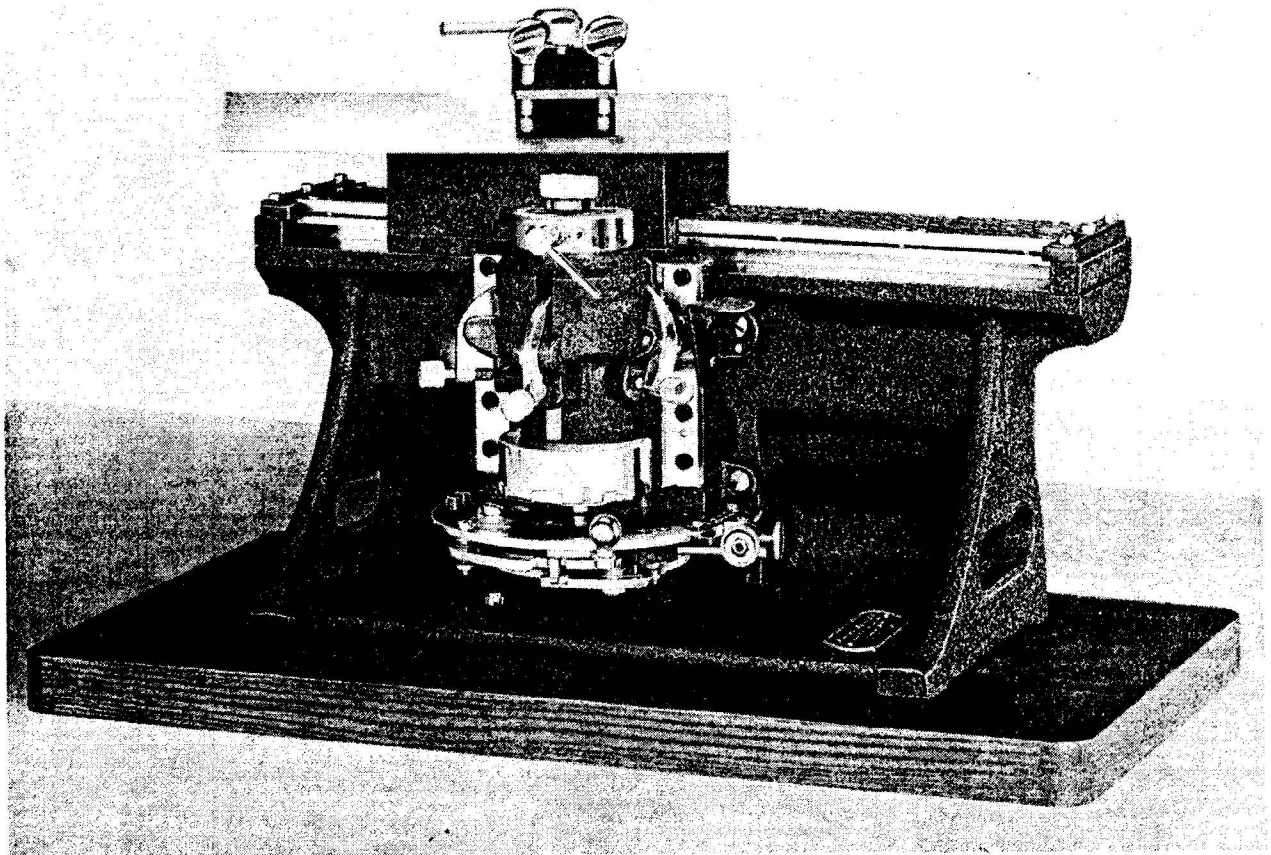


# AO SPENCER SLIDING MICROTOME

Model 860

## REFERENCE MANUAL



 **AMERICAN OPTICAL  
CORPORATION**

SCIENTIFIC INSTRUMENT DIVISION • BUFFALO, N. Y. 14215

## INSTRUMENT WARRANTY

This American Optical Corporation, Scientific Instrument Division, product is warranted against defective material and workmanship for one year. This warranty applies only to new products that have not been tampered with or misused in any way.

*AO will not be liable to anyone for special or consequential damages of any kind. Nor does AO warrant consumables or accessories not manufactured by AO. AO makes no implied warranties of merchantability or fitness for a particular purpose.*

## CLAIMS AND RETURNS

If discrepancies are discovered, an immediate report should be made to the customer's ordering point referring to the packing list number. All packing should be carefully examined to insure that no small items are overlooked. Claims for loss or damage in transit should be made directly to the transportation company.

If, upon delivery, the outside of the packing case shows evidence of rough handling or damage the transportation company's agent should be requested to make a "Received in Bad Order" notation on the delivery receipt. If there is no exterior evidence of rough handling upon delivery but concealed damage is evident upon unpacking the shipment within 48 hours of delivery the transportation company should be requested to make out a "Bad Order" report. This procedure is necessary in order to maintain the right of recovery from the carrier.

Customers are requested to write to American Optical Corporation, Scientific Instrument Division, Buffalo, New York 14215, or their ordering dealer for permission to return any goods to the factory for any reason. The letter of request should indicate the date and number of the invoice, or packing list. If arrangements are made for a return, the material should be plainly tagged with the customer's and/or dealer's name and address, carefully packed and shipped PREPAID.

## PRODUCT CHANGES

The American Optical Corporation, Scientific Instrument Division, reserves the right to change designs or to make additions to or improvements in its products without imposing any obligations on itself to add such to products previously manufactured.

The equipment supplied may not agree in all details with our descriptions or illustrations because instruments are subject to modification and improvement.

## SERVICE

Repairs should be performed only by qualified service personnel. Complete repair facilities are available at many of AO's authorized dealers, and AO Technical Service Centers in Buffalo, N.Y., Chicago, Ill., Glendale, Calif., Springfield, N.J., and Dallas, Texas.

## PARTS LIST

Parts listed are for identification only. The fact that a particular item is shown does not necessarily mean that it can be conveniently and/or easily replaced in the lab.

## MAINTENANCE

Regular care and maintenance are essential to the long useful life of your precision microtome. Two drops of Pike Oil should be put in the oil holes and slides marked "Oil", and a light grease should be applied at surfaces marked "Grease" after every use.

## SLIDING MICROTOME MODEL 860

### Basic Package Includes

- AO Spencer Precision Sliding Microtome
- 861 Knife Holder
- 950 Knife
- 963 Back
- 957 Handle
- Object Disc, 1-1/2" diameter
- 969 Pike oil
- Reference Manual

### PRELIMINARY PROCEDURE

Break open double carton used for shipping to expose storage cabinet. Lift instrument cabinet from carton and unlatch cover. To remove the microtome, grasp its base firmly with both hands and carefully slide it out from the cabinet.

Place the microtome on the table so that the front of the instrument with the feeding mechanism and object clamp is turned toward your left hand. Before moving the sliding knife block, make certain that the sliding surfaces are free from dirt and well lubricated. Oil holes are in the top of the knife block. Use the oil furnished with the microtome.

Insert the knife in the knife holder and adjust the five clamping screws to give the desired tilt and clearance angle. The two outer screws should be turned equally in order to hold the knife level. All knife holders have an indicator at the side of the clamp. This provides for recording the angle that proves best and later replacing the knife at the same angle. Tighten the clamping screws so that the knife will be rigidly held. All usual adjustments are made by hand. Tools are not needed. Be sure that the knife edge will not hit the object holder before moving the knife along the slideway.

The No. 860 microtome has a ball-shaped unit for adjustment of the object holder, which may be oriented by loosening or tightening one or more of three levers controlled by set

screws D, E, F in Fig. B. When the object is properly positioned for sectioning, tighten by hand the three set screws and the clamping screw A which holds the block, disc object holder, or freezing chamber. These adjustments hold the specimen in place and prevent vibration.

The thickness of the section is set by loosening the lock screw H of the No. 860 Microtome, Fig. B, and turning the micrometer screw I until the index lever is exactly opposite the scale value of the thickness desired; then the set screw is tightened. The index line and scale value must be in line with each other in order to insure correct operation of the feed mechanism, and the set screws must be tightened to prevent any shift or creeping of the adjustment.

The automatic feed lever is held on a slide on the back of the knife block. It may be moved along the slide, and should be set so that the vertical movement of the object takes place on the return stroke after the knife has passed beyond the specimen. When hand feed is desired, the automatic feed lever may be removed. To feed the object by hand, pull knob K counterclockwise as far as it will go and then back to its original position. This lever also permits increasing the thickness of a single section without effecting the automatic feed. By moving the knob K several times, the thickness of the next cut may be increased by that many times the thickness for which the feed is set.

The knife should be returned to the far end of the slideway before the specimen is raised for the next cut. This will prevent injury to the specimen or the knife from rubbing or pressing against the specimen on the return stroke. When surfacing the top of the new block, it is expedient to make several thin cuts, rather than to risk tearing a portion of the block by too deep a cut.

The knife and block should be pulled forward with a slow and even stroke. Hesitation during the cut will leave an irregular surface on the section. Care should be used to pull the knife block without straining or tilting of the knife. When the 250 mm knife is used, the 862 adjustable holder is desirable as it supports the free end of the knife and keeps it from being drawn down into the specimen by hard spots in the specimen.

To insure optimum performance and long life of the instrument, the slideway should be cleaned with a soft cloth when cutting is finished, or at the end of the day, and the machine should be oiled before use. Small pieces of embedding material should be removed promptly from the slide. Empty the drip pan M as necessary to prevent the fluid from overflowing onto the mechanism.

After long periods of use, the friction on the ratchet wheel may require adjustment. Should the feed crank turn too freely or sections appear to be thicker than previous ones, increase the friction by turning the adjusting screw L slightly. Move the knife block to the back of the slideway, then turn the microtome on end so that the corresponding adjustment screw may be reached through the hole in the wooden baseboard. Continue turning each set screw equally until the necessary friction is obtained.

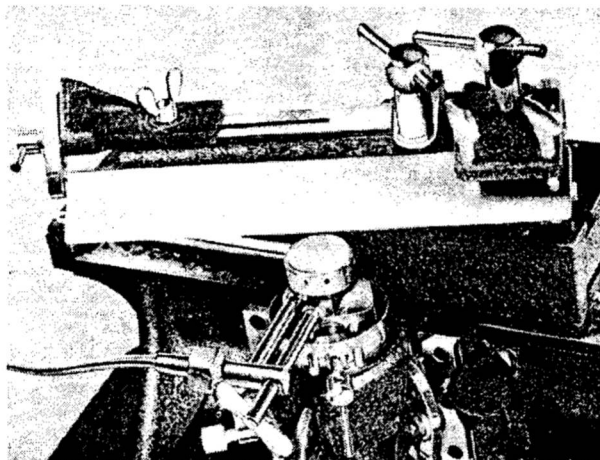


Figure A. No. 862 Adjustable Knife Holder

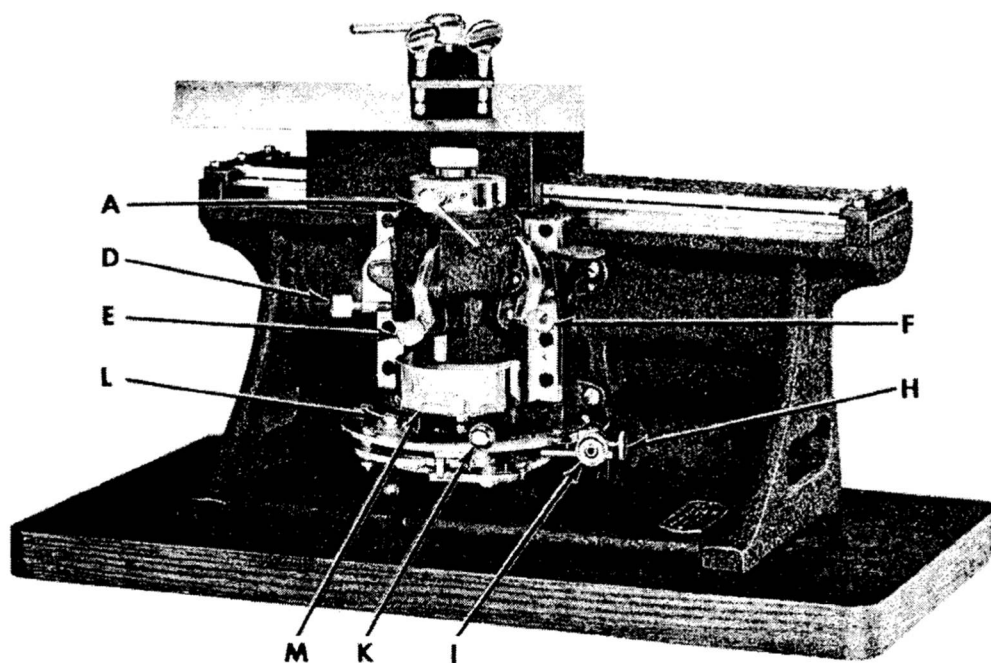
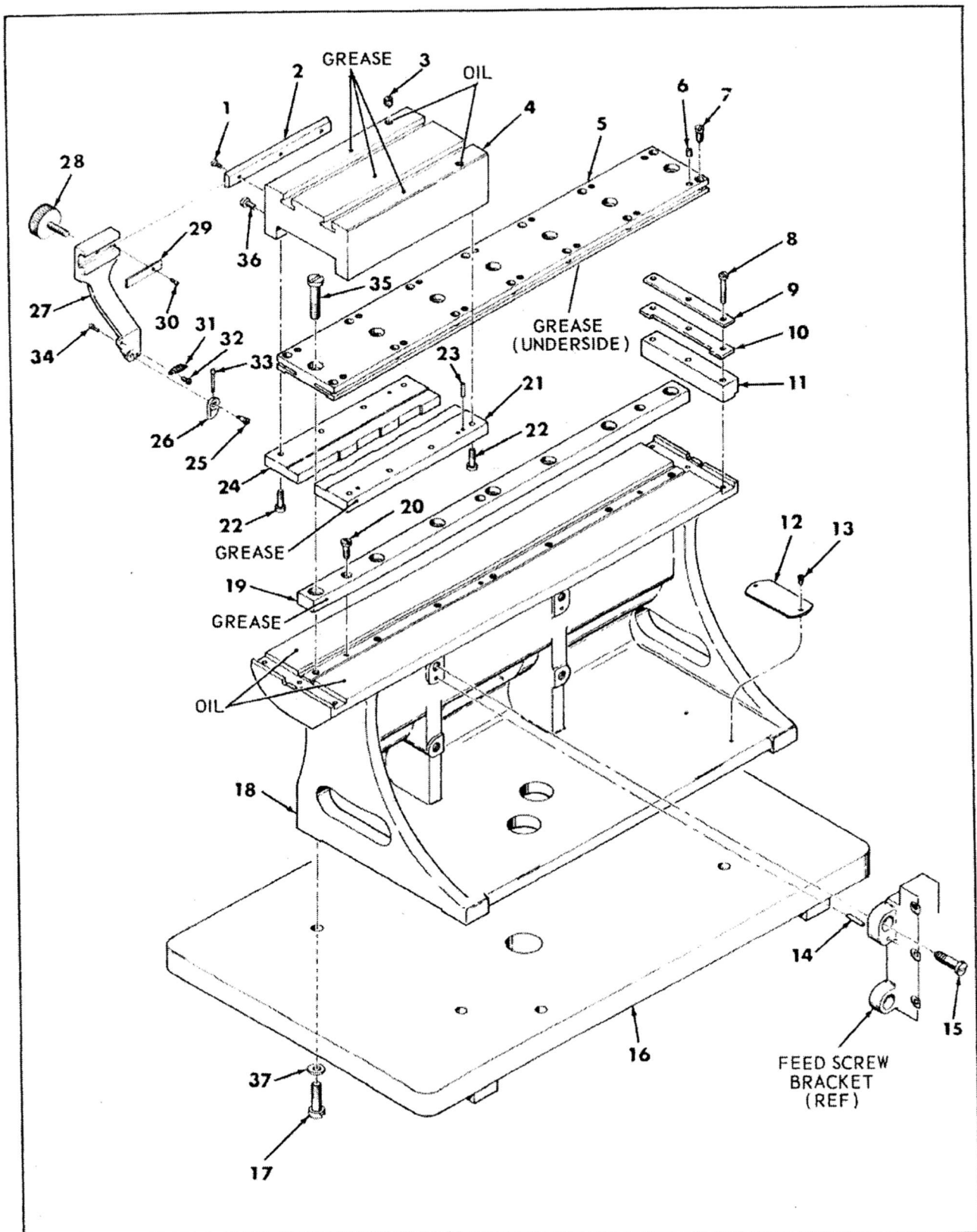


Figure B. AO Spencer 860 Sliding Microtome



Figure 1. BASE AND SLIDING BLOCK ASSEMBLY



**Figure 1. BASE AND SLIDING BLOCK ASSEMBLY**

Index No.	Part Number	Description	Quantity
	860-865	Base and Sliding Block Assembly (Includes items 1 thru 11, 19, 20, 35, 860-504 and 860-864)	1
	860-504	Sliding Block Assembly (Includes items 4, 21 thru 24 & 36)	1
1	0398	Screw	3
2	860-5	Gib	1
3	055-4	Screw	2
4	860-3	Sliding Block	1
5	860-4	Adjustable Gib	1
6	0115-4	Screw	14
7	0432-5	Screw	14
8	X-18250	Screw	6
9	860-16	Stroke Stop Plate	2
10	860-48	Stop Cushion	2
11	860-67	Stop Block	2
	860-864	Base Assembly (Includes items 12, 13 & 18)	1
12	860-79	Instruction Plate	1
13	X-9973-4	Screw	2
14	X-13256	Pin	2
15	X-1224-4	Screw	4
16	B860-50	Wood Base	1
17	X-19646	Screw	4
18	860-7	Base	1
19	860-40	Knife Block Gib	1
20	X-18227	Screw	3
21	860-37	Gib	1
22	0460	Screw	8
23	X-14064-1	Taper Pin	2
	860-852	Feed Pawl Arm Assembly (Includes items 25 thru 34)	
24	860-36	Gib	1
25	820-136	Screw	1
26	860-15	Automatic Feed Pawl	1
27	860-33	Arm	1
28	0623-4	Screw	1
29	860-35	Clamp Plate	1
30	0127-3	Screw	1
31	B860-27	Spring	1
32	0357-5	Screw	1
33	860-14	Hook	1
34	0263-5	Screw	1
35	0461-4	Screw	7
36	0434-5	Screw	2
37	16030	Washer	4

Figure 2. FEED SCREW MECHANISM ASSEMBLY (Sheet 1 of 2)

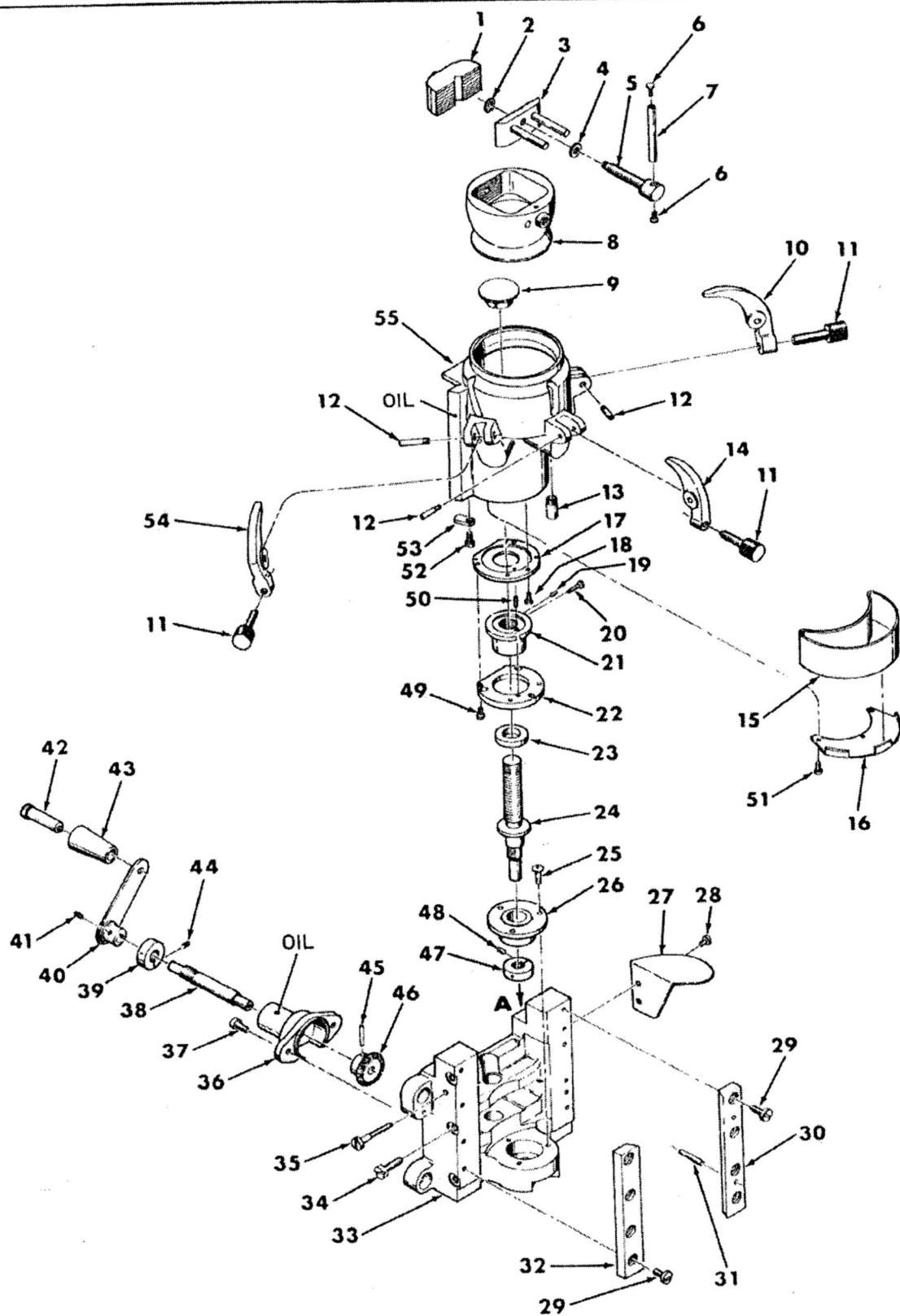


Figure 2. FEED SCREW MECHANISM ASSEMBLY

Index No.	Part Number	Description	Quantity
	860-855	Feed Screw Mechanism Assembly (Includes all items except 27 & 28)	
	860-859	Object Clamp Assembly (Includes items 1 thru 8)	1
1	860-42	"V" Block	1
2	X-51414	Retaining Ring	1
3	860-501	Clamp Jaw Assembly	1
4	X-16001	Washer	1
5	860-85	Screw	1
6	X-38001	Screw	2
7	860-28	Handle	1
8	860-503	Bushing and Clamp Assembly	1
9	860-25	Cover Plug	1
10	860-80	Clamp finger, right hand	1
11	682-23	Screw	3
12	0715-4	Screw	3
	860-854	Feed Screw Bracket Assembly (Includes items 13, 16, 29 thru 35, 51 thru 53, & 55)	
13	860-17	Drain Pipe	1
14	860-51	Clamp finger	1
15	860-502	Drip Pan Assembly	1
16	860-22	Drip Pan Holder	1
	860-860	Pawl Lever Assembly (Includes items 73 thru 86, 94, 95, 97 thru 106, 119 & feed screw assembly 860-853)	1
	860-853	Feed Screw Assembly (Includes items 17, 19, 20 thru 22, 24, 26, 47 thru 50, 60, & 61)	1
17	860-39	Bottom Plate	1
18	0401-5	Screw	3
19	085-3	Screw	1
20	0401-5	Screw	2
21	860-68	Feed Nut	1
22	860-38	Top Plate	1
23	01175	Washer	1
24	860-59	Feed Screw	1
25	0263-5	Screw	5
26	860-19	Feed Screw Bearing	1
27	860-52	Hand Rest	1
28	0431-5	Screw	2
29	0436-5	Screw	8
30	820-25	Stationary Gib	1
31	X-14064-1	Pin	2
32	820-24	Adjustable Gib	1
33	860-1	Feed Screw Bracket	1
34	0434-5	Screw	3
35	0525-5	Screw	1
	860-858	Miter Gear Assembly (Includes items 36, 38, 39, 44 thru 46, & 820-861)	1
36	860-6	Miter Gear Bracket	1



Figure 2. FEED SCREW MECHANISM ASSEMBLY (Sheet 2 of 2)

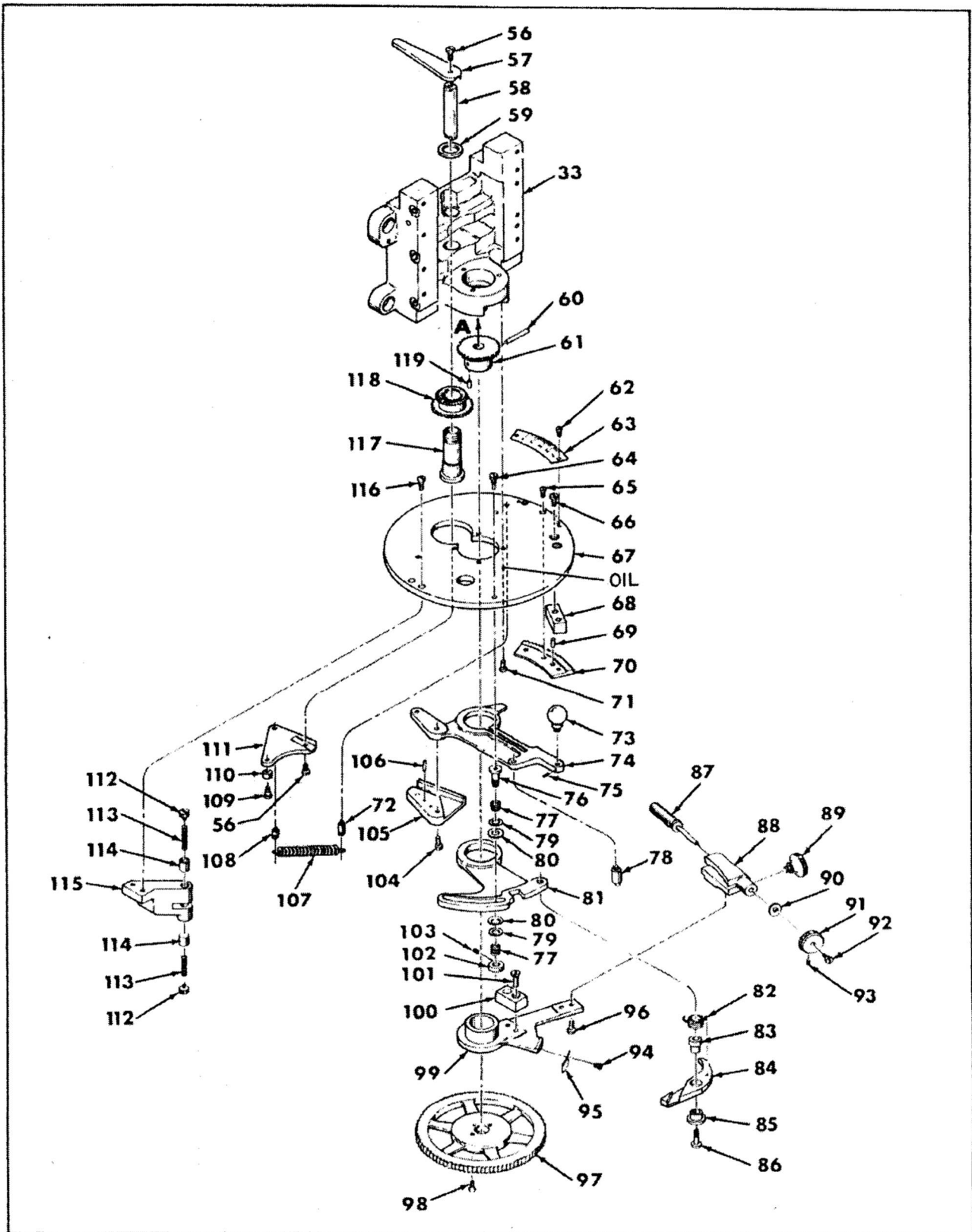


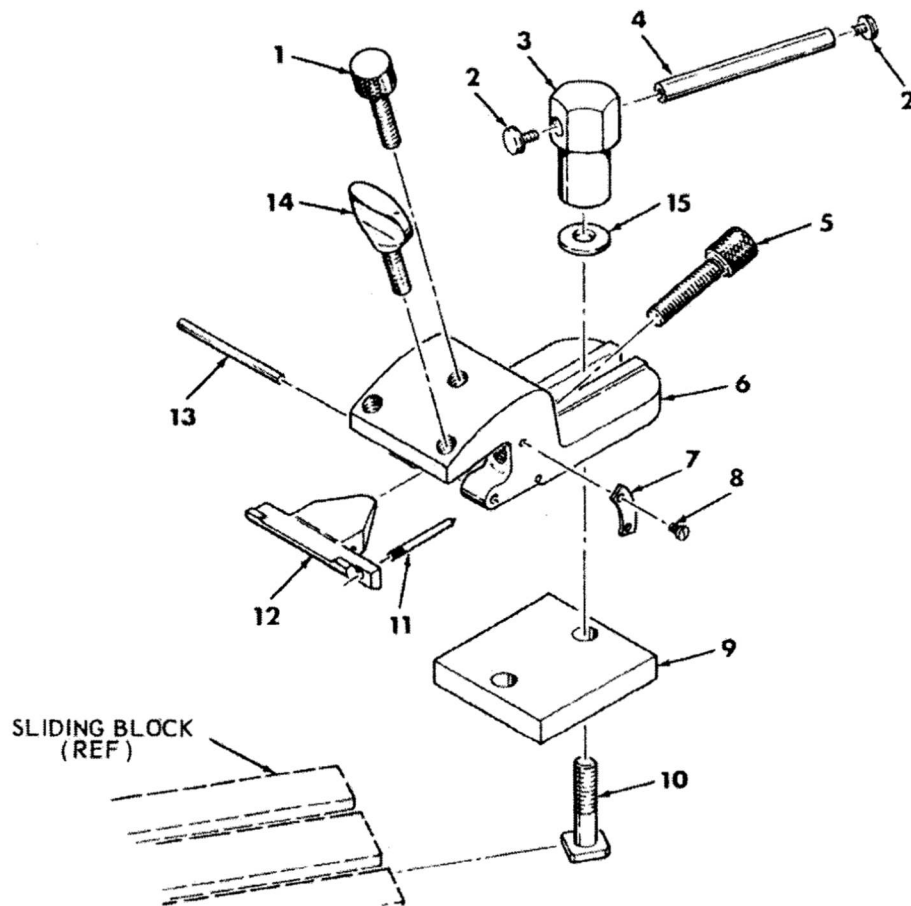
Figure 2. FEED SCREW MECHANISM ASSEMBLY ( Cont.)

Index No.	Part Number	Description	Quantity
37	0432-5	Screw	2
38	860-58	Miter Gear Shaft	1
39	02109-4	Nut	1
	820-861	Feed Crank Assembly Complete ( Includes items 40 thru 43 )	1
40	820-525	Feed Crank Assembly	1
41	050-4	Screw	1
42	820-153	Handle Stud	1
43	B820-152	Feed Wheel Knob	1
44	0410-4	Screw	1
45	X-14028	Taper Pin	1
46	860-53	Miter Gear	1
47	02109-4	Nut	1
48	0410-4	Screw	1
49	0248-5	Screw	4
50	0511-3	Screw	1
51	0368-5	Screw	3
52	0432-5	Screw	1
53	860-20	Stop Block	1
54	860-81	Clamp finger , left hand	1
55	860-2	Vertical Slide	1
	860-861	Rocker Shaft Assembly ( 56 thru 59, 108 thru 111, 117, & 118 )	
56	0434-5	Screw	2
57	860-64	Upper Arm	1
58	860-56	Rocker Shaft	1
59	02018-4	Nut	1
60	X-51867	Taper Pin	1
61	860-55	Feed Screw Gear	1
62	0245-3	Screw	2
63	860-13	Index Plate	1
64	0307-4	Screw	1
65	0367-5	Screw	3
66	0431-5	Screw	2
67	860-11	Cover Plate	1
68	860-70	Feed Stop Block	1
69	01605	Pin	2
70	860-29	Worm Wheel Sector	1
71	0248-5	Screw	6
72	02638-4	Stud	1
73	860-69	Feed Handle	1
74	860-8	Feed Handle Arm	1
75	032-1	Set Screw	1
76	860-66	Friction Sleeve	1
77	860-63	Spring	2
78	01720-4	Pin	1
79	01115-3	Washer	2
80	01148	Washer	2

Figure 2. FEED SCREW MECHANISM ASSEMBLY ( Cont.)

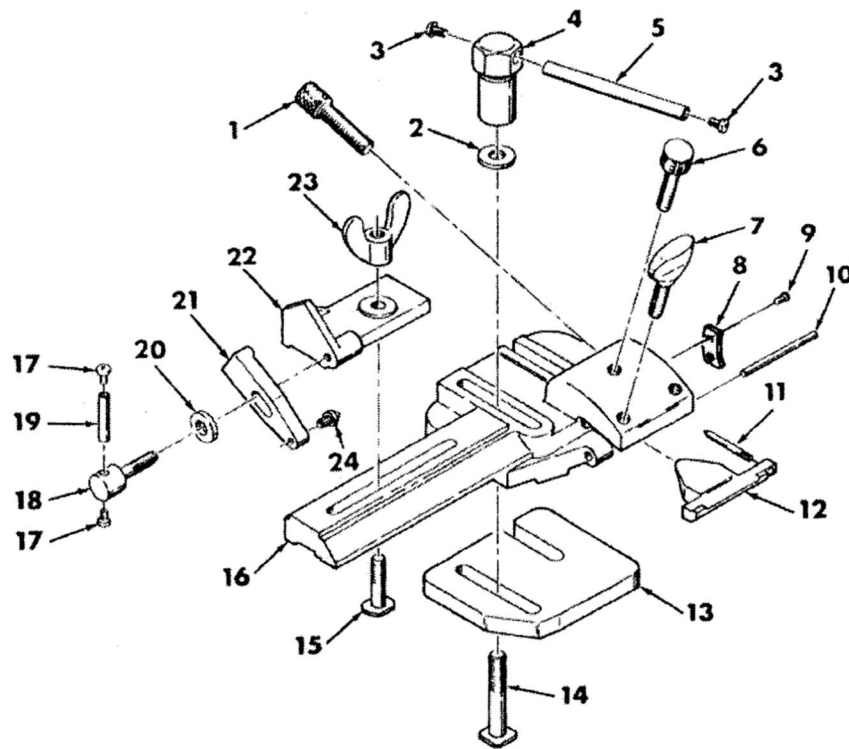
Index No.	Part Number	Description	Quantity
81	860-9	Pawl Arm	1
82	B860-26	Spring	1
83	860-73	Bushing	1
84	860-12	Pawl Cam Tip	1
85	860-34	Bushing	1
86	0265-4	Screw	1
	860-856	Worm Bearing Assembly ( Includes items 87 thru 93 )	1
87	860-30	Worm	1
88	860-31	Worm Bearing	1
89	0696-4	Screw	1
90	01217	Washer	1
91	860-18	Button	1
92	0366-5	Screw	1
93	040-3	Screw	1
94	0357-5	Screw	2
95	860-21	Pawl Cam Tip	1
96	0263-5	Screw	2
97	820-248	Ratchet Wheel	1
98	0368-5	Screw	2
99	860-10	Cam Arm	1
100	860-32	Stop Block	1
101	0433-5	Screw	2
102	02069-4	Nut	1
103	021	Screw	1
104	0433-5	Screw	2
105	860-62	Cam Plate	1
106	01612-1	Pin	2
107	860-82	Spring	1
108	02632-4	Stud	1
109	0546-3	Screw	1
110	860-65	Cam Roller	1
111	860-83	Roller Arm	1
	860-851	Friction Bracket Assembly ( Includes items 112 thru 115)	1
112	820-175	Friction Screw	2
113	820-200	Friction Spring	2
114	820-174	Friction Plunger	2
115	860-60	Friction Bracket	1
116	0436-5	Screw	2
117	860-57	Rocker Shaft Sleeve	1
118	860-54B	Cluster Gear	1
119	01562	Pin	1

Figure 3. KNIFE HOLDER ASSEMBLY



Index No.	Part Number	Description	Quantity
	861	Knife Holder Assembly (Includes items 1, 5 thru 9, 11 thru 14)	
	860-857	Knife Holder Bolt Assembly (Includes items 2, 3, 4, 10 and 15)	
1	0662	Screw	1
2	0728-5	Screw	2
3	860-46	Clamp Nut	1
4	860-47	Handle	1
5	0663	Screw	2
6	860-74	Base	1
7	860-76	Graduated Plate	1
8	X-9961-3	Drive Screw	2
9	860-77	Raising Block	1
10	860-45	Clamp Bolt	1
11	860-75	Pointer	1
12	860-78	Leaf	1
13	01560-4	Pin	1
14	0714-4	Screw	2
15	01046	Washer	1

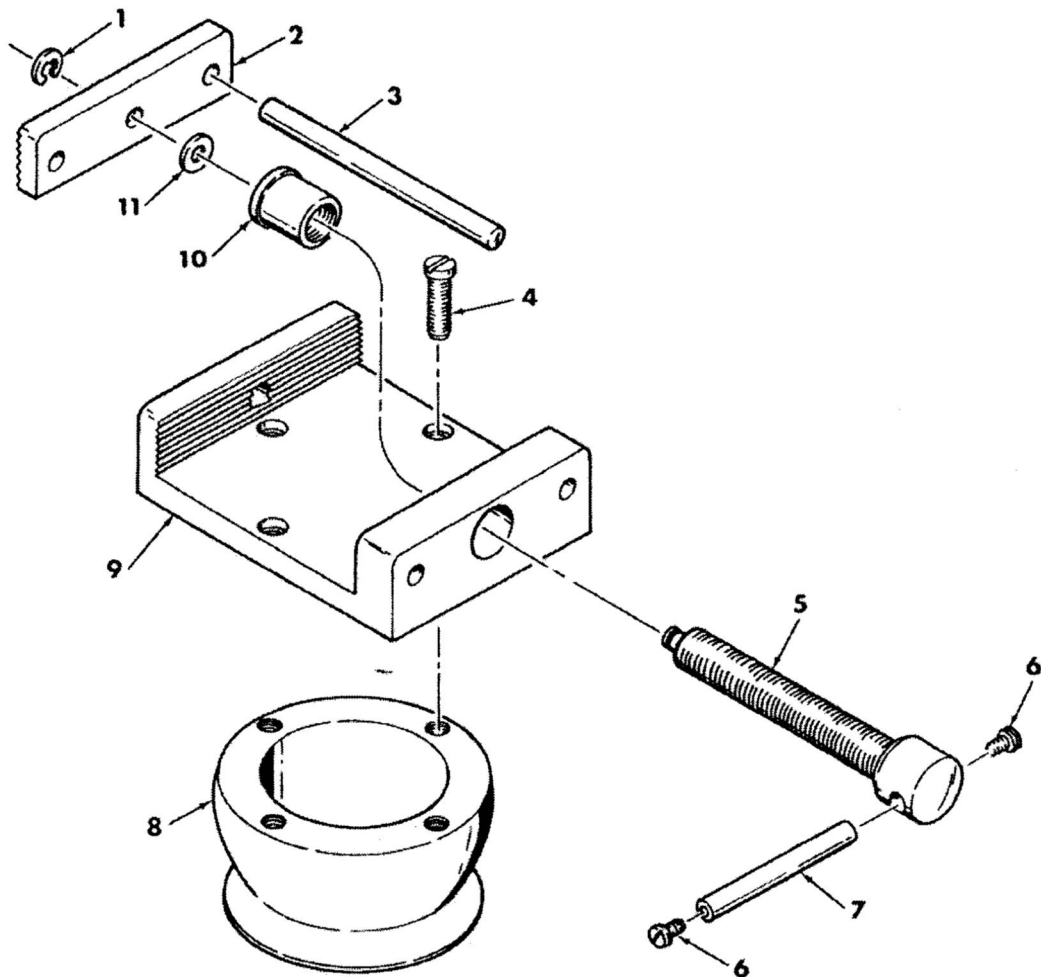
Figure 4. ADJUSTABLE KNIFE HOLDER ASSEMBLY



Index No.	Part Number	Description	Quantity
	862	Adjustable Knife Holder	
1	0663	Screw	2
2	01046-4	Washer	1
3	0728-5	Screw	2
4	860-46	Clamp Nut	1
5	860-47	Handle	1
6	0662	Screw	1
7	0714-4	Screw	2
8	860-76	Graduated Plate	1
9	X-9961-3	Screw	2
10	01560-4	Pin	1
11	860-75	Pointer	1
12	860-78	Leaf	1
13	04008	Raising Block	1
14	862-5	Clamp Bolt	1
15	862-7	Clamp Bolt	1
16	862-1	Base	1
17	X-38001	Screw	2
18	0660-4	Screw	1
19	862-8	Handle	1
20	01210-4	Washer	1
21	862-3	End Plate	1
22	862-2	Supporting Arm	1
23	X-23821	Wing Nut	1
24	862-6	Knife Support Center	1



Figure 5. OBJECT CLAMP ASSEMBLY



Index No.	Part Number	Description	Quantity
	863	Object Clamp Assembly - Johns Hopkins	
1	X-51414	Retaining Ring	1
2	863-6	Clamping Jaw	1
3	828-6	Guide Pin	2
4	0438-4	Screw	4
5	828-12	Screw	1
6	X-38001	Screw	2
7	860-28	Handle	1
8	863-3	Body	1
9	863-4	Clamp	1
10	828-5	Bushing	1
11	X-16001	Washer	1



**AMERICAN OPTICAL  
CORPORATION**

SCIENTIFIC INSTRUMENT DIVISION • BUFFALO, N. Y. 14215