

12 ADJUSTMENT OF DRIVING MECHANISM

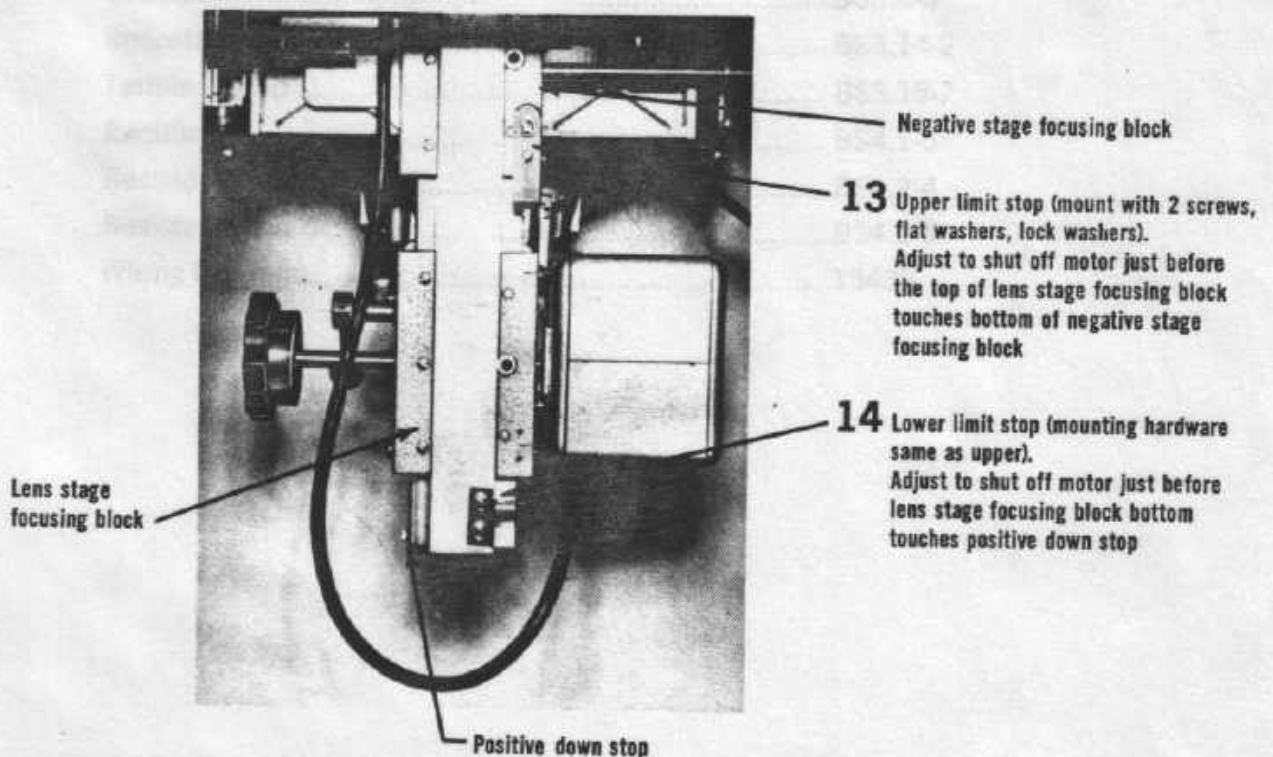
With the three adjusting screws (page 3, instruction 9) loose, slowly rotate the focusing knob several times to locate motor assembly, and then tighten screws. Repeat knob rotation to be sure of no binding or slippage.

Replace the cover making sure that the grommet is correctly installed (clamped between base of unit and cover). Install screws and cable clamp on cover.

Plug the motor drive unit connector into its receptacle on the carriage of the enlarger. Set "fine focus speed adjust" to approximately 10 o'clock. Turn on "all power" switch and operate "lens focus" switch up and down to check drive. Observe that as you slowly move switch handle from center off position in either direction, the focusing motor will start driving in its slow speed mode. As you continue moving the handle in the same direction, as the handle approaches the end of its travel the motor will be switched to full speed. You can adjust the rate (of fine focus only) to your preference with the "fine focus speed adjust" knob. The fine focus speed will increase as you advance the knob in a clockwise direction.

If the motor has difficulty in driving in fine focus mode, loosen set screw (see page 2, illustration of the complete installation) one-half turn at a time, until motor drives smoothly. If necessary, advance the fine focus speed adjust knob a bit at a time, clockwise until smooth operation up and down results.

INSTALLATION OF LIMIT STOPS



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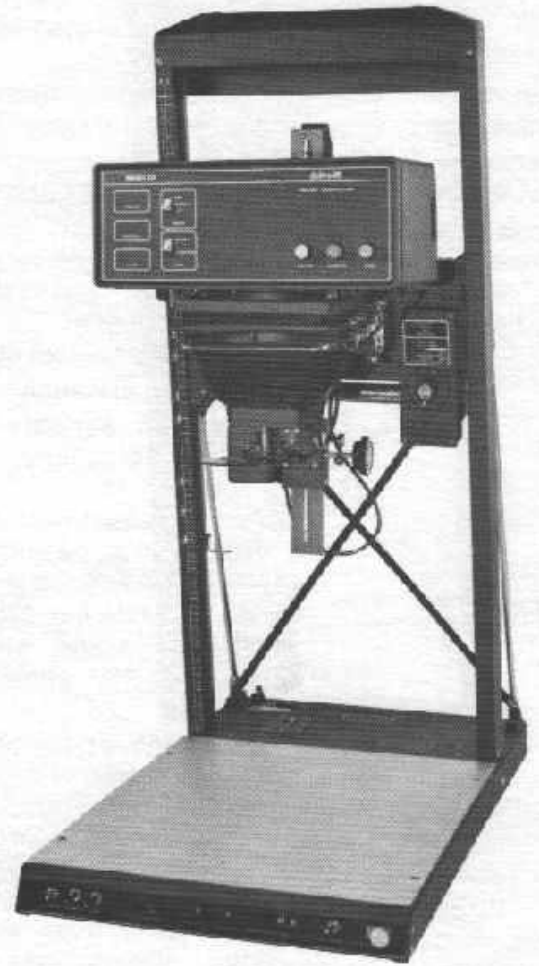


Figure 1. CB-7 Enlarger Complete with Dichro 45 Colorhead.

INTRODUCTION

Congratulations on your purchase of one of the most versatile enlarging systems that has ever been made available. Offering you the rugged stability so common to Beseler enlargers in combination with advanced engineering concepts, the CB7 brings to your darkroom a new degree of flexibility and efficiency. The CB7 allows you to perform all of your tasks with such flawless ease that you will be able to devote your full attention to the photographic image.

Your CB7 is designed and constructed to provide years of dependable and precise service. In order to gain the full advantage of the many features incorporated into your enlarger, please read this instruction manual. It is also suggested that this be made available to all persons using the enlarger.

I. CB7 SPECIFICATIONS

Height (fully Extended):	
With Condenser Head	71" (1803mm)
With Colorhead	58 ¹ / ₄ " (1478mm)
Baseboard:	
Overall	36 ³ / ₄ " D x 21 ¹ / ₂ " W (933mm x 546mm)

Usable	25" D x 21" W (635mm x 533mm)
Shipping Dimensions:	
Chassis	53 ¹ / ₂ " x 23 ¹ / ₂ " x 17" (1359mm x 597mm x 432mm)
Projection Assembly	28" x 15" x 16" (711mm x 381mm x 406mm)
Condenser Head	25" x 10" x 9 ¹ / ₄ " (635mm x 254mm x 235mm)
Colorhead	24 ¹ / ₂ " x 16 ⁵ / ₈ " x 16 ⁵ / ₈ " (622mm x 422mm x 422mm)
Shipping Weight:	
Chassis Only	- 140 lbs. (62.7 kilos)
Condenser Head	- 16 lbs. (7.2 kilos)
Computerized Colorhead	- 25 lbs. (11.2 kilos)
Line Voltage	120V ± 10%, 60 Hz
Lamp:	
Condenser Head	PH-212 (Cat. #8100)
Colorhead	EVW, 82V/250W (Cat. #8108)
Filtration:	
Condenser Head	Built-in Heat Absorbing Glass, accepts 7" x 7" GP Filters

Colorhead Built-in IR and UV filtration
Continuously variable dichroic filters - cyan, magenta, yellow

Both versions have below the lens filter holder

Negative Sizes: 4" x 5" and smaller
Magnification Range on Baseboard: 0.125X — 16.5X approx.

Controls & Adjustments: All controls feature positive mechanical locks or unidirectional drive gear
Fingertip electrical controls
Motorized elevation
Motorized variable speed focus with optional remote control
Vertical adjustment on condenser stage, negative stage and lens stage.

Negative rotation: 270°
Negative stage tilt: Calibrated $\pm 7\frac{1}{2}^\circ$ w/micrometer drive

Lens stage tilt: Calibrated $\pm 15^\circ$ w/micrometer drive

Design Criteria: Absolute rigidity through use of triangular truss construction providing 4 points of support, 11 points of rigidity, 5 triangular truss areas for solid, vibration-free operation.

- (e) 1 special extension screw, $4\frac{3}{4}$ " long.
- (f) 1 open end wrench for adjusting the eccentrics in the focusing blocks.
- (g) 1 Allen hex wrench for adjustment of focusing blocks.

Timer cords:

- (a) Accessory timer power cord.
- (b) Footswitch trigger cord.

Adapter kit for mounting Computerized Colorhead (Cat. #8277).

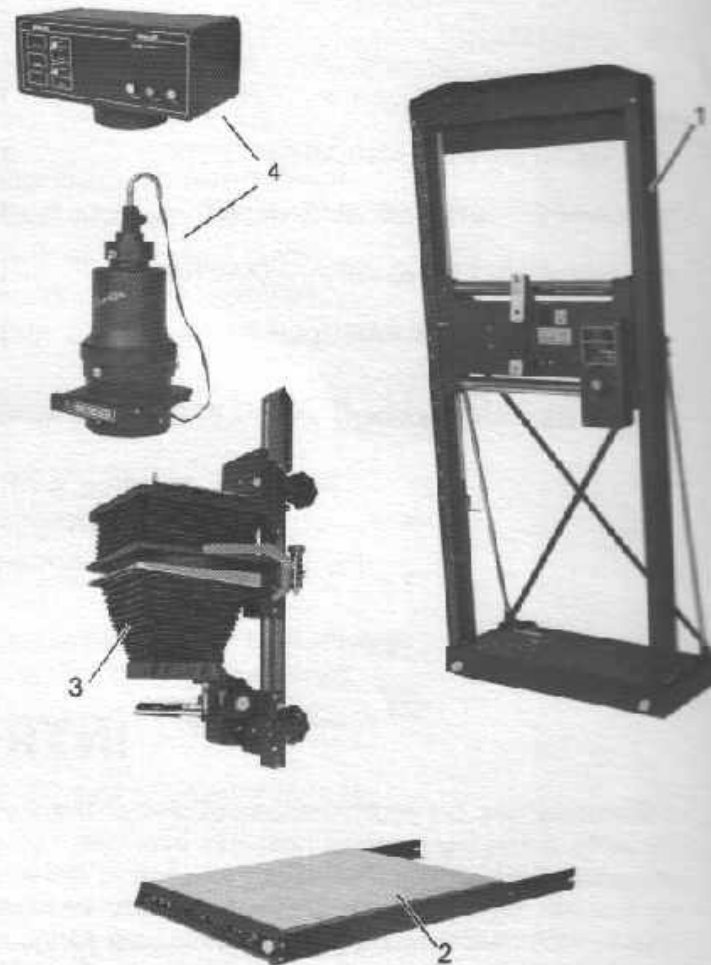


Figure 2. CB-7 Enlarger Disassembled for shipment.

II UNPACKING AND ASSEMBLY

A. UNPACKING

After complete assembly, alignment and inspection at the factory, the Beseler CB7 is disassembled into four principal sub-assemblies to facilitate shipping and prevent damage in transit. The design is such that when reassembled the enlarger will be in proper alignment. These sub-assemblies, illustrated in Fig. 2, are:

1. The vertical frame, carriage and base pan assembly.
2. The base frame and board assembly.
3. The projection assembly, consisting of the focusing track, condenser stage, negative stage and lens stage.
4. The Condenser Lamphouse (Cat. #8255) or Computerized Colorhead (Cat. #8282).

Also included are:

Bag of maintenance tools and hardware containing:

- (a) 4 truss head screws, $\frac{1}{4}$ -20 x $\frac{1}{2}$ " for attaching the channels of the base frame to the sides of the pan.
- (b) 1 Allen head cap screw, $\frac{9}{16}$ " diameter x $\frac{3}{8}$ " long.
- (c) 1 Allen hex wrench for above.
- (d) 1 special extension screw, 4" long.

B. ASSEMBLY OF THE BASIC ENLARGER

Assembly of the enlarger consists of:

1. MOUNTING THE BASE FRAME ASSEMBLY TO THE VERTICAL FRAME ASSEMBLY

The rear of the vertical frame, carriage and base pan assembly (1, Fig. 2) contains two flat diagonal braces and two rear struts.

- a. Place this assembly on the floor (or on a table) with the struts lying down.
- b. Assemble the base frame to the vertical frame assembly as follows:

- (1) Note that the ends of the two side rails which form the base frame assembly are slotted.

- (2) Insert two of the truss head screws (from the hardware kit) in the rear threaded holes (47, Fig. 5) below the rear struts (one on each side). Do not tighten these yet. Leave about $\frac{1}{4}$ " space under the head, so that they can accept the slotted ends of the side rails.
- (3) Hold the base frame assembly approximately vertical and slip the slotted ends over the screws which were previously inserted (step 2).
- (4) Align the other holes in the base frame with those in the vertical frame assembly and insert the other two truss head screws.
- (5) Tighten all four screws.
- (6) You will notice on each side of the base frame an electrical harness, terminating in a square plastic plug. Plug each of these into the corresponding socket of the base pan assembly.
- (7) Raise the vertical frame (with the base frame now attached) to its normal upright position.

2. MOUNTING THE PROJECTION ASSEMBLY TO THE CARRIAGE

Note that the back of the focusing track (48, Fig. 5) has three threaded holes. Note also that the front of the carriage has two projections, the upper one containing a slot and a hole. The slot permits hanging the focusing track assembly so that it is supported, while the other two mounting screws can be inserted from the rear. These are the two extension screws (included in the hardware kit).

The procedure is as follows:

- a. Insert the Allen head cap screw in the top hole of the focusing track, allowing about $\frac{3}{16}$ " space under the head of the screw.
- b. Using the screw just inserted as a supporting member, hang the assembly from the slot mentioned above.
- c. From the rear of the carriage, insert the extension screws into the two lower threaded holes in the focusing track: *the shorter screw goes into the upper hole*. These screws can be inserted through the holes in the rear cover of the carriage.
- d. Tighten all three screws.

3. MOUNTING THE CONDENSER LAMPHOUSE

The Condenser Lamphouse (Cat. #8255) comes to you separated into two components, the lamphouse and the condenser housing. Loosen the three lamphouse mounting screws (4, Fig. 5) on the condenser housing and slide the lamphouse into place on top of the housing until it seats itself (the name Beseler should face towards you; refer to Fig. 5). Tighten the lamphouse mounting screws.

Mount the Condenser Lamphouse by pulling the latching bars (8, Fig. 5) forward. Insert the assembly into

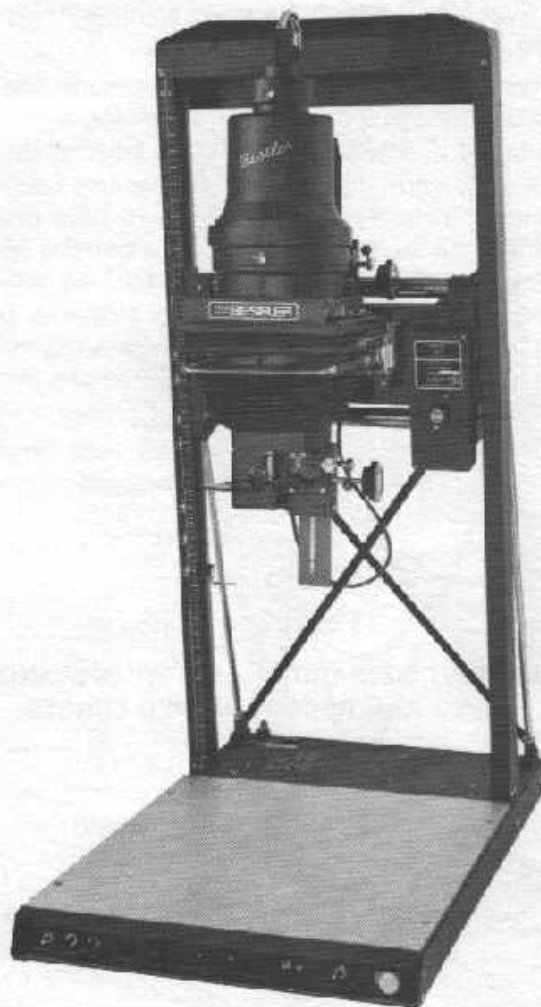


Figure 3. CB-7 Enlarger Complete with Condenser Head

the circular opening of the condenser stage (7, Fig. 5) and push the latching bars back.

Note that the condenser housing has a drawer (6, Fig. 5) for accommodating 7" x 7" filters. This drawer contains a transparent filter holder, both sides of which are masked to protect the surface. *Remove this masking material and reinsert the filter holder.*

Plug the end of the cord set into the lamphouse outlet (40) on the carriage assembly. Slip the cord under the two clips on the back of the focusing track so that it lies flat against the track.

4. MOUNTING THE COMPUTERIZED COLORHEAD

See the instructions packaged with the Dichro 45 Custom Mounting Kit (Cat. #8277) for complete information on adapting the colorhead to fit the CB7. Plug the power cord from the colorhead into the auxiliary outlet on the carriage assembly and the timer cord into the lamphouse outlet. Turn the power switch of the colorhead to the "On" position and leave it on. The main power switch of the CB7 will control all power to the enlarger and the colorhead.

5. INSERTING THE LENS

Most lenses of focal lengths from 50mm to 150mm may be used in the Beseler CB7 enlarger without the need of negative spacers or special lens boards. The standard 4" lens board used in the Beseler CB7 will accommodate any of these lenses and will operate perfectly with its corresponding negative. Special recessed lens boards are available for use with lenses

shorter than 50mm which are used when working with subminiature films.

Note that the bottom of the lens stage contains two retaining strips, at the front and the rear, which hold the lens board in place. With the back edge of the lens board tilted upward, insert it into the groove above the rear retaining strip. Push the lens board back into the groove and raise the front edge until the board is level. A leaf spring in the rear groove will push the lens board into the groove above the front retaining strip and hold it in position. Be sure the lens board is securely held at the front and rear of the lens stage. To remove the lens board, reverse the procedure.

Lenses are available for every size negative. Recommended focal lengths and baseboard magnifications are shown in Table I.

TABLE I

RANGE OF PRINT SIZES OBTAINABLE FROM STANDARD NEGATIVES AND RECOMMENDED LENSES ¹

NEGATIVE SIZE	RECOMMENDED LENS -F.L.	SIZE OF PRINT (INCHES)	
		MAXIMUM ²	MINIMUM ³
4" x 5"	135	23 x 29½	2⅜ x 2⅞
	150	19½ x 25	2⅝ x 3⅝
3¼" x 4¼"	105	24 x 32	2 x 2¾
	135	18 x 24	1⅞ x 2½
2¼" x 3¼"	90	21¼ x 31⅝	1¼ x 1⅞
	105	17½ x 25⅝	1⅝ x 2⅝
2¼" x 2¼"	75	26⅜ x 26⅝	2 x 2
	80	23⅝ x 23⅞	1¾ x 1¾
35mm	50	16½ x 24½	1⅝ x 2½

- (1) Without changing condensers and using lens cones or other accessories.
- (2) Working on base board (no easel).
- (3) Working on easel 1" thick. Note that greater reductions (smaller prints than those listed) are obtainable by special procedures discussed elsewhere. See Section IV, D and E.

6. TIMER

Provisions have been made to insert any enlarging timer with a foot switch outlet directly into the electrical system. There are three outlets near the back of the base which allow this hookup (see Fig. 4).

Plug the power cord from the enlarging timer into the outlet marked "From Timer, Timer Power." Plug the male end of the accessory timer power cord into the "Enlarger" receptacle of the timer and the female end into the outlet on the base marked "To Timer, Enlarger Outlet."

Using the footswitch trigger cord, plug one end into the outlet on the base marked "To Timer, Remote Outlet" and the other end into the remote footswitch outlet of any Beseler timer. (When using another brand of timer, it may be necessary to change the plug on one end of the footswitch trigger cord to accommodate this unit. Check with the timer manufacturer for this information.)

Turn the power switch for the timer to the "On" position and the Expose/Focus switch to "Expose." It is no longer necessary to use these two switches on the timer; all that you have to do is adjust the timing interval as desired. Power comes on with the main power switch of the CB7 and an Expose/Focus switch is provided on the control panel of the enlarger.

NOTE: If your timer has no footswitch receptacle or you already have a footswitch hooked up to your timer, connect the timer power cords only. The only difference in operation will be that your timer must be activated with its own expose button, not the one on the front control panel.

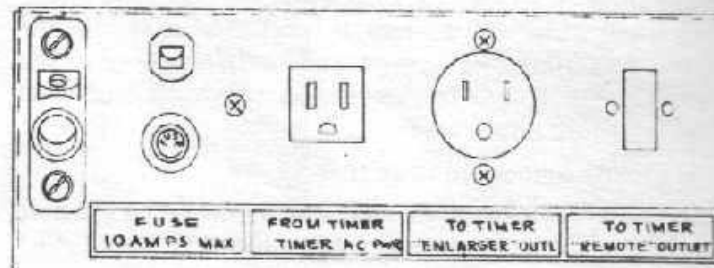


Figure 4. CB-7 Timer Connections

III. DESCRIPTION

A. IDENTIFICATION OF PRINCIPAL PARTS

The principal parts of the enlarger are illustrated and identified in Fig. 5.

B. DESCRIPTION OF THE PRINCIPAL PARTS

(All identification numbers refer to Fig. 5)

1. LAMP

The normal lighting system of the condenser enlarger uses a standard PH-212 enlarging lamp. Other lighting systems such as the Point Light Source and Computerized Colorhead are available. These are described in Section IV and below.

2. LAMP CAP (1)

The lamp cap provides a ventilated, yet light-tight, cover for the lamp housing, and supports the lamp socket assembly. It is quickly removable from the lamp

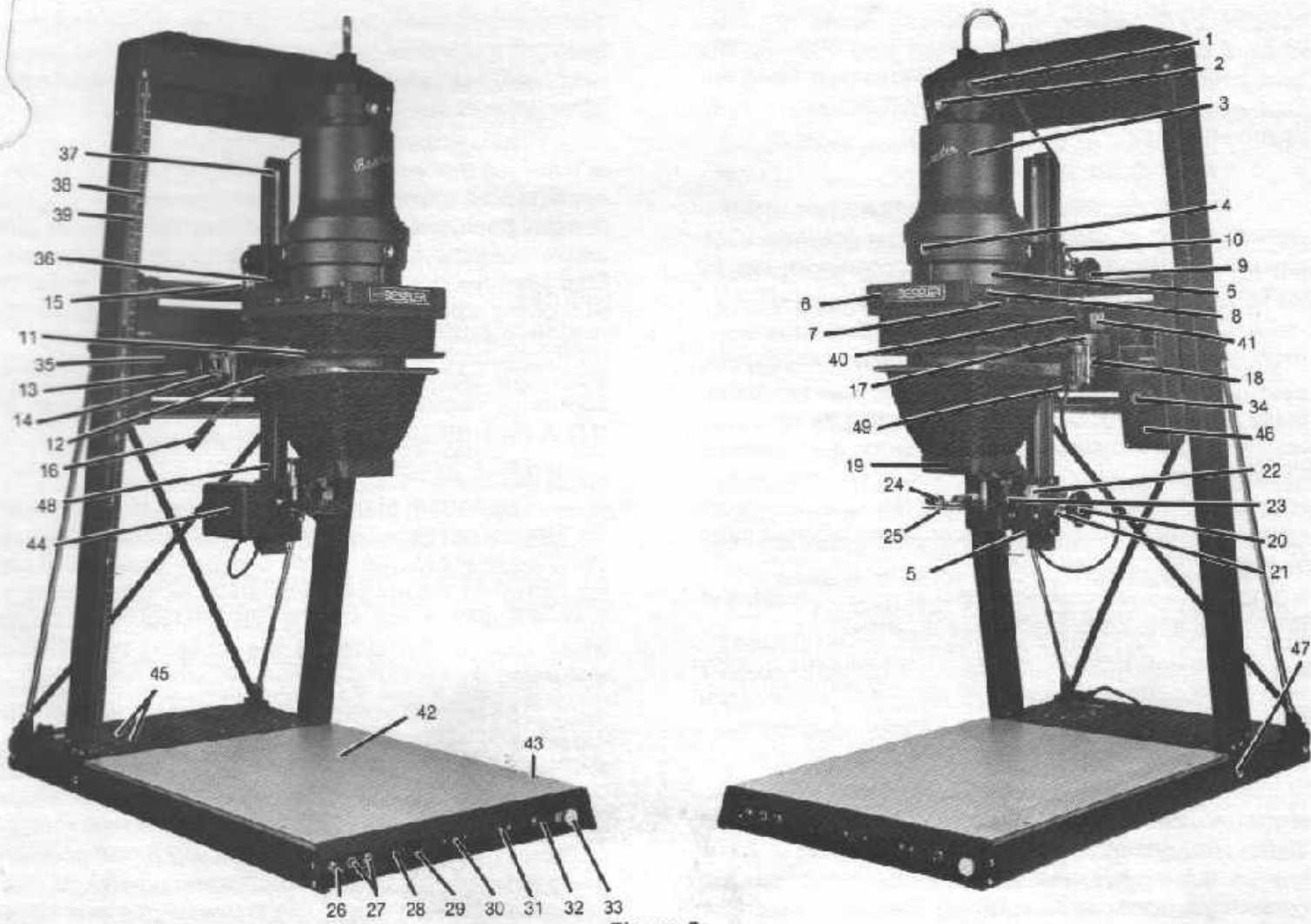


Figure 5.

PRINCIPAL PARTS AND CONTROLS OF CB7 ENLARGER

- | | |
|---|---|
| 1 — Lamp Cap | 27 — Lens Focusing Switches |
| 2 — Lamp Cap Mounting Screw | 28 — Outlet for Remote Fine Focusing Control Cable |
| 3 — Lamp House | 29 — Speed Adjustment Knob for Fine Focusing |
| 4 — Lamp House Mounting Screw | 30 — Main Switch |
| 5 — Condenser Housing | 31 — Receptacle for Foot Switch Cable |
| 6 — Filter Drawer | 32 — Selector Switch for Setting Timer:
Focusing or Exposure |
| 7 — Condenser Stage | 33 — Exposure Button |
| 8 — Condenser Stage Latching Bars | 34 — Carriage Vernier Positioning Knob |
| 9 — Condenser Stage Positioning Knob | 35 — Carriage |
| 10 — Condenser Stage Lock | 36 — Condenser Stage Counterbalance
Spring Engagement Screw |
| 11 — Upper Negative Stage | 37 — Condenser Stage Positioning Scale (A) |
| 12 — Lower Negative Stage | 38 — Carriage Positioning Scale (C) |
| 13 — Negative Stage Positioning Knob | 39 — Negative Stage Positioning Scale (D) |
| 14 — Negative Stage Lock | 40 — Outlet for Lamp Cord (Black) |
| 15 — Negative Stage Positioning Scale (B) | 41 — Accessory Outlet (Grey) |
| 16 — Negative Stage Opening Lever | 42 — Baseboard |
| 17 — Negative Stage Tilting Knob | 43 — Baseboard Mounting Screw |
| 18 — Negative Stage Tilting Scale | 44 — Power Focus Drive Unit |
| 19 — Lens Stage | 45 — Timer Outlets |
| 20 — Lens Stage Focusing Knob | 46 — Carriage Transmission Cover |
| 21 — Lens Stage Lock | 47 — Base Frame Mounting Screw |
| 22 — Lens Stage Tilt Knob | 48 — Focusing Track |
| 23 — Lens Stage Tilt Scale | 49 — Outlet for Power Focus |
| 24 — Swinging Filter Holder | 50 — Focusing Block Adjusting Screw |
| 25 — Red Filter | |
| 26 — Carriage Elevation Switch | |

housing by loosening the mounting screw (2), after which it can simply be lifted off the lamp housing. The lamp socket is part of an adjustable tube permitting vertical adjustment of the lamp for optimum uniformity of illumination.

3. LAMPHOUSE (3)

The lamphouse consists of a light-tight, double-walled ventilated chamber designed for optimum cooling. It is quickly removable from the condenser box by means of three thumb screws (4).

4. CONDENSING SYSTEM

The condensing system of the CB7 enlarger has been designed using larger condensers than those normally used for 4 x 5 enlargers, resulting in improved uniformity of illumination and superior performance. The condensing system also incorporates a heat absorbing filter. The components are in a die cast housing (5) which also includes a filter drawer (6) and a filter holder to accommodate color filters.

NOTE: Remove the masking material from both sides of the filter holder before using the enlarger.

The entire condenser assembly mounts quickly onto the condenser stage (7) by means of two latching bars (8).

5. COMPUTERIZED COLORHEAD

The colorhead available for the CB7 is a micro-processor controlled unit providing accurate, direct digital readouts indicating the exact amounts of filtration in the system. For a complete description and operating procedure, consult the instruction manual included with the unit.

6. FOCUSING TRACK (48)

A special feature of the Beseler CB7 enlarger is that in addition to the usual focusing movement of the lens stage up and down the focusing track, the condenser stage and negative stage also can be positioned up and down this track for special work. This is particularly useful for small magnifications and reductions, and greatly enhances the versatility of the enlarger.

7. CONDENSER STAGE (7)

As stated above, the condenser stage is also vertically adjustable — relative to the carriage — by moving it up and down the focusing track.

This motion is accomplished by a positioning block operated by knob (9). It is locked into position by locking lever (10). This swings upward (clockwise) to lock, downward to unlock.

The condenser stage is connected to its positioning block by means of a spring-balanced ball-bearing suspension, permitting it to move up and down smoothly when the negative stage is open for the insertion of negative carriers. The spring counterbalancing system of the condenser stage also includes means for reducing the counterbalancing force when the stage is used with lighter lighting systems.

8. NEGATIVE STAGE

The negative stage consists of an upper (11) and lower (12) casting, the latter being carried on a positioning block so that the stage can be located in the optimum position of the focusing beam of light emerging

from the condensing system. The stage is positioned by knob (13) and locked by the locking lever (14). The proper position is indicated by a scale B (15) calibrated in terms of negative size.

The upper casting of the negative stage (to which is mounted the lower end of the upper bellows) is connected to the lower stage by a pair of arms. The stage is opened for insertion of the negative by the lever (16) which operates on an over-center camming principle. This provides great mechanical advantage for easy lifting of the condenser system and makes it self-locking in both open and closed position.

The negative stage is also tiltable for distortion control by means of a self-locking vernier tilting knob (17). A tilt scale (18) is also provided.

9. LENS STAGE

The bottom of the tapered bellows is attached to the lens stage (19), which is carried on a focusing block operated by the focusing knob (20), and is capable of being locked by means of a lens stage locking lever (21). This actuates a full-floating set of locking clamps, which lock on the sides of the focusing bar without disturbing the focusing in any way.

The forward portion of the lens stage is pivotably mounted to the focusing block for distortion control, this being the complementary pivoting motion required in conjunction with the pivoting of the negative stage described above. Tilting of the lens stage is accomplished by means of a vernier tilting knob (22), the position being indicated on tilt scale (23). Center position is also indicated by means of a detent. To return the lens stage to the center position, pull down on the adjusting knob to separate the worm from the worm wheel, and swing the lens stage until the detent action is felt. Then release the knob and gently turn it until the worm slips into the closest tooth on the wheel. The tilting control is self-locking.

The square portion of the lens stage is designed for rapid insertion of lenses mounted on standard 4" x 4" Beseler lens boards. The stage also carries threaded mounting holes for the rapid attachment of a wall projection device, as well as additional threaded holes for mounting other accessories.

10. SWINGING FILTER HOLDER AND RED SAFE FILTER

The swinging filter holder (24) and the red filter (25) are carried on the lens stage casting, conveniently located for swinging into position beneath the lens. The swinging filter holder is adjustable vertically for optimum positioning relative to lenses of various focal lengths and can accommodate Variable Contrast, Tri-Color, Neutral Density, Soft Focus, Diffusion and other filters in a size range from 2 1/4" x 2 1/4" to 2 1/8" x 2 1/8". To insert or remove filters, rotate holder to the left and carefully remove or insert desired filter. When the desired filter is in place, rotate holder back to position beneath lens.

11. TIMER OUTLETS (45)

A series of outlets are provided to allow hookup of an enlarging timer into the electrical system.

12. FUSE

A quickly replaceable fuse protects the electrical components of the enlarger. It is located at the rear of the base pan. The rating of the fuse is 8 amperes.

C. ELECTRICAL CONTROLS

The control panel at the base of the CB7 contains the controls that are illustrated and described below.

1. CARRIAGE ELEVATION SWITCH (26)

This switch controls the carriage elevating motor. Move the switch handle up to move the carriage up, down to move the carriage down. At each end of the travel, limit switches prevent the carriage from over-traveling.

2. LENS FOCUSING SWITCHES (27)

Two switches are provided for the power focus. Moving the switches up causes the lens stage to move up, and down causes the lens stage to move down.

One switch permits rapid, coarse positioning of the lens, while the other switch is for very slow, fine focus.

3. OUTLET FOR REMOTE POWER FOCUS CONTROL, CAT. #8253 (28)

For working on murals by projection onto a wall, provision is made for remote control of the focusing. The outlet provides for plugging in a control cord, on the end of which is a two-directional control switch for fine focusing.

4. SPEED ADJUSTMENT OF FINE FOCUS CONTROL (29)

This is an adjustment on the speed of the fine focus.

5. MAIN SWITCH (30)

The main switch controls power to everything on the enlarger.

6. RECEPTACLE FOR FOOT SWITCH, CAT. #8179 (31)

This outlet permits plugging in a foot switch when desired for foot switch operation of the timer.

7. SELECTOR SWITCH FOR TIMER: FOCUSING OR EXPOSURE (32)

This is a two-position switch. Moving the switch to the "Focus" position turns on the lamp (for focusing). The lamp will remain on until the switch is moved to the "Expose" position which connects the circuit to the exposure button.

8. EXPOSURE BUTTON (33)

This is a momentary, single throw switch. With the selector switch set to expose, pushing the exposure button starts the timer, which in turn keeps the light on for the pre-selected exposure time.

D. MECHANICAL CONTROLS

These are illustrated and identified in Fig. 5. and described further below.

1. NEGATIVE STAGE POSITIONING KNOB (13)

This permits positioning the negative stage along the focusing track to suit various sizes of negatives and for making reductions.

NOTE: Be sure to release the lock (14) before attempting to remove the negative stage.

2. NEGATIVE STAGE LOCK (14)

This permits the negative stage to be locked in any desired position. Push up to lock, pull down to release.

3. NEGATIVE STAGE LEVER (16)

This lever opens the negative stage for insertion of the negative carrier. It incorporates an over-center camming linkage making the operation smooth and easy, and it is self-locking in the open and closed position. The negative stage is opened by pulling the lever forward.

4. NEGATIVE STAGE TILTING KNOB (17)

This enables the negative stage to be tilted for correction of distortion in the negative. "0" position is indicated by the scale beneath the positioning knob. The tilt adjustment is self-locking and will stay as set.

5. CONDENSER STAGE POSITIONING KNOB (9)

Normally the condenser stage is set as high as possible on the focusing track. However, for special purposes (described in Section IV) it is convenient to be able to move it down. This is accomplished by the condenser stage positioning knob.

NOTE: Be sure to release the lock before attempting to move the condenser stage. Note also that if the condenser stage is down against the negative stage, the latter must be lowered (using its own positioning knob) before the condenser stage can be moved. Do not try to drive the negative stage downward by means of the condenser stage positioning knob (or vice versa in going upward).

6. CONDENSER STAGE LOCK (10)

This locks the condenser stage. Push up to lock, pull down to release.

7. FOCUSING KNOB (LENS STAGE) (20)

8. LENS STAGE LOCK (21)

9. LENS STAGE TILTING KNOB (22)

This control permits tilting of the lens stage for correction of distortion.

10. CONDENSER BOX LATCH (8)

To remove the condenser box, pull the latches forward. To clamp the condenser box, push the latches back.

11. CARRIAGE VERNIER POSITIONING KNOB (34)

This knob permits extremely precise positioning of the carriage (35), and is of importance in establishing the exact position for 1:1 magnifications.

12. ENGAGEMENT SCREWS (36) FOR CONDENSER STAGE COUNTERBALANCE SPRINGS

When using 4 x 5 negatives, the negative stage is set up against the condenser stage so that when the negative stage is open it is necessary to lift the weight of the condenser stage. In order to obtain smooth operation of this function, the condenser stage is counterbalanced with springs designed to offset the weight of the condenser stage and condensers. When the standard lamphouse and condensing system are not em-

ployed and some other lighting system is used, the weight carried by the condenser stage may be considerably reduced, and these screws provide means for adjusting the force of the counterbalancing springs to suit. Specific instructions for making this adjustment are contained in Section VI. As long as the enlarger is used with the standard condensing system or Computerized Colorhead, these screws need never be touched.

E. POSITIONING SCALES

In order to facilitate the use of the enlarger, four positioning scales are provided. These are illustrated in Fig. 5 and (on the enlarger) are labeled A, B, C, and D. Their functions are as follows:

SCALE A, CONDENSER STAGE POSITIONING SCALE (37)

This scale indicates the position of the condenser stage relative to the focusing track. The normal position of the condenser stage is at the top of the track, which is the position for maximum enlargements. For special applications, particularly in the making of reductions, it is advantageous to lower the condenser stage, and this scale provides a reference for the recording of special setups.

SCALE B, NEGATIVE STAGE SCALE (15)

This scale shows the position of the negative stage in relationship to the condenser stage and indicates the proper setting of the negative stage for each size negative. The markings are therefore in terms of negative size.

SCALE C, CARRIAGE POSITIONING SCALE (38)

This scale indicates the vertical height of the carriage above a 1" thick easel and serves as a positioning reference (relative to the easel) both for the carriage (35) and the negative stage (12). This is of great convenience in the recording of special setups and in the making of reductions.

SCALE D, NEGATIVE STAGE POSITIONING SCALE FOR 1:1 MAGNIFICATION (39)

This scale indicates the position of the negative stage for 1:1 magnifications when using the lenses indicated.

This is the point at which the travel of the negative stage reverses in going from enlargements to reductions. To put this another way, in the case of maximum enlargement the distance from the negative stage to the easel is as great as possible, and the distance from the lens to the negative is at its minimum (slightly more than its focal length). As the magnification is reduced, the negative stage is lowered toward the easel and the lens must be moved away from the negative until sharp focus is obtained. This procedure continues until a 1:1 print is obtained, at which time the lens is midway between the easel and the negative, and each distance (lens to easel and lens to negative) is twice the focal length. As you continue down the scale (i.e., to make prints smaller than the negative) the negative stage must reverse its motion and move away from the easel while the lens moves toward the easel. Thus the 1:1 magnification provides an ideal reference as a starting position for making reductions and Scale D is specifically designed for this purpose.

IV. OPERATION

A. INTRODUCTION

The CB7 enlarger permits a very wide range of magnifications and reductions; thus, prints up to 16 x 20, and in some cases larger, can be made on the baseboard from all negative sizes from 35mm to 4" x 5", using lenses that would normally be used with each of these negatives. Larger prints, up to mural size, can be made with the wall projection attachment. At the other end of the scale, by selecting the proper lenses and using the various adjustments incorporated in the enlarger, reductions down to one-eighth original size, and in some cases even smaller, can readily be made. Table II, included at the end of this section, indicates what can be accomplished with the CB7 enlarger. Specific operating instructions are contained below.

Note that all stage locks are locked when the levers are pushed up—unlocked when pushed down. This means that those on the right side of the enlarger (the condenser stage lock and the lens stage lock) turn clockwise to lock; the one on the left side (negative stage lock) turns counterclockwise to lock.

B. GENERAL OPERATING PROCEDURE

1. Plug the power cord into a proper source of current. Check to see that the lamp cord from the Condenser Head is plugged into the lamphouse outlet (40) on the carriage (35). If using the Computerized Colorhead, the power cord should be plugged into the auxiliary outlet (41) and the timer cord into the lamphouse outlet (40) on the carriage (35). The power switch of the colorhead should be left "On."

2. Turn on the main switch.

3. Setting the condenser stage.

For usual enlargements the condenser stage will be at the top of the focusing track (Scale A = 0). For reductions see specific instructions given below.

NOTE: When lowering the condenser stage, grasp the knob firmly and turn it slowly.

4. Setting the negative stage.

Set the stage in accordance with the size of the negative as indicated on Scale B. Note, however, that for certain reduction procedures the negative stage is set to the 4 x 5 position for all negatives.

5. Inserting the negative.

Place the negative in the negative carrier and open the negative stage by pulling the operating lever (16) forward. Place the loaded negative carrier on the negative stage, engaging the bottom locating pins in the circular opening, and close the negative stage by pushing the operating lever back.

6. Focusing.

Set the selector switch (32) to the "Focus" position and the light in the lamphouse will go on.

The enlarger is equipped with power focus which is controlled by the operation of two switches. The lens stage moves upward by pushing the switch handles up and vice versa.

Rapid positioning of the lens stage is achieved by using the switch marked "Coarse Focus", while the use of the switch marked "Fine Focus" will permit extremely slow, precise focusing. Furthermore, the vernier speed can be adjusted by means of the fine focus adjustment knob (29).

NOTE: The manual lens focusing knob (20) can overdrive the motorized drive, which means that the lens stage can be moved more rapidly by hand if desired. However, the manual focusing knob should never be turned too quickly, as this may damage the gears of the power focus.

The accessory Remote Power Focus Control (Cat. #8253) is a great convenience in the making of murals since precise focusing can be accomplished while the operator is at the wall. The remote focusing control cable plugs into the receptacle provided (28).

7. MAKING THE EXPOSURE

Move the selector switch (32) to the "Expose" position. The light which had been turned on in the "Focus" position will be off and the circuit will be interconnected to the momentary exposure button (33).

Set the timer for the interval desired and push the exposure button. The exposure button will then start the timer which will time the exposure turning it off at the end of the predetermined cycle.

C. MAKING ENLARGEMENTS

1. ON THE BASEBOARD

Table I shows the maximum size enlargement that can be made on the baseboard. The procedure is as follows:

- (a) Set the condenser stage to the top of the focusing track (Scale A-O) and lock it.
- (b) Set the negative stage to the size negative being used (Scale B) and lock it.
- (c) Use the lens recommended for the negative being enlarged (see Table I).
- (d) Set the selector switch to "Focus."
- (e) Raise or lower the carriage as required, keeping the image in approximate focus, until the desired size picture is obtained.
- (f) Focus sharply.
- (g) Set the selector switch to "Expose."
- (h) Insert paper into easel and expose.

2. THROUGH THE BASEBOARD

Magnifications of selected areas on the negative exceeding that possible on the baseboard can be made by removing the baseboard (42) and shooting through the frame onto a horizontal surface below the frame.

3. ON THE WALL

Prints of almost any desired magnification can be made by projecting onto the wall. This can be done with the CB7 enlarger by using the Wall Projection Attachment (Cat. No. 8247). This consists of a front surface mirror carried on a bracket which mounts to the bottom of the lens stage.

In using the attachment, the enlarger is moved

toward or away from the wall (with the lens being continually adjusted for approximate focus) until the magnification desired is obtained. Then the lens is focused sharply.

For maximum convenience in wall projection, the enlarger should be placed on a table with casters to facilitate motion. It should also be equipped with the Remote Power Focus Control (Cat. No. 8253) so that you can stand near the wall and observe the image while you are focusing it sharply.

Note that, unlike normal "on the board" enlarging, moving the carriage up and down does not change the magnification very much. What it does do is change the position of the picture on the wall. It does, however, change the magnification of the picture slightly because of the slope of the enlarger frame, and this provides a vernier adjustment on the size of the picture.

Adjusting the lens up and down for focusing also moves the center line of the image up and down the wall slightly, since the mirror moves with the lens stage. Furthermore, as in all enlarging, the process of focusing modifies the size of the picture slightly since the magnification is the ratio of the image distance (image to lens) to the object distance (lens to negative).

D. MAKING PRINTS THE SAME SIZE AS THE NEGATIVE

As is well known, for maximum enlargements the carriage of the enlarger is raised to its highest position and the lens, when focused, stands at a distance from the negative a little greater than its focal length (the actual distance from the negative to the lens being equal to the focal length plus the focal length divided by the magnification). As the size of the print is reduced (from the maximum possible size) the carriage is lowered toward the baseboard and the lens must be moved further away from the negative, in order to bring it into focus. This process (of moving the carriage down and the lens away from the negative) continues as the magnification is reduced until you are making a print the size of which is the same as that of the negative (magnification = 1). In that position the lens stands a distance from the negative equal to twice its focal length, and the same distance (twice the focal length) above the easel. Thus at 1:1 magnification the distance from the easel to the negative stage is four times the focal length of the lens being used.

This magnification of 1:1 has a special significance in that if smaller size prints are desired, the motion of the carriage has to be reversed at this point so that from magnifications of 1:1 down to reduced size prints, the carriage must be moved away from the easel while the lens continues to move toward it.

Note that the negative must never get closer to the easel than four times the focal length of the lens being used. If it does, sharp focus will be impossible. On the other hand, if you are trying for 1:1 magnification and cannot get sharp focus, it means that the negative is too low—you have gone below the point of reversal.

The Beseler CB7 enlarger has two features which make it especially convenient for 1:1 prints.

The first is Scale D which shows the approximate negative stage position for 1:1 magnification.

The second is the vernier adjusting control for the carriage (34) which permits fine adjustment of the carriage so that the exact position required for 1:1 magnification (point of reversal) can be obtained.

E. MAKING REDUCTIONS

The Beseler CB7 enlarger is especially well suited to making reductions because the lens stage can be brought close to the easel and the other stages positioned as required. Thus by using proper lenses, etc., almost any reduction can be made. Furthermore, the enlarger is equipped with scales which enable specific instructions to be given and followed. It is assumed herein that a 1" thick easel will be used for all reduction work. We include below specific instructions for making reductions down to one-eighth the size of the negative.

METHOD 1 — CONTINUATION OF THE NORMAL ENLARGING PROCEDURE

If the reduction desired falls within the sizes given in Table I then the simplest method is to follow the procedure given for making enlargements, moving the carriage (and lens) down until the 1:1 magnification position is reached. Then proceed to obtain the reduction desired by reversing the carriage (moving it up) while continuing to focus the lens by moving it down.

This is the simplest method since it only requires moving the motorized carriage and lens stage. For greater reductions use Method 2 or 3.

METHOD 2 — MAKING REDUCTIONS BY SETTING THE ENLARGER FOR A MAGNIFICATION OF 1:1 AND WORKING DOWN

In Section IV, D (Making Prints the Same Size as the Negative) it was pointed out that the negative position for this magnification has a special significance in that it is the lowest position that the negative can occupy with a particular lens and still produce a sharp focus.

Scale D indicates this position for various lenses, and thus provides an easy starting point for making reductions. From this position to make reductions move the negative up (by moving the carriage) and the lens down.

It was also pointed out that the distance from the negative stage to the easel at this point of reversal is equal to four times the focal length. With the condenser stage set at the top of the focusing track (Scale A = 0) and with the negative stage set for 4" x 5" negatives (Scale B), the lowest possible position of the negative stage will be 20 1/2" above the easel. For 1:1 magnification this distance must equal four times the focal length. Therefore, for lenses shorter than 5 3/4" (135mm) not only must the carriage be at the bottom of its travel, but the condenser stage and negative stage must be lowered on the focusing track (Scale A no longer at 0) as required to bring the negative stage in line with the proper mark on Scale D.

The step-by-step procedure is as follows:

- A. Set the condenser stage at the top of the focusing track (Scale A = 0).
- B. Set the negative stage to the 4 x 5 position (regardless of the size negative being used).
- C. Note the focal length of the lens being used.

- D. Lower the carriage so that the top surface of the lower negative stage is in line with the indication on Scale D corresponding to the focal length of the lens being used. This can be judged by sighting along the upper surface of the lower negative stage or by using the button in the center negative stage positioning knob (13) as a reference.

NOTE: If the focal length of the lens is shorter than 5 3/4" (135mm) it will then be necessary to lower the negative stage and the condenser stage (keeping them in the 4" x 5" position relative to each other as indicated on Scale B) until the negative stage is in line with the proper marking on Scale D. When the negative stage is so positioned, it is in proper position for 1:1 magnification.

- E. Position the lens for sharp focus.

NOTE: To obtain the exact 1:1 position is difficult and requires careful back and forth positioning of the carriage and the lens. This is best accomplished (after getting close to the correct position) with the vernier carriage positioning knob (34). Keep in mind that the 1:1 condition (that the distance from the negative stage to the easel, equal to four times the focal length of the lens being used) represents the lowest possible position of the negative at which sharp focus can be obtained with the particular lens being used. For larger or smaller pictures, the negative must be further away from the easel. Therefore, if you are close to the 1:1 condition and cannot obtain a sharp focus, it is because the negative is too close to the easel.

- F. Having set the enlarger for obtaining a magnification of 1:1, to make reductions the negative must be moved up (usually by moving the carriage) and the lens down, the print size becoming smaller until some mechanical limit is reached; e.g., the lens stage reaching the bottom of the focusing track, etc.

Note that further reductions can frequently be obtained by using lenses of shorter focal length, taking advantage of the fact that a lens not capable of covering a larger size negative when making enlargements can indeed cover such a negative when making reductions, because it stands so far away from the negative that the field of view at that distance encompasses the negative size in question. In this case the old rule of thumb that the focal length of the lens should roughly equal the diagonal of the negative can be considered in reverse and thought of as equal to the diagonal of the print, which, since you are making a reduction, permits a shorter focal length.

METHOD 3 — MAKING REDUCTIONS BY SPECIFIC SETTINGS

A. GENERAL CONSIDERATIONS

Because of the many combinations of lenses and settings that can be employed in making reductions, a procedure has been worked for obtaining any reduction

down to one-eighth the size of the negative. This information is contained in Table II. This procedure is based on setting the enlarger for the smallest size picture and working up.

Referring to Column 1 of this table:

Line 1 shows the scale of reduction or the size of the print relative to the size of the negative.

Lines 2 to 11 each contain a heavy black bar which indicates the range of reductions that can be obtained with the lens listed (in Col. 2) on that line.

Line 12, for convenience, shows the size print obtained from a 4 x 5 negative at the indicated scale of reduction. It is thus the application of line 1 to a 4 x 5 negative.

Example: With a 50mm lens (line 11) the table shows that reductions from one-quarter to one-eighth size can be made. Line 12 shows that from a 4 x 5 negative this could make a print of from 1 1/4" x 1 9/16" to 1/2" x 5/8".

Column 2 contains the lenses required for each range indicated on lines 2 to 11.

Column 3 shows whether or not a lens cone is needed and, if so, its length.

Note that reductions down to three-eighths of the original can be made without any lens cones and that with a single lens cone (3 1/4" long) all indicated reductions can be obtained.

Column 4 shows the settings for obtaining the minimum indicated reduction in a particular range.

B. THE PROCEDURE IS AS FOLLOWS:

- (1) Pick the range containing the desired print size.
- (2) Pick a lens capable of working in the desired range.
- (3) Set the enlarger as indicated in column 4. This will give the smallest picture in the range.
- (4) To make larger pictures within the indicated range, follow one of the two procedures indicated below and referred to in column 5. Where procedure #1 can be used (as indicated in column 5) this is preferable because it does not require readjustment of the condenser and negative stages.

PROCEDURE #1











Starting from the minimum size print, move the lens up and the carriage down until the desired size print is obtained.

PROCEDURE #2

Starting from the minimum size print, move the lens up and move both the condenser stage and negative stage down until the desired print size is obtained (keeping Scale B set at 4 x 5).

TABLE II

TABLE II. MAKING REDUCTIONS BY SPECIFIC SETTINGS⁽¹⁾
(WITH LENSES SPECIFIED ANY REDUCTION DOWN TO 1/8 ORIGINAL SIZE CAN BE MADE)

LINE	COLUMN →	RANGE OF PRINT SIZES OBTAINABLE FROM 4x5 NEGATIVES ⁽²⁾								LENS NOMINAL FOCAL LENGTH		LENS CONE REQ'D.	SETTINGS FOR SMALLEST PICTURE IN THE RANGE					PROCEDURE ⁽³⁾ FOR LARGER PICTURES WITHIN RANGE
		FULL SIZE	7/8	3/4	5/8	1/2	3/8	1/4	1/8	MM	INCHES		CONDENSER STAGE	NEGATIVE STAGE RELATIVE TO		CARRIAGE POSITION	LENS BOARD TO EASEL	
1	SIZE OF PRINT RELATIVE TO NEGATIVE												SCALE A	SCALE B	SCALE C	SCALE C	INCHES	
2	BARS SHOW RANGE OF REDUCTIONS OBTAINABLE WITH LENSES SPECIFIED IN COLUMN 2									161	6 3/8	None	0	4x5	26	21	11 3/8	#1
3										150	6	None	0	4x5	25	20 1/4	10 1/2	#1
4										135	5 3/8	None	0	4x5	23 1/4	18 3/8	8 3/4	#1
5										127	5	None	1	4x5	21 3/4	17 3/4	8	#1
6										100	4	None	5	4x5	17	16 3/4	6 3/8	#1
7												None	0	4x5	20 3/4	15 1/2	5 3/8	#2
8										90	3 1/2	None	6 1/2	4x5	14 1/2	16 3/4	6 3/8	#1
9												None	4 3/4	4x5	15 3/4	15 1/2	5 3/4	#2
10												3 3/4	0	4x5	22 1/2	17 3/4	4 3/4	#2
11										50	2	3 1/4	0	4x5	20 1/2	15 1/2	2 3/4	#2
12		SIZE OF PRINT FROM 4x5 NEGATIVE (INCHES)	WIDTH x LENGTH	4 x 5	3-1/2 x 4 3/8	3 x 4	2 1/2 x 3-1/8	2 x 2-1/2	1-1/2 x 1-7/8	1 x 1-1/4	1/2 x 5/8							

⁽¹⁾ Because of manufacturing tolerances in the focal lengths of lenses, all settings are approximate.

⁽²⁾ This chart also applies to smaller negatives, with corresponding reductions, the resulting prints being proportionately smaller, however the negative stage is always to be located in the position indicated for 4x5 negatives (on Scale B).

⁽³⁾ Procedure #1: Starting from the minimum size print, move the lens up and the carriage down until the desired size print is obtained.

Procedure #2: Starting from the minimum size print, move the lens up and move both the condenser stage and negative stage down until the desired print size is obtained (keeping Scale B set at 4x5).

V. ACCESSORIES

As well as accepting an extensive assortment of lenses, lens boards and negative carriers, the CB7 can accommodate many other accessories, the most important of which are described below.

1. Point Light Source, Cat. #8135 — Designed to give the highest resolution and extremely brilliant, high-contrast illumination, the Point Light Source is easily interchangeable with the conventional lamphouse, fitting directly on top of the condenser assembly. The ideal system for EM labs, photomicrographics, printed circuit production, micro-fiche, micro-file, color separations, photo murals or the most discriminating photographic printer.

2. Wall Projection Attachment, Cat. #8247 — The wall projection attachment consists of a front surface mirror furnished with special mounting screws which permit it to be mounted beneath the lens stage. The device incorporates a snap-on cover to protect the mirror and provision is made for this cover to snap under the mirror frame when the device is being used.

3. Remote Power Focus Control, Cat. #8253 — This power cord is designed for use with wall projection, permitting fine focusing of the enlarger while standing at the wall. The cord is 12 feet long, has a male plug on one end which plugs into a suitable receptacle on the front of the enlarger. The other end contains a momentary switch by means of which the lens can be raised or lowered (at its fine focus speed).

4. Footswitch, Cat. #8179 — This consists of a foot-operated switch, 6 feet of cord and a plug which mates with a suitable outlet on the front of the enlarger. This switch permits remote activation of the timer.

5. Audible/Repeating Enlarging Timer, Cat. #8177 This all-electronic timer hooks directly into the timer circuit of the enlarger. Exposure times range from 0.1-110 seconds and a switchable "metronome" tone provides an audible "beep" every second to aid in dodging and burning operations.

6. Negafat — Cat. #8340 — The Beseler Negafat carrier safely grips the edges of your 4" x 5" negative, pulls it taut and holds it taut and flat under "controlled tension." The negative cannot curl or buckle, holds it as flat as glass without all the problems of glass.

7. Negatrans —

Cat. #8332 for 35mm roll (1/2 and full frame)

Cat. #8333 for 2 1/4 roll (2 1/4 sq. and 2 1/4 x 2 1/4)

Cat. #8092 "645" adapter for 2 1/4 model

The Beseler Negatrans keeps negative handling to a minimum. Individual negatives or complete rolls are transported through the Negatrans carrier without fingerprinting or scratching. The accessory Extension Control Shaft (Cat. #8079) allows easier use of Negatrans when making large prints.

VI. MAINTENANCE AND ADJUSTMENT

The CB7 Enlarger is designed to stay in adjustment and to operate with a minimum of maintenance; however, certain cleaning and lubrication procedures

are important in any piece of optical equipment, and this applies also to the CB7 enlarger. The following instructions should cover all ordinary maintenance procedures required by the enlarger. Identification numbers refer to Fig. 3.

1. REPLACING THE LAMP

Loosen the screw (2) and lift the lamp cap assembly off of the lamphouse. The Lamp is then accessible for replacement.

2. CLEANING THE CONDENSERS AND HEAT ABSORBER

Disconnect the lamp cord from the lamphouse outlet (40) and remove the lamp housing by loosening the three thumb screws (4) and lifting the housing off of the condenser housing. Remove the condenser housing by pulling the condenser housing latching bars (8) toward you. The condenser housing can then be lifted from the condenser stage.

The condensing system incorporates a heat absorber placed over the top condenser. The top surface of this heat absorber and the bottom surface of the lower condenser can, of course, be cleaned without disassembly. If the interior surfaces need cleaning, remove the four retaining pads, which will permit removal of the heat absorber. Remove the wire ring which is located between the heat absorber and top condenser, and the upper condenser can then be removed.

NOTE: After removing the four retaining pads, a convenient way of removing the heat absorber and upper condenser is to put a small circular object (such as a saucer) against the heat absorber and turn the assembly over. Then by lifting the housing upward, the heat absorber glass will be left on the supporting object. The inverse procedure can be used for reassembly.

3. CLEANING THE FOCUSING TRACK

Clean the focusing track with a soft rag which has been moistened with fine oil such as regular "3 in 1" oil, SAE #5. Run the focusing blocks up and down and then wipe the track with paper toweling or with a lint-free rag. The cleaning of the track is very important for smooth power focus.

4. ADJUSTMENT OF THE LOCKING LEVER POSITIONS

The locking levers (10, 14, and 21) of the three stages are mounted in collars having four mounting holes spaced at 90°. These holes provide a means of changing the angular position of the locking levers if desired.

5. ADJUSTMENT OF THE FRICTION DRIVE IN FOCUSING BLOCKS

All focusing blocks are actuated by a hardened friction driving wheel riding on a hardened friction bar. The pressure between these two members is adjustable by means of an adjusting screw which actuates a pressure spring.

The adjusting screw for the lens stage is identified on Fig. 5 by callout 50. There is a similar screw for the focusing block of the negative stage and for the condenser stage.

The negative stage adjusting screw is visible on the enlarger; however, the condenser stage adjusting

screw is not. Access to the latter is obtained by removing the lamphouse and condenser box. The adjusting screw can then be reached through a hole in the vertical wall of the condenser stage (when the stage is pushed down as far as it will go).

The pressure spring adjusting screw should not be overtightened, but should be adjusted inward until smooth, firm driving action is obtained.

As the lens stage is equipped with power focus, the friction adjustment should be as light as possible consistent with obtaining definite driving action.

6. ADJUSTMENT OF THE FIT OF THE FOCUSING BLOCK TO THE FOCUSING TRACK

As illustrated (in Fig. 6) the focusing blocks ride on two plastic gibs on the back of the focusing track and four plastic blocks on the front of the track. Gib No. 1 is fixed. Gib No. 2 is adjustable and provides for lateral adjustment of the stages.

The four plastic blocks (3) are mounted on eccentric nuts which can be turned by the hex collars (4) to move the block in or out to obtain the desired fit. A thin $\frac{3}{16}$ " hex wrench is furnished with the enlarger for this purpose.

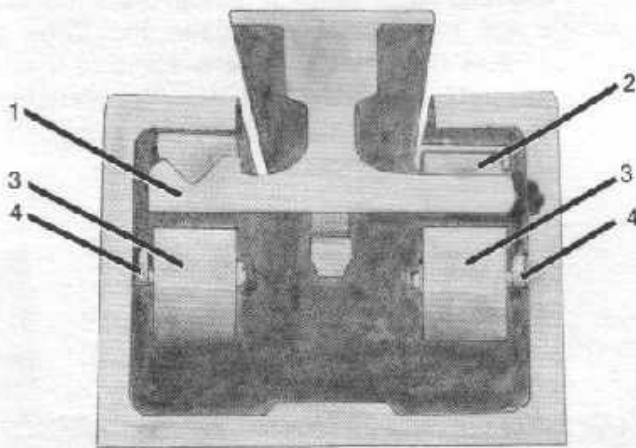


Figure 6. Adjusting the focusing blocks.

To make the adjustment, loosen the screws (on the side of the block) which mate with the eccentric nuts, and adjust the gib against the track using a .003" shim. Tighten the screws and remove the shim.

7. ADJUSTMENT OF CONDENSER STAGE COUNTERBALANCE SPRINGS

The condenser stage is equipped with counterbalance springs which help lift the condensing system and lamphouse. These counterbalance springs push upward against plastic plugs which, in turn, engage the tips of the counterbalance spring engagement screws (36, Fig. 5).

When using alternate lighting systems of lighter weight, one of these screws can be removed, thus cutting the counterbalancing force in half, or both can be removed so that there is no counterbalancing effort at all. In this way the condenser stage can be adjusted to suit alternate types of lighting systems.

To insert the screws, the condenser stage must

be positioned down as far as it will go, in which position the tip of the screw will pass over the top of the plastic plug.

VII. INSPECTION AND ALIGNMENT OF CB7 ENLARGER

In writing these inspection and alignment procedures, we assume that this instruction manual has been carefully read. We also assume that the enlarger has been assembled from its shipping carton as described in this manual. The following procedures will check out the enlarger from that point.

1. Recheck the assembly of the enlarger. Check all mounting hardware and assembly screws (baseboard, frame, focusing track, braces, etc.). Make sure all are firmly set.

2. Make an electrical ground check. All wires should be firmly connected. The enlarger should be grounded from the frame to an electrical ground at the wall outlet. Both a simplified schematic and a complete wiring diagram have been provided in Section VIII for your convenience.

3. Check condenser glass. The condensers should be clean and seated properly in the condenser housing.

4. Check general cleanliness of enlarger. Bellows should be free of dirt and dust.

5. Before alignment can be checked, the entire enlarger must be leveled. This is done by using a good quality "bubble" level (carpenter's line level). The level is placed on the baseboard and the entire enlarger is adjusted accordingly. **LEVELING OF THE ENLARGER IS OF MAXIMUM IMPORTANCE**, since all future alignment checks use a level baseboard as a point of reference.

6. Check the alignment of the carriage assembly (35, Fig. 5) in the elevation gear racks. Use a good quality carpenter's square and measure the distance from the lower cross-tube to the baseboard, left and right sides. A $\frac{1}{16}$ " tolerance (difference) is acceptable. To adjust, loosen the two elevation gear rack screws (inside the upright frame), top and bottom, on one side. The entire gear rack can now be moved, up or down, by applying pressure to the upper or lower tube. After adjustment is made, retighten the gear rack screws. Recheck with the carpenter's square and repeat procedure until both sides of the lower cross tube are equal distance from the baseboard.

7. a. Check to see that the focusing track (48, Fig. 5) is perpendicular to the baseboard. First check the sides (left and right) of the focusing track using the carpenter's square. To adjust, loosen slightly the two extension mounting screws and the Allen head cap screw. Pivot the entire focusing track, as needed.

b. Using the carpenter's square, check the focusing track from the front. The front or rear of the focusing track should also be perpendicular to the baseboard. To adjust, go to the

rear of the enlarger and loosen the rear strut lock nuts (on each side). Carefully tighten or loosen (as needed) the rear struts until the focusing track is perpendicular. This procedure must be done carefully and slowly. Make the adjustments to the rear struts in *small and equal* increments. Start by turning the left rear strut $\frac{1}{4}$ turn. Then turn the right rear strut the same amount ($\frac{1}{4}$ turn). Continue in this manner until the focusing track is perpendicular. One final word of caution. If the rear struts are adjusted unevenly, a "twisting" of the entire upright frame assembly will result. This "twisting" will cause uneven operation of the carriage assembly in the elevation gear racks and might eventually wear out these gear racks and/or the elevation motor.

8. Check parallelism (to baseboard) of the condenser support stage (7, Fig. 5). The condenser lamp-house assembly must be removed first.

a. Front view — Measure (using the carpenter's square or an accurate tape rule) each side of the condenser stage (make this measurement along the front edge of the condenser stage) to the baseboard. Up to a $\frac{1}{16}$ " difference is within tolerance. To adjust, refer to Fig. 7.

1. Loosen the four locking screws.

2. Adjust the four Allen screws on the sides. If the condenser stage is too high on the left side, loosen screws B and C and tighten A and D. If the right side is too high, loosen A and D and tighten B and C.

3. After adjustment, retighten the four locking screws.

b. Side view — Measure (front to back) the left and right sides of the condenser support stage to the baseboard. Make this measurement, using the carpenter's square or tape rule, along the bottom edge of the condenser stage. A $\frac{1}{16}$ " difference (usually the front is slightly lower than the back) is within tolerance. If the difference is greater than $\frac{1}{16}$ ", the condenser support stage is bent, and must be replaced.

9. Check parallelism, to baseboard, of negative stage. Insert a *flat* piece of metal into the negative stage (as if it were a negative carrier) so that it protrudes out both sides of the negative stage. Using the carpenter's square or tape rule, measure each side from the baseboard to this piece of metal. Adjust the negative stage tilt knob until both sides are equal distance to the baseboard. When both sides are equal distance, the negative stage is now parallel (front view) to the baseboard. Now check to see that the negative stage tilt indicator points to zero on the tilt scale (18, Fig. 5). The tilt scale can be moved so that the indicator pointer and the "zero" position on the scale line up. This is done by applying heat to the scale (use a hot air hair dryer) and moving it accordingly.

a. Side view — Insert a flat piece of metal so that it protrudes out over the entire side (front to back) of the negative stage. Measure with

the carpenter's square or tape rule the front of the flat metal plate to the baseboard. Do the same thing from the back of the metal plate. Again, a $\frac{1}{16}$ " difference is within tolerance. Repeat this procedure on the other side of the negative stage. If the difference between the front and back of the metal plate is greater than $\frac{1}{16}$ ", the negative stage must be replaced.

10. a. Lens stage parallel — front view — This procedure is done similarly to the negative stage, except the measurements are made from a flat lensboard that has been placed in the lens stage of the enlarger. Lower the entire carriage assembly so that the lensboard comes into contact with the carpenter's square. Adjust the lens stage tilt knob so that both sides of the lensboard just make contact with the carpenter's square. This lens stage tilt scale (23, Fig. 5) should read zero. If not, the scale plate should be removed and repositioned using epoxy cement.

b. Lens stage parallel — side view — This procedure is done the same way as in #10, a (above), except the measurements are made from the side of the enlarger. If the lens stage is not parallel, "shims" can be placed between the lens stage casting (19, Fig. 5) and the lens stage tilt assembly. Loosen the three (3) screws that attach the lens stage to the tilt assembly and insert the "shims." Retighten the screws and recheck the measurements. Repeat as necessary.

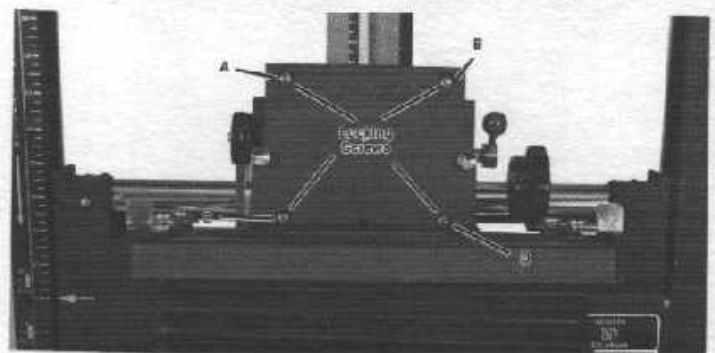
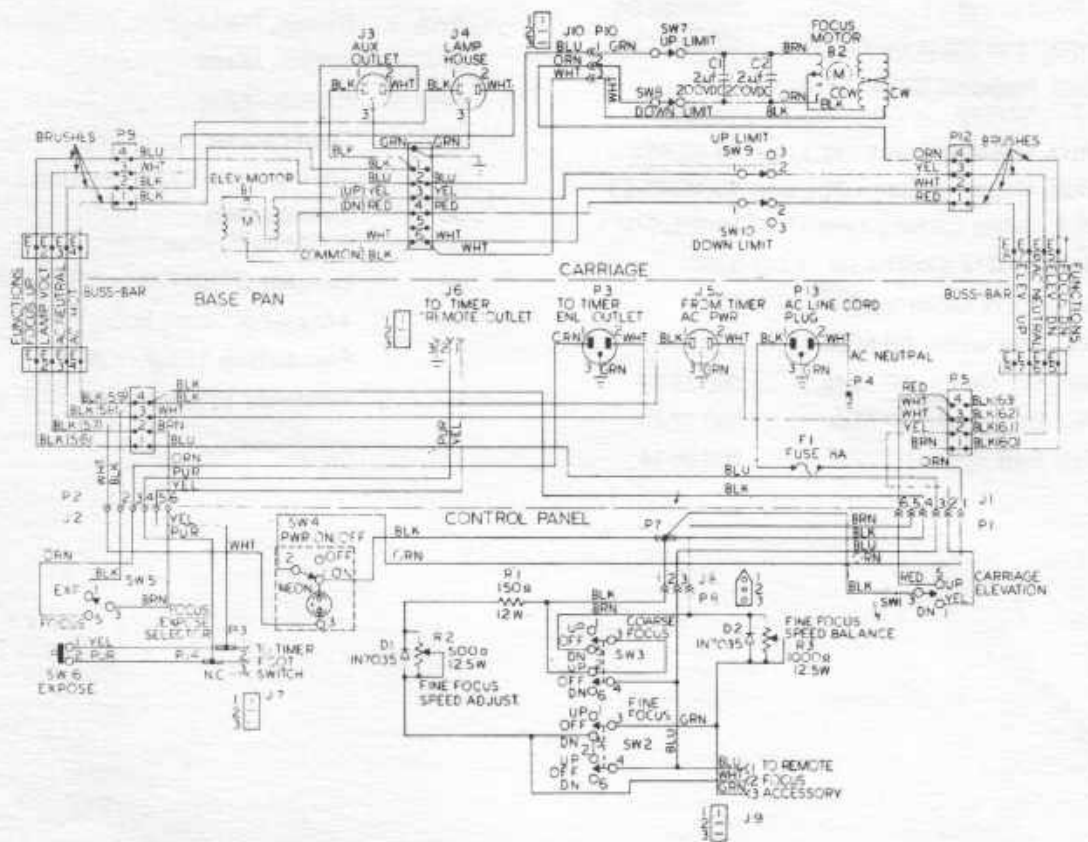
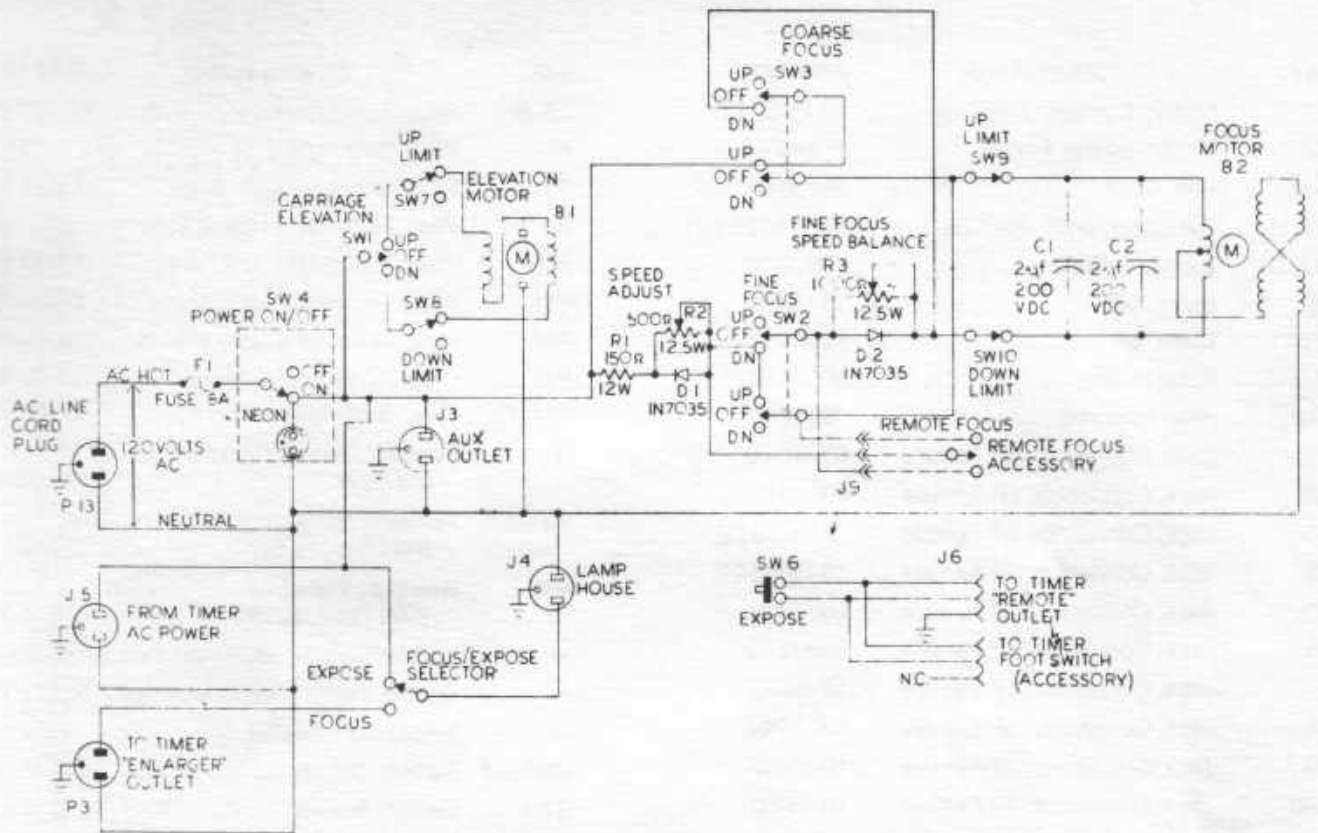


Figure 7. Adjustment of Condenser Support Stage

VIII SCHEMATIC AND WIRING DIAGRAM



IX REPLACEMENT PARTS LIST FOR CB7

Reference symbols beginning with letters are from the Wiring Diagram (Section VIII).

Reference symbols beginning with numbers are from Fig. 5.

REF.	DESCRIPTION	PART NO.	REF.	DESCRIPTION	PART NO.
B1	Motor, Carriage Elevation	10-15453-22	P5, 6	Plug, Terminal Block, 4 Term.	600-50-15
B2	Motor, Power Focus	615-42-03	P7	Plug, Butt Splice	600-25-14
—	Belt, Drive	562-36-01	P8	Plug, Connector, 3P Male	600-17-05
C1, C2	Capacitor, 2mF, 200VDC	632-31-02-62-21	P9	Plug, Terminal Block, 4 Term.	600-50-06
D1, D2	Diode, 1N7035	635-70-10	P10	Plug, Focus Motor, 3 Term.	605-74-15
25	Filter, Red	10-15380	P11	Plug, Terminal Block, 6 Term.	600-50-17
F1	Fuse, 8A	600-62-05	P12	Plug, Terminal Block, 4 Term.	600-50-06
—	Fuse Holder	600-60-01	P13	Plug, AC and Line Cord	605-72-54
—	Heat Absorber	680-78-17	P14, 15	Plug, Butt Splice	600-25-14
J1	Jack, Connector, 6P Female	600-23-09	R1	Resistor, Fixed, 150 Ohm, 5%,12W	630-29-15-12
J2	Jack, Connector, 6P Female	600-21-07	R2	Resistor, Variable, 500 Ohm, 12.5W	631-10-16
J3	Jack, Connector, 3P Female	10-15359-22	R3	Resistor, Variable, 1000 Ohm, 12.5W	631-10-26
J4	Jack, Connector, 3P Female	10-15359-21	—	Socket, Lamp (Condenser Head)	625-82-01
J5	Jack, Connector, 3P Female	600-15-06	—	Socket, Lamp (Condenser Head)	625-72-13
J6	Jack, Connector, 3P Female	600-19-03	—	Speed Control Unit	10-15449
J7	Jack, Connector, 3P Female	10-46633	SW1,2,3	Switch, Toggle	610-10-60
J8	Jack, Connector, 3P Female	600-19-02	SW4	Switch, Rocker	610-14-01
J9	Jack, Connector, 3P Female	10-15449	SW5	Switch, Toggle	610-10-59
J10	Jack, Connector, 3P Female	10-15358	SW6	Switch, Pushbutton	610-18-20
9	Knob, Condenser Stage Positioning	10-15306-06	SW7, 8	Switch, Micro	610-18-04
20	Knob, Lens Stage Focusing	10-15214-06	SW9,10	Switch, Micro	610-18-18
13	Knob, Negative Stage Positioning	10-15387	2	Thumbscrew, Lamp Cap	568-20-07
17	Knob, Negative Stage Tilt	10-15295-01	4	Thumbscrew, Lamp Housing	540-43-29
16	Knob, Negative Stage Opening	10-15288-01	36	Thumbscrew, Spring Engagement	10-15308
10,14,21	Knob, Stage Locking Lever	10-15225-01	—	Carriage Brush Replacement Kit	10-44008
—	Lamp, PH212 (Condenser Head)	8100	—	Accessory Timer Power Cord	605-78-14
—	Lamp, EVW (Colorhead)	8108	—	Footswitch Trigger Cord	10-46631
P1	Plug, Connector, 6P Male	600-21-07	—	Hardware & Tool Set	10-15145
P2	Plug, Connector, 6P Male	600-23-09			
P3	Plug, Connector, 3P Male	600-17-25			
P4	Plug, Butt Splice	600-25-14			

PROCEDURE FOR INSPECTION AND ALIGNMENT
OF
CB-7 ENLARGER

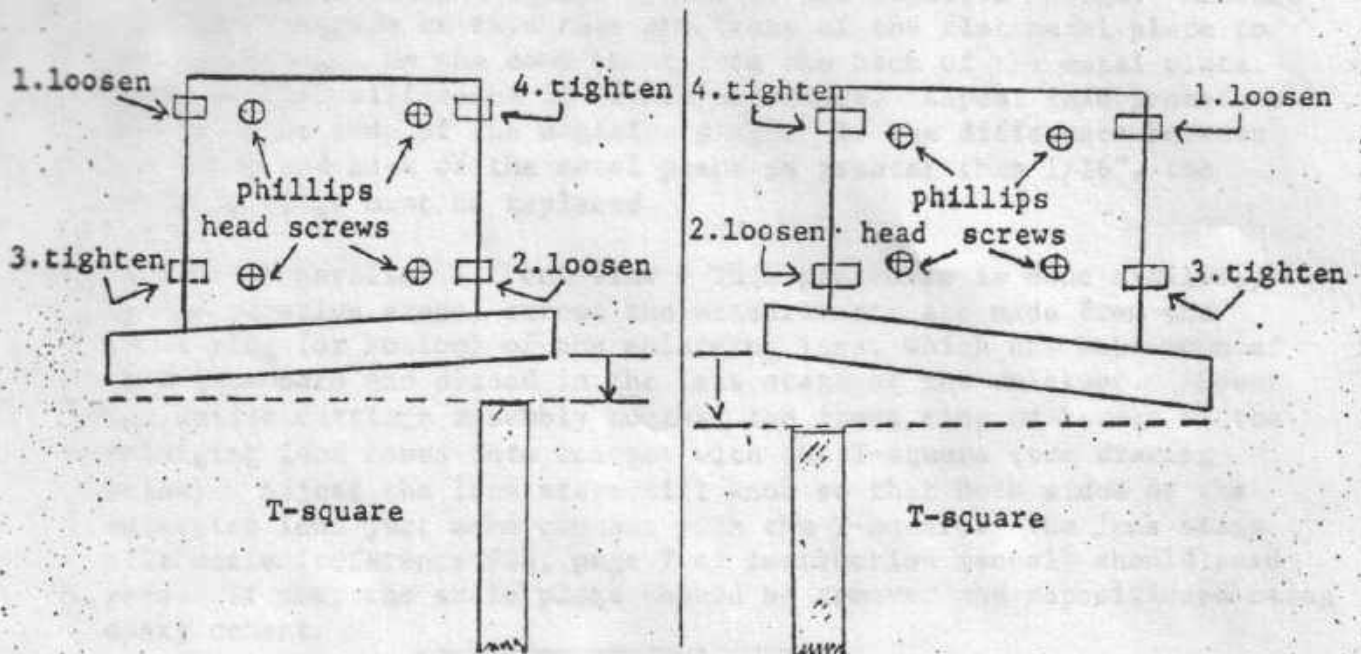
The CB-7 enlarger is a precision made and carefully assembled piece of photographic darkroom equipment. It's modular component design offers features and conveniences that are hard to find in other enlargers. Every CB-7 enlarger leaves our factory carefully aligned and thoroughly checked out, ready for the most demanding darkroom use. The procedures outlined below will help those CB-7 owners who desire to make their own repairs, in the event repairs are needed.

In writing these repair procedures we assume that the instruction manual that is packed with every CB-7 enlarger has been carefully read. We also assume that the enlarger has been assembled from its shipping carton as described in the instruction manual. The following procedures will check out the enlarger from that point.

1. Recheck the assembly of the enlarger. Refer to the instruction manual for details. Check all mounting hardware and assembly screws (base-board, frame, focusing track, braces, etc.). Make sure all are firmly set.
2. Make an electrical ground check. All wires should be firmly connected. The enlarger should be grounded from the frame to an electrical ground at the wall outlet. Electrical schematic wiring diagrams are available upon request.
3. Check condenser glass. The condensers should be clean and seated properly in the condenser housing.
4. Check general cleanliness of enlarger. Bellows should be free of dirt and dust.

5. Before the alignment can be checked the entire enlarger must be leveled. This is done by using a good quality "bubble" level (carpenters line level). The level is placed on the baseboard and the entire enlarger is adjusted accordingly. LEVELING OF THE ENLARGER IS OF MAXIMUM IMPORTANCE, since all future alignment checks use a level baseboard as a point of reference.
6. Check the alignment of the carriage assembly (reference #35 on page 7 of instruction manual) in the elevation gear racks. Use a good quality T-square and measure the distance from the lower cross-tube to the baseboard, left and right sides. A 1/16" tolerance (difference) is acceptable. To adjust, loosen the two elevation gear rack screws (inside the upright frame), top and bottom, on one side. The entire gear rack can now be moved, up or down, by applying pressure to the upper or lower tube. After adjustment is made, retighten the gear rack screws. Recheck with the T-square and repeat procedure until both sides of the lower cross tube are equal distance from the baseboard.
7. a. Check to see that the focusing track (reference #50, page 7 of the instruction manual) is perpendicular to the baseboard. First check the sides (left and right) of the focusing track using the T-square. To adjust, loosen slightly the two extension mounting screws (items #7D and 7E, page 4 of instruction manual) and the Allen head cap screw (item 7B). Pivot the entire focusing track, as needed.
b. Using the T-square check the focusing track from the front. The front or rear of the focusing track should also be perpendicular to the baseboard. To adjust, go to the rear of the enlarger and loosen the rear strut lock nuts (on each side). Carefully tighten or loosen (as needed) the rear struts until the focusing track is perpendicular. This procedure must be done carefully and slowly. Make the adjustments to the rear struts in small and equal increments. Start by turning the left rear strut 1/4 turn. Then turn the right rear strut the same amount (1/4 turn). Continue in this manner until the focusing track is perpendicular. One final word of caution. If the rear struts are adjusted unevenly, a "twisting" of the entire upright frame assembly will result. This "twisting" will cause uneven operation of the carriage assembly in the elevation gear racks and might eventually wear out these gear racks and/or the elevation motor.
8. Check parallelism (to baseboard) of the condenser support stage (reference #7, page 7 of instruction manual). The condenser assembly (including lighthousing and lamp cap) must be removed first (refer to B-3 on page 4 of instruction manual).

- a. Front view - Measure (using the T-square or an accurate tape rule) each side of the condenser stage (make this measurement along the front edge of the condenser stage) to the baseboard. Up to a 1/16" difference is within tolerance. To adjust, refer to the drawing below.



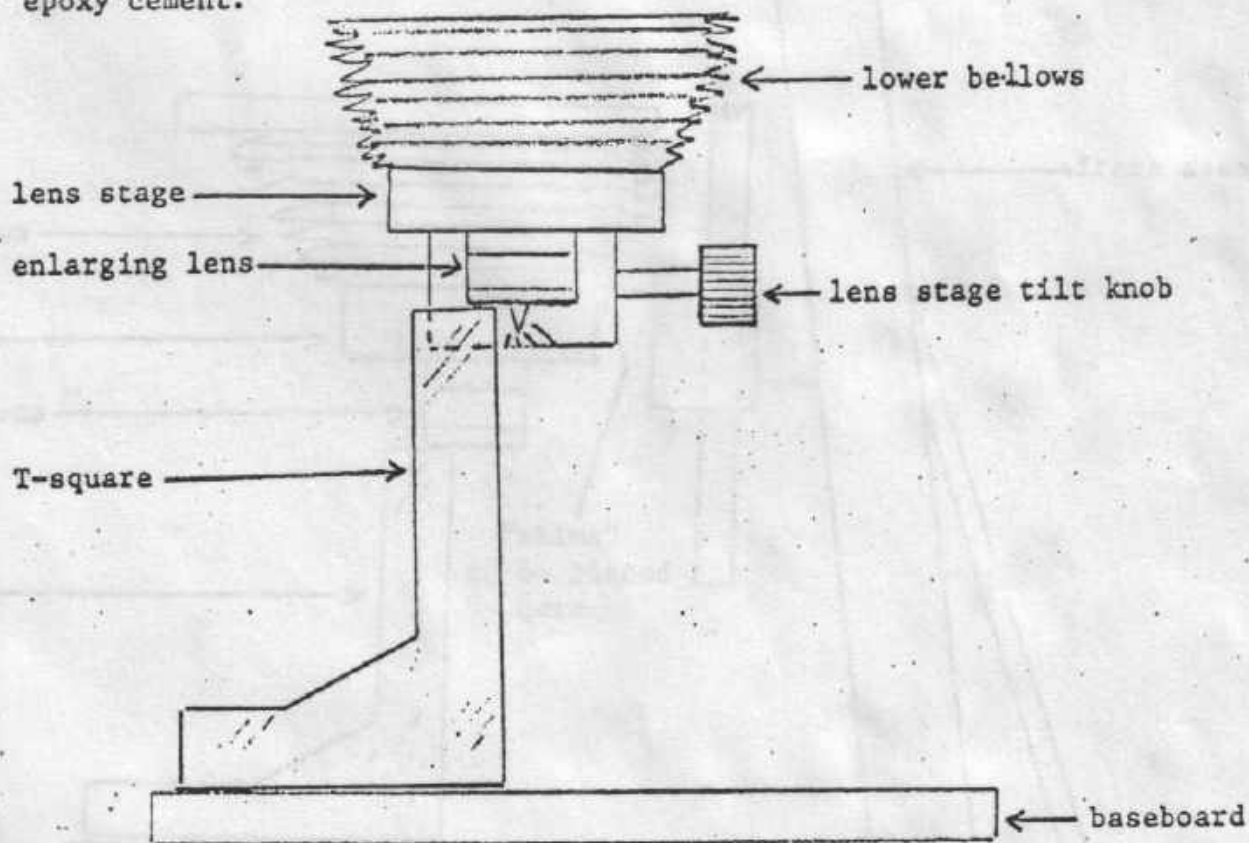
1. Loosen the four phillips head screws.
2. Adjust the four allen screws on the sides as outlined in the diagram.
3. After adjustment, retighten the four phillips head screws.

- b. Side view - Measure (front to back) the left and right sides of the condenser support stage to the baseboard. Make this measurement, using the T-square or tape rule, along the bottom edge of the condenser stage. A 1/16" difference (usually the front is slightly lower than the back) is within tolerance. If the difference is greater than 1/16", the condenser support stage is bent, and must be replaced.

9. Check parallelism, to baseboard, of negative stage. Insert a flat piece of metal into the negative stage (as if it was a negative carrier) so that it protrudes out both sides of the negative stage. Using the T-square or tape rule measure each side from the baseboard to this piece of metal. Adjust the negative stage tilt knob until both sides are equal distance to the baseboard. When both sides are equal distance the negative stage is now parallel (front view) to the baseboard. Now check to see that the negative stage tilt indicator points to zero on the tilt scale (reference #18, page 7 of instruction manual). The tilt scale can be moved so that the indicator pointer

and the "zero" position on the scale line up. This is done by applying heat to the scale (use a hot air hair dryer) and moving it accordingly.

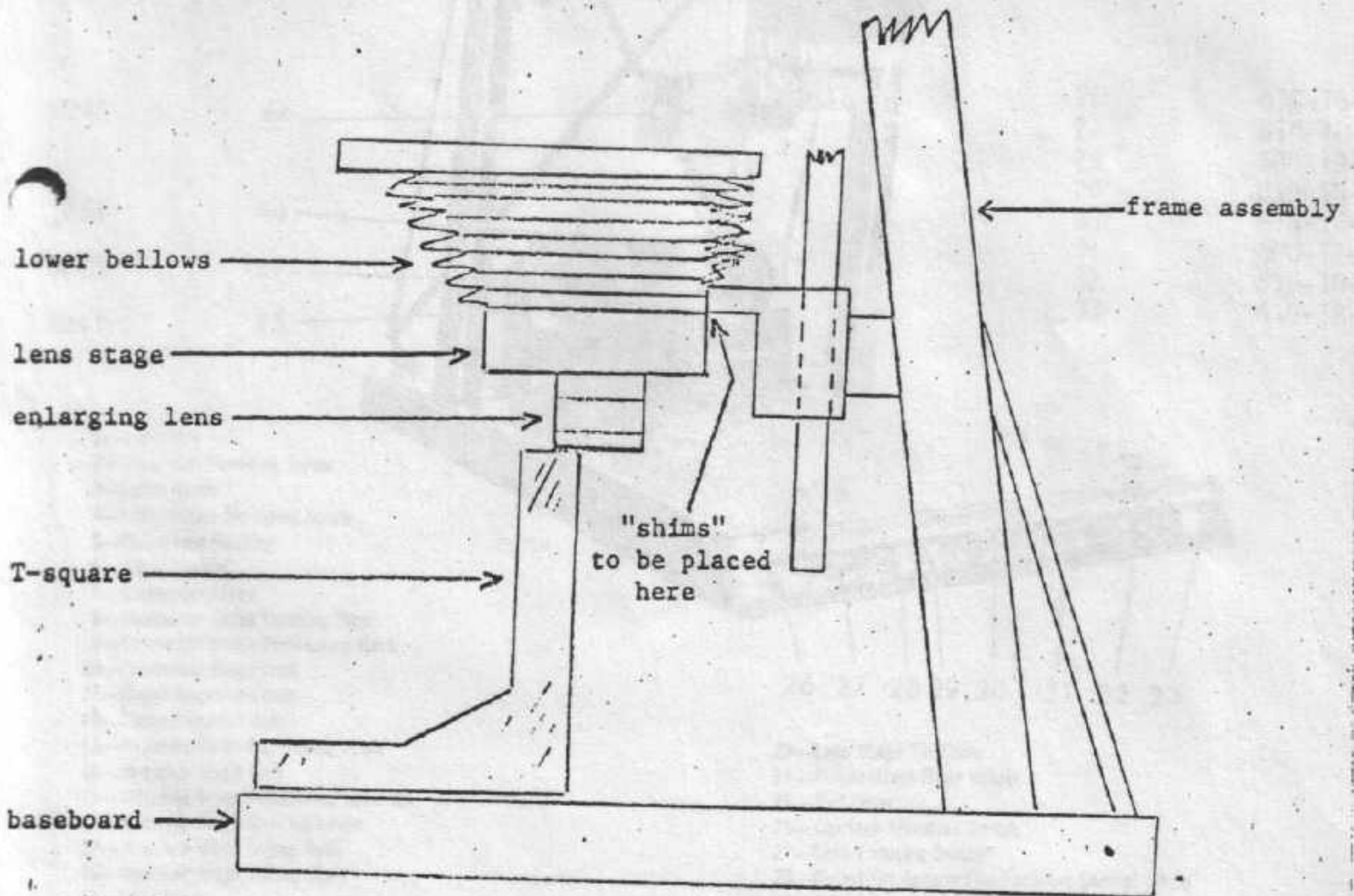
- 9.a. Side view - Insert the flat piece of metal so that it protrudes out over the entire side (front to back) of the negative stage. Measure with the T-square or tape rule the front of the flat metal plate to the baseboard. Do the same thing from the back of the metal plate. Again a 1/16" difference is within tolerance. Repeat this procedure on the other side of the negative stage. If the difference between the front and back of the metal plate is greater than 1/16", the negative stage must be replaced.
- 10.a. Lens stage parallel - front view - This procedure is done similarly to the negative stage, except the measurements are made from the front ring (or bottom) of the enlarging lens, which has been mounted on a lensboard and placed in the lens stage of the enlarger. Lower the entire carriage assembly so that the front ring or bottom of the enlarging lens comes into contact with the T-square (see drawing below). Adjust the lens stage tilt knob so that both sides of the enlarging lens just make contact with the T-square. The lens stage tilt scale (reference #23, page 7 of instruction manual) should read zero. If not, the scale plate should be removed and repositioned using epoxy cement.



FRONT VIEW

pages out of order

- b. Lens stage parallel - side view - This procedure is done the same way as in #10A (above), except the measurements are made from the side of the enlarger. If the lens stage is not parallel, "shims" can be placed between the lens stage casting (reference #19, page 17 of the instruction manual) and the lens stage tilt assembly. Loosen the three (3) screws that attach the lens stage to the tilt assembly and insert the "shims". Retighten the screws and recheck the measurements. Repeat as necessary.



The Power Focus Attachment provides a convenient means of obtaining fine focus by a simple control mounted on the vertical stand of the microscope. With its fine adjustment dial, you can obtain a sharp optical image by the simple turning of the knob. The fine focus is located in the center of the dial. The convenient control of the microscope is the center of the dial. The control is mounted on the vertical stand of the microscope. The control is mounted on the vertical stand of the microscope. The control is mounted on the vertical stand of the microscope.

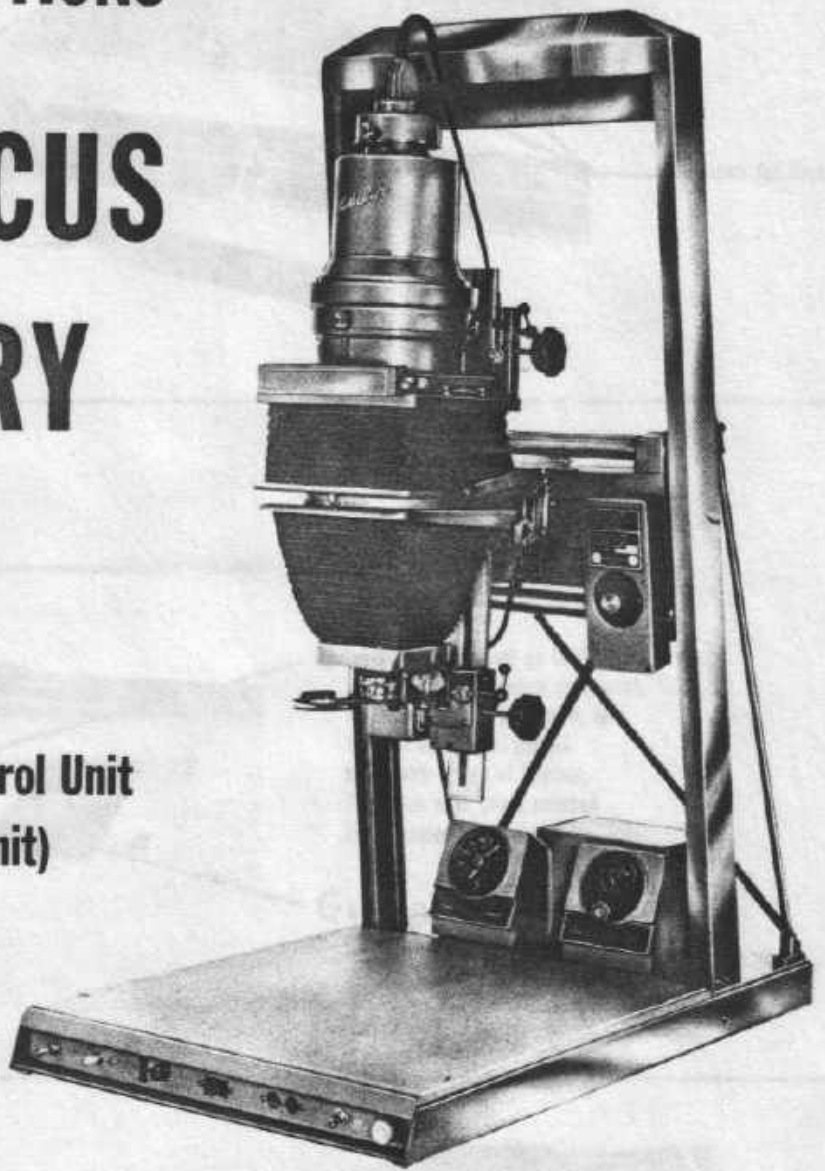
INSTALLATION POWER FOCUS CONTROL UNIT

ASSEMBLY INSTRUCTIONS

POWER FOCUS ACCESSORY

P-101

(Consist of Power Focus Control Unit
and Power Focus Drive Unit)



COMPLETE INSTALLATION

CHARLES BESELER COMPANY

219 SOUTH 18th STREET

EAST ORANGE, N. J. 07018



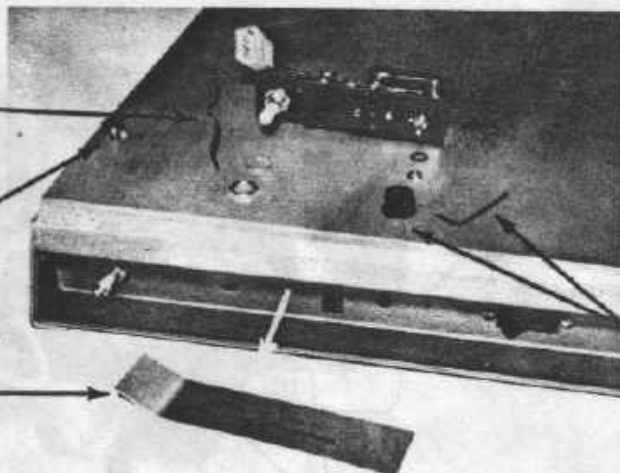
The Power Focus Attachment provides a convenient means of focusing the lens by a single control located on the control panel of the enlarger, and it also permits the use of a remote control cord so that when making great enlargements on the wall, the lens can be focused while standing at the enlarger. The attachment consists of two main units: the control unit and the motor drive unit. The latter contains limit switches which automatically stop the motion at each end of the travel. The unit is easily installed by following the instructions given below.

INSTALLATION POWER FOCUS CONTROL UNIT

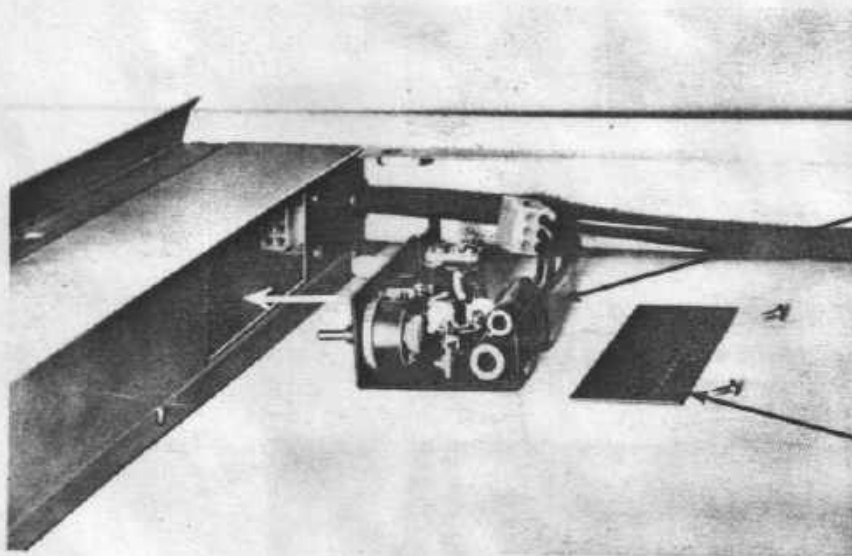
1 Power Focus Control with Mounting Hardware Removed, ready for Installation

2 Remove 4 Baseboard Screws and Lift Out Baseboard

3 Peel Off Cover Plate



Wrench for Knob



4 Remove perforated cover plate

5 Install control unit as follows: (avoid handling switch contacts), mate connector, assemble and tighten hardware. Install knob with index at approx. 7 o'clock with shaft rotated full counterclockwise

6 Reinstall perforated cover plate

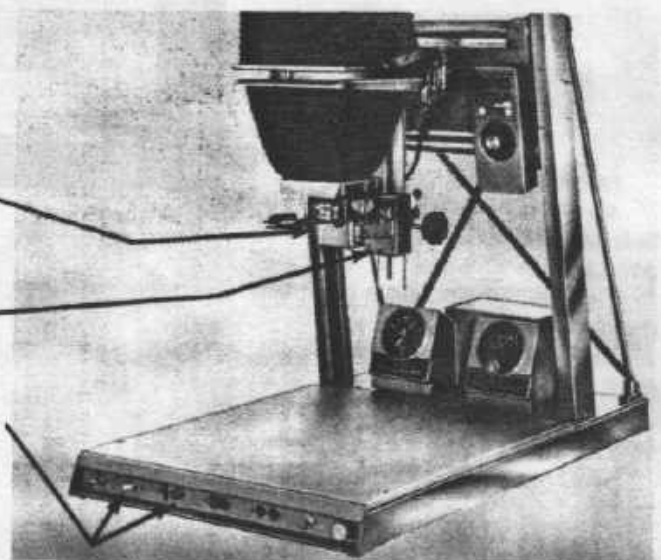
7 Reinstall baseboard

COMPLETED INSTALLATION

Power Focus Drive Unit

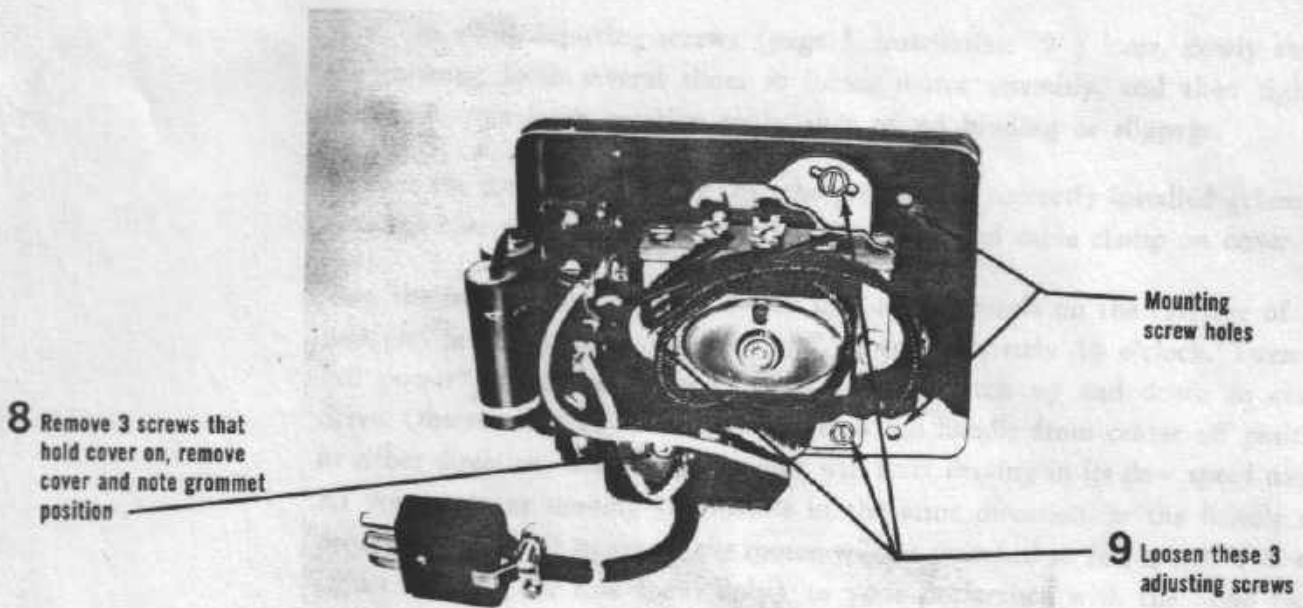
Slide Tension Adjusting Screw (See Pg. 4)

Power Focus Control Unit



INSTALLATION POWER FOCUS DRIVE UNIT

Power Focus Drive Unit Shown with Cover Removed



MOUNTING POWER FOCUS DRIVE UNIT

