tinted green or magenta).	Use color compensating filter properly: CCM (magenta) for tinted green; or CCG (green) for tinted magenta).
	Available period of film has been expired.	Use film within available period.
b) Incorrect exposure.	Exposure is not correctly compensated for low contrast specimen.	Basically, compensate exposure time up to 1 to 1-1/3 stops over for low contrast. (Prior to this compensation, reduce film speed ISO 100 to ISO 40~50, for instance.)
	Objects are scattered in field of view.	Adjust exposure: in bright field . . . over exposure (+) or in dark field . . . under exposure (-), or manual exposure.
	Light intensity is too high that shutter speed exceeds 1/1000 sec.	Use ND filter.
c) Blurred image.	Eyepiece diopter was not correctly adjusted for operator's eye acuity.	Adjust eyepiece diopter so that focusing reticle (or double cross lines) can be sharply seen.
	Image blurs by camera's shutter vibration.	Use mechanical shutter.
	Incorrect focus.	Refer to 1. d).
d) Picture image is not sharp.	Lens aperture is stopped down (or opened) too much.	Maximize lens aperture for plain specimen (e.g. slide specimen); or stop down aperture for uneven object (be certain to check depth of focus by means of stop down lever).
	Specimen is stained too weak; lack of contrast.	<ul style="list-style-type: none"> <li>• Change stain color.</li> <li>• Use contrast filter to take monochromatic picture or use high contrast film.</li> </ul>



**OLYMPUS OPTICAL CO., LTD.**  **SAN-EI BUILDING, 22-2, NISHISHINJUKU  
1-CHOME, SHINJUKU-KU, TOKYO, JAPAN**