

INSTRUCTION MANUAL

TROUPER "1200"

FOLLOW SPOTLIGHT

Type 41050

Issue 1-86



Strong Electric

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PREFACE

THE STRONG TROUPER "1200" FOLLOW SPOTLIGHT type 41050 is an AC follow spot complete with lamphouse, power supply, optical system, and six color boomerang. It is designed for use with the 1200 watt metal halide bulb, Strong part number 41103, as its light source.

THE TROUPER "1200" LAMPHOUSE utilizes a deep ellipse dichroic metal reflector designed to operate in a fixed position, with the bulb mounted horizontally in the reflector. The bulb is adjustable in relation to the reflector to permit correct positioning on the reflector optical center line. Adjustment controls are located behind the cover panel on the rear of the lamphouse.

THE IGNITER is mounted to the base of the lamphouse. It requires a 220 V.AC pulse, provided by a step-up transformer in the power supply, to ignite the bulb. After ignition, the power supply automatically reduces the voltage to the level required to maintain the arc.

THE LAMPHOUSE INSTRUMENT PANEL includes a running time meter to indicate the number of hours the bulb has been used. It also has (2) lighted switches for "ON" or "OFF" control at the lamphouse.

THE SEPARATE POWER SUPPLY is designed to operate from a 115 V.AC line, and draws 14 amperes after bulb ignition. It is recommended to protect the AC line with a 20 ampere fuse or circuit breaker.

THE POWER SUPPLY connects to the lamphouse with an interconnect cable assembly approximately four feet long, terminated with a MS connector for easy attachment to the lamphouse. This cable assembly contains all control wires for operation of the lamphouse and power supply. The MS connector is keyed to insure correct connection.

AN INTAKE BLOWER in the lamphouse supplies air flow to keep the bulb at a safe operating temperature. A capped exhaust stack on the top of the lamphouse permits connection of six inch flexible ducting if an external exhaust system is desired.

AN INTERLOCK SWITCH below the top cover of the lamphouse, and another behind the igniter access panel, open the AC circuit in the lamphouse and prevent bulb ignition if the housing is not correctly closed.

IF AT ANY TIME you have a suggestion, or desire aid in securing anticipated results, please feel free to write directly to STRONG INTERNATIONAL, 1712 Jackson Street, Omaha, Nebraska 68102.

RECEIVING AND INSTALLATION

INSPECT THE SHIPMENT on receipt and report any damage to the freight carrier immediately. It is the responsibility of the consignee, not the shipper, to initiate any damage claims.

THE TROUPER "1200" is shipped in sections which must be assembled.

ASSEMBLE the four base legs to the square section of the center tube using the 3/8-16 x 2-3/4" hex head cap screws and 3/8" split lockwashers supplied to secure each leg. Insert a leveling foot with locknuts in each of the four legs.

THE INNER TUBE and support yoke assembly has (4) holes on four inch centers and will allow an optical center height of approximately 46-1/2", 50-1/2", 54-1/2", and 58-1/2" above floor level. The leveling feet may be adjusted through a two inch range. Insert the height location pin through the hole in the outer tube and the desired hole in the inner tube so the retaining ball in the pin extends beyond the outer tube.

THE FOUR ANGLE BRACKETS on the base legs can be used as hold down brackets for spotlights installed in a fixed location. These brackets should be bolted to the floor or platform for safety purposes. The casters are provided only for ease of movement to the operating location and should be removed from the base legs for stability during operation of the follow spot.

THE VERTICAL TILT LOCKING LEVER is on the right hand (operating) side of the yoke assembly. Tighten this locking mechanism securely before attempting to place the lamphouse and lens mechanism on the support yoke.

PLACE THE LAMPHOUSE and lens mechanism on the yoke assembly with the lens control handle to the right hand (operator's) side, the same as the locking lever on the yoke. Line up the (4) mounting holes on the bottom of the base rail with the (4) slotted holes in the support saddle and secure fingertight with the (4) 5/16-18 wing screws. Loosen the vertical tilt locking control and move the lamphouse and optical system forward or back in the slots until the system is balanced. Tighten the wing screws to secure the base rail to the saddle.

CONNECT THE CABLE ASSEMBLY from the power supply to the mating receptacle on the bottom of the lamphouse and tighten firmly. The connector and receptacle are keyed to prevent misalignment of the pins. Do not connect the power supply to the AC supply at this time.

MOUNT THE BOOMERANG to the front of the optical system housing using the hinge pin and hardware provided. One set of (6) color gels is included in the accessory kit; to prolong gel life, install the densest (darker) colors toward the front of the boomerang, away from the lamphouse.

BULB INSTALLATION AND OPERATION

TIGHTEN THE VERTICAL TILT LOCK. Make certain that the power supply is disconnected from the AC source. Using the special screwdriver provided, remove the (4) tamperproof screws on the top of the lamphouse and remove the cover.

REMOVE THE BULB from the packing, taking care not to touch any portion of the quartz envelope. If the bulb envelope is accidentally touched, remove all fingermarks with alcohol; fingermarks can burn into the quartz and shorten bulb life.

REMOVE THE KNURLED NUT from the threaded end cap on the end of the bulb without the seal tip (quartz nipple). Install the bulb lead to the seal tip end of the bulb using the remaining knurled nut. Tighten securely, but do not apply excessive strain on the body of the bulb.

PLACE THE END of the bulb without the bulb lead through the center hole of the reflector and into the rear bulb support collet. Position the bulb with the seal tip directed UP and the conductor ribbon in the bulb HORIZONTAL. Loosen the small allen head set screw in the bulb collet to permit the bulb stem to be inserted fully into the collet. Tighten the set screw firmly against the bulb stem to ensure a good electrical contact.

SEAT THE END of the bulb with the bulb lead into the yoke on the air duct. Insert the banana plug on the end of the bulb lead into the receptacle in the air duct.

REPLACE THE TOP COVER on the lamphouse and secure with the (4) tamperproof screws. Make certain the edges of the top cover fit inside the overlapping edges of the lower panels.

CONNECT THE AC LEAD CORD from the power supply to any three wire, 15 ampere, 120 volt outlet. Place the circuit breaker on the power supply to the "ON" or "RESET" position. The red "OFF" indicator on the lamphouse instrument panel will light. Press the green "ON" switch and the bulb will ignite. The cooling fan in the lamphouse will start at the same time, and operate as long as the bulb is ignited.

ALLOW THE BULB to operate for two or three minutes to reach full brightness, and proceed with the following procedure to align the bulb to the reflector.

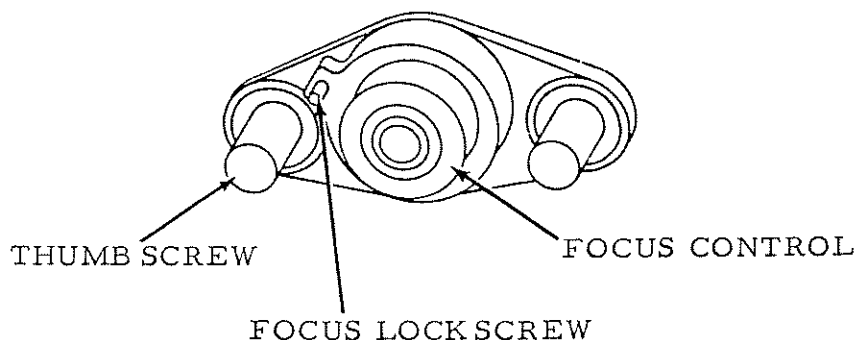
REMOVE THE COVER PANEL from the rear of the lamphouse to expose the bulb adjustment controls.

THE CENTER SECTION of the control is a threaded member that moves the bulb in a horizontal plane to position the arc at the focal point of the reflector.

Rotating this section clockwise moves the bulb away from the reflector; counterclockwise, toward the reflector. The small knurled screw to the left of this section can be tightened to lock the focusing mechanism after the following procedures have been completed.

THE THUMB SCREWS on either side of the focusing control lock the horizontal and vertical adjustment mechanism in place.

BULB ADJUSTMENT CONTROLS



TO FOCUS THE METAL HALIDE BULB and obtain the best light on stage, the method outlined below is the most suitable.

MOVE THE SPOT SIZE CONTROL HANDLE on the large lens carriage all the way forward to project the smallest spot possible; with the iris, masking shutter, and dimmer blades in the full open position. Project the spot to a wall or similar flat perpendicular surface opposite the follow spot.

TURN THE CENTER FOCUSING SECTION of the bulb positioning control clockwise until a brown color with a hot spot is projected on the wall.

LOOSEN THE TWO THUMB SCREWS, one on each side of the center focusing section, just enough to permit manual movement of the complete assembly. The bulb adjustment control will now move around these two thumb screws.

MOVE THIS CONTROL SECTION around the two thumb screws until the hot spot is centered in the brown circle of the reflector. After the hot spot is centered, tighten the two thumb screws to lock this adjustment in place. Turn the center section counterclockwise to obtain the brightest light with the best light distribution. Rotate the lens spot focus control knob, located on the front of the lens mechanism, to obtain the sharpest edge possible on the projected spot.

REPLACE THE REAR COVER PLATE over the bulb adjustment control mechanism. These adjustments will remain fixed until the bulb is replaced.

PRESS THE "OFF" SWITCH to extinguish the bulb. It is recommended that the circuit breaker on the power supply be placed in the OFF position, to function as a line switch, when the spotlight is off for any extended time.

WHEN TRANSPORTING, or if the spotlight may be subjected to excessive shock when moving to another location, remove the assembled metal halide bulb from the lamphouse. If the position of the bulb adjustment control is not changed, little or no readjustment will be required after replacing the bulb.

WARRANTED BULB LIFE is 750 hours, but because of manufacturing tolerances, some bulbs may lose color quality before this period. The bulb warranty does not cover heat damage incurred by loose electrical connections; establish a routine of periodically checking bulb connection for tightness.

THE METAL HALIDE BULB ignites best when cold. After extinguishing the bulb, allow at least one minute cooling before attempting re-ignition.

BULB LIFE can be maximized by avoiding repeated ignitions. Allow the lamp to burn throughout the spotlight's use cycle, dousing out with the masking shutter blades or fadeout mechanism as required.

RECORD the elapsed time meter reading when replacing the bulb. If returning a bulb for warranty evaluation, pack it in its original shipping container and complete all warranty forms.

OPERATION OF OPTICAL SYSTEM

THE IRIS CONTROL is the front lever which projects through the top of the optical system housing. When this lever is to the left (viewed from the rear), the largest aperture is provided. Smaller apertures are provided as the lever is moved to the right.

THE SPOT SIZE CONTROL HANDLE is located on the right side of the optical system just above the base pan. A variation of spot sizes from full flood to a small spot can be obtained by moving the spot size control handle from one extreme to the other. Beam intensity is increased by this optical system when reducing from flood to spot, and maximum intensity is reached when the spot size control handle is in the extreme forward position.

THE MAXIMUM FLOOD SPOT is obtained with the iris control lever to the left (away from operator) for the large aperture and with the spot size control handle moved as far as possible toward the rear.

SMALLER SIZED SPOTS are projected as the spot size control handle is moved forward. Most of the spot sizes needed will be produced with the iris in its maximum open position.

FOR A "HEAD SPOT", or any spot size smaller than can be obtained with the spot size control handle in its extreme forward position, shift the iris control lever to the right (toward the operator) for a smaller aperture. The iris control lever should always be returned to its extreme left position before the spot size control handle is again moved to project larger spots.

THE MASKING SHUTTER CONTROL is the middle lever projecting through the top of the optical system housing. The masking shutter blades are operated by use of this lever to shape the projected spot to a rectangle, strip spot, or for dousing.

THE DISENGAGED POSITION of the masking shutter lever is to the extreme right (toward the operator), and varying degrees of masking to complete cutoff are obtained as the lever is moved to the left (away from the operator).

THE ANGLE OF THE MASKING SHUTTER BLADES can be adjusted to compensate for the horizontal projection angle of permanently installed spotlights. Unscrew the spot size control handle and the optical system control knobs. Dismount the boomerang and optical system housing. Using a right angle screwdriver, loosen each of the screws holding the masking shutter blades enough to allow adjustment. Ignite the bulb and adjust the angle of the lower blade by tapping it with a screwdriver so its projected edge lies parallel to the footlights, and re-tighten the screw.

OPERATE THE MASKING SHUTTER LEVER to close the blades. Adjust the upper blade to close in line with the lower blade. Tighten the screw to secure the upper blade. Replace the optical system housing and boomerang.

CAUTION: BECAUSE OF THE HIGH LEVEL OF ULTRAVIOLET RADIATION EMITTED BY THE IGNITED BULB, WEAR PROTECTIVE CLOTHING AND GLASSES WHEN ADJUSTING THE SHUTTER BLADES.

THE FADEOUT MECHANISM AND DOUSER is the rear lever projecting through the optical system housing. This lever controls the intensity of light from complete fadeout when the lever is to the left, to full intensity when the lever is to the right.

THE LENS FOCUSING CONTROL is located on the operating side of the optical system base pan (forward end) and is used to adjust the optical system for the length of throw. When making an adjustment, rotate the spot focusing control knob until the sharpest edge is obtained on the projected spot. Moving the large lens to its center of travel, and re-adjusting for a sharp edge, should give satisfactory results for the full movement of the optical system.

HANDLING THE SPOTLIGHT

GENERALLY THE BEST POSITION for the operator to stand is near the center of the spotlight, on the right hand side, although the angle of tilt and the size of the porthole may alter the position for the most convenient operation.

EACH OPERATOR will, after a few minutes of operation, generally develop his own system and position for operating the follow spot.

THE VERTICAL TILT LOCKING CONTROL on the yoke assembly can be set to provide the required amount of friction on the spotlight to suit the individual operator.

THE LARGE CARRIAGE FRICTION BRAKE is located in the outrider of the large lens carriage casting, and is preset at the factory for the most satisfactory operation under normal circumstances. Individual requirements vary, and the brake can be adjusted to suit the operator. Remove the color boomerang and dismount the optical system housing. Loosen the locknut and adjust the tension screw to the desired degree of tension. Tighten the locknut and replace the optical system housing and boomerang.

OPERATION OF COLOR BOOMERANG

THE COLOR BOOMERANG is equipped with six color filters and provision has been made for installation of an ultraviolet filter. The UV Filter Kit (Strong Part No. 51829) can be purchased as an accessory and is easily attached to the front of the boomerang. Additional filter holders can be supplied by your Strong dealer.

TO ENGAGE INDIVIDUAL COLOR FILTERS, lower the desired filter selector lever. A rocker catch located in the color disc housing holds the filter in position.

TO RELEASE A COLOR, push the filter release arm up or engage another color, thus releasing the previous color automatically.

TO REPLACE A FILTER HOLDER, open the hinged top of the color disc housing and lift out the desired filter holder.

TO PROLONG FILTER LIFE, when replacing color filters in the boomerang, the less dense colors should be placed in the holders toward the rear (toward lamp) of the spotlight, and those of greater density should be placed in the holders nearer the front.

COLOR TEMPERATURE REDUCTION FILTERS, required for use with television and videotape, are available through theatrical supply dealers.

MAINTENANCE

THE TROUPER "1200" requires minimal maintenance to keep it in good working order. No lubrication is required.

THE FRONT SURFACE of the large lens is accessible through the front opening of the optical system housing. Clean the lens periodically using a good grade of lens cleaner and lens tissue, available through theatre equipment dealers.

TO CLEAN THE SMALL LENS, and the back surface of the large lens, dismount the boomerang and remove the optical system housing.

THE NEGATIVE LENS, mounted on the support for the fadeout mechanism, must be removed for cleaning. Use the same cleaning materials for this lens as are used for the others. The negative lens must be replaced with the curved surface facing the lamphouse.

THE REFLECTOR should be cleaned periodically with a clean, soft, lint-free cloth to remove any dust from the reflecting surface. Take care not to finger-mark the bulb.

THE INSIDE of the lamphouse and optical system, and the grille of the intake blower, should be cleaned periodically, depending on the dust conditions at each installation. The blower blades require cleaning to remove the dust build-up that accumulates over a period of time.

TROUPER 1200
WIRING DIAGRAM

<u>Ref.</u> <u>Desig.</u>	<u>Part No.</u>	<u>Description</u>
B1	81272	Blower, 230 V.A.C, 50/60 Hz.
DS1	41193	Lighted Switch (S1) "ON"
DS2	41194	Lighted Switch (S2) "OFF"
DS3	41103	Metal Halide Bulb, 1200 W.
J1	41110	MS Receptacle
-	41931	Lamphouse/Power Supply Cable Ass'y.
M1	81289	Elapsed Time Meter, 230 V.A.C, 60 Hz.
-	81347	Elapsed Time Meter, 230 V.A.C, 50 Hz.
S1	41193	"ON" Switch (with DS1)
S2	41194	"OFF" Switch (with DS2)
S3	80168	Top Cover Interlock Switch
S4	80168	Side Panel Interlock Switch
TB1	65134	Barrier Strip, 10 Terminal
-	41929A	Igniter Ass'y.
-	41206	Igniter Insulator

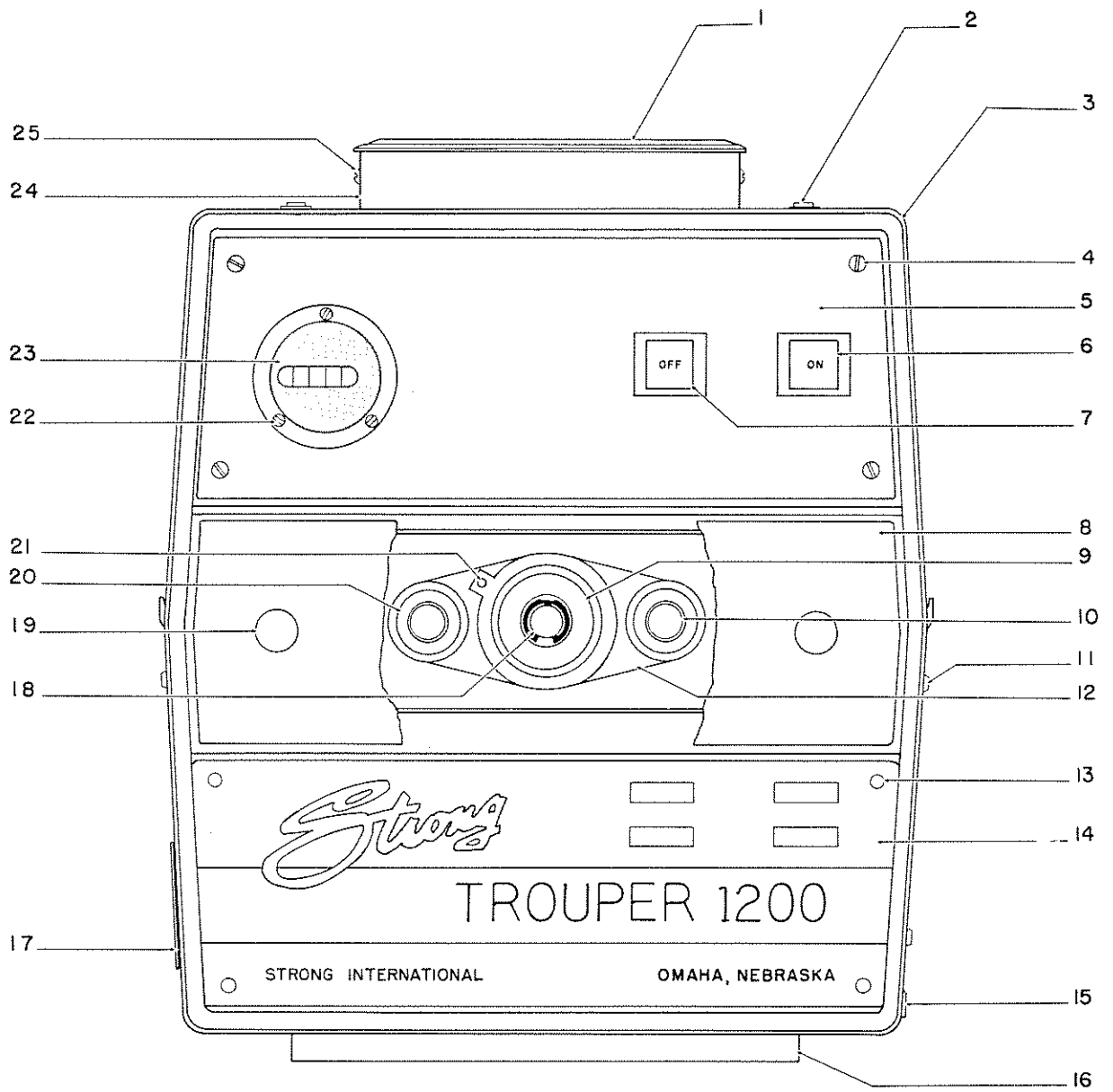


FIGURE 1

PARTS LIST
FIGURE 1

<u>Item</u>	<u>Part No.</u>	<u>Description</u>
1	65866	Vent Cap, Exhaust Stack
2	1736-1	Screw, 10-32 x 1/2" Tamperproof
-	1715	#10 Flatwasher
3	65112	Back Casting
4	1382	Screw, 8-32 x 3/16" Pan Hd.
5	41213	Plate, Instrument Panel
6	41193	"ON" Switch (S1, DS1)
7	41194	"OFF" Switch (S2, DS2)
8	65140	Cover Plate
9	65959	Focus Screw, Bulb Adjust
10	37985	Thumb Screw
-	15010	Spring
11	1307	Screw, 10-32 x 3/8" Pan Hd.
12	65116	Bulb Adjust Index Plate Casting
13	1639-2	Rivet, 1/8" Domed Hd.
14	41205	Name & Data Plate
15	37963	Access Panel
16	37128	Spacer Block
17	71203	Hole Plug
18	41930	Bulb Collet (see Figure 2, Item 22)
-	90416A	Snap Ring
19	65166	Plunger
-	65167	Grommet
20	65150	Fender Washer
21	65153	Thumb Screw, Focus Lock
-	65154	Nylon Ball
22	953	Screw, 4-40 x 1/2" Rd. Hd.
-	1620	Hexnut, 4-40
-	1343	#4 Lockwasher
23	81289	Elapsed Time Meter (M1), 60 Hz.
-	81347	Elapsed Time Meter (M1), 50 Hz.
24	37993	Top Cover & Exhaust Stack Welded Ass'y.
25	1303	Screw, #6 Self Tapping

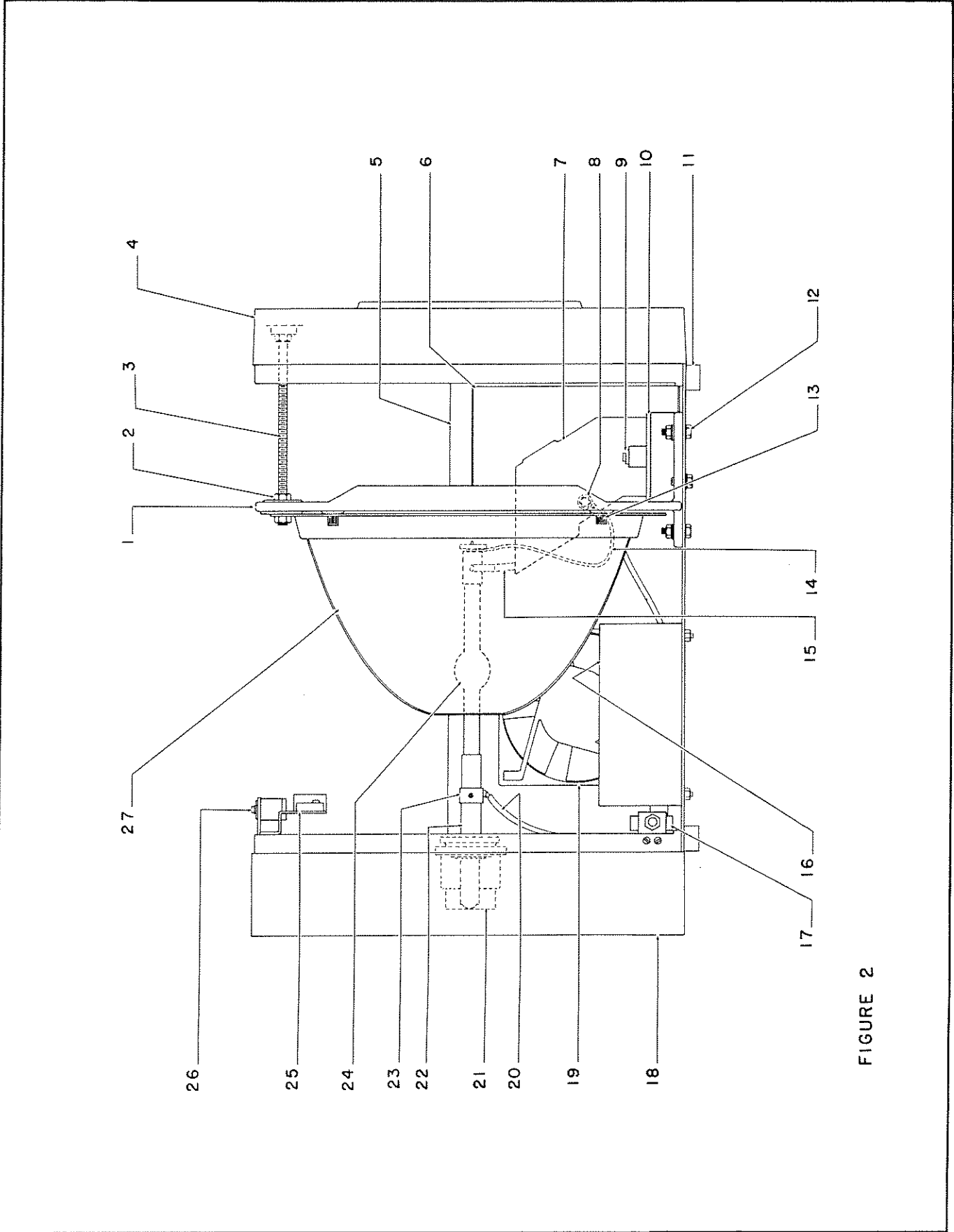


FIGURE 2

PARTS LIST

Figure 2

<u>Item</u>	<u>Part No.</u>	<u>Description</u>
1	65114	Bulkhead Casting, Reflector Mount
2	00805	Hexnut, 1/4-20
3	65164*	Reflector Positioning Tie Rod
4	65111	Front Casting
5	41942	Side & Base Panel, Welded Assembly
6	65155	Inner Heat Shield, Left
-	65156	Inner Heat Shield, Right (not shown)
-	01304	Screw, 8-32 x 5/16" Pan Head
7	41155A	Air Duct Casting
8	72181	Receptacle
9	00262	8-32 x 1" Fillister Head
-	65171	Insulated Bushing
10	41987	Insulator Plate
11	37128	Spacer Block
-	00492	Screw, 1/4-20 x 3/4" Flat Head
12	00691	Screw, 1/4-20 x 3/4" Hex Head
-	00876	Lockwasher, 1/4"
-	00805	Hexnut, 1/4-20
13	01432	Screw, 1/4-20 x 1/2" Socket Head
14	41974	Bulb Lead Assembly
15	41980	Bulb Yoke
-	01721	Set Screw, 8-32 x 5/16"
16	41929A	Igniter Assembly (with Hardware)
17	80168	Access Panel Interlock Switch (S4)
-	65185	Switch Mounting Bracket
-	00254	Screw, 8-32 x 1/4" Fillister Head
-	00891A	Lockwasher, #8
18	65112	Back Casting
19	81272	Blower, 230 V.AC, 50/60 Hz. (B1)
-	01763	Screw, 6-32 x 1" Pan Head
-	61127	Blower Mounting Clip, 6-32
-	83131	Blower Intake Grille (not shown)
20		Bulb Collet Lead Assembly
21	41933	Bulb Adjust Assembly (see Figure 1)
22	25117	Bulb Collet (see Figure 1, Item 18)
23	25117	Bulb Collet (see Figure 1, Item 18)
24	41103	Metal Halide Bulb, 1200 W.

* Positioned at Factory - *Do Not Adjust*

<u>Item</u>	<u>Part No.</u>	<u>Description</u>
25	65134	Barrier Strip, 10 Terminal (TB1)
-	65160	Mounting Bracket
-	182	Screw, 6-32 x 7/16" Fil. Hd.
-	255	Screw, 8-32 x 5/16" Fil. Hd.
-	891A	#8 Lockwasher
26	80168	Top Cover Interlock Switch (S3)
-	65185	Switch Bracket
-	255	8-32 x 5/16" Fil. Hd.
-	891A	#8 Lockwasher

OPTICAL SYSTEM AND BASE - PARTS LISTS

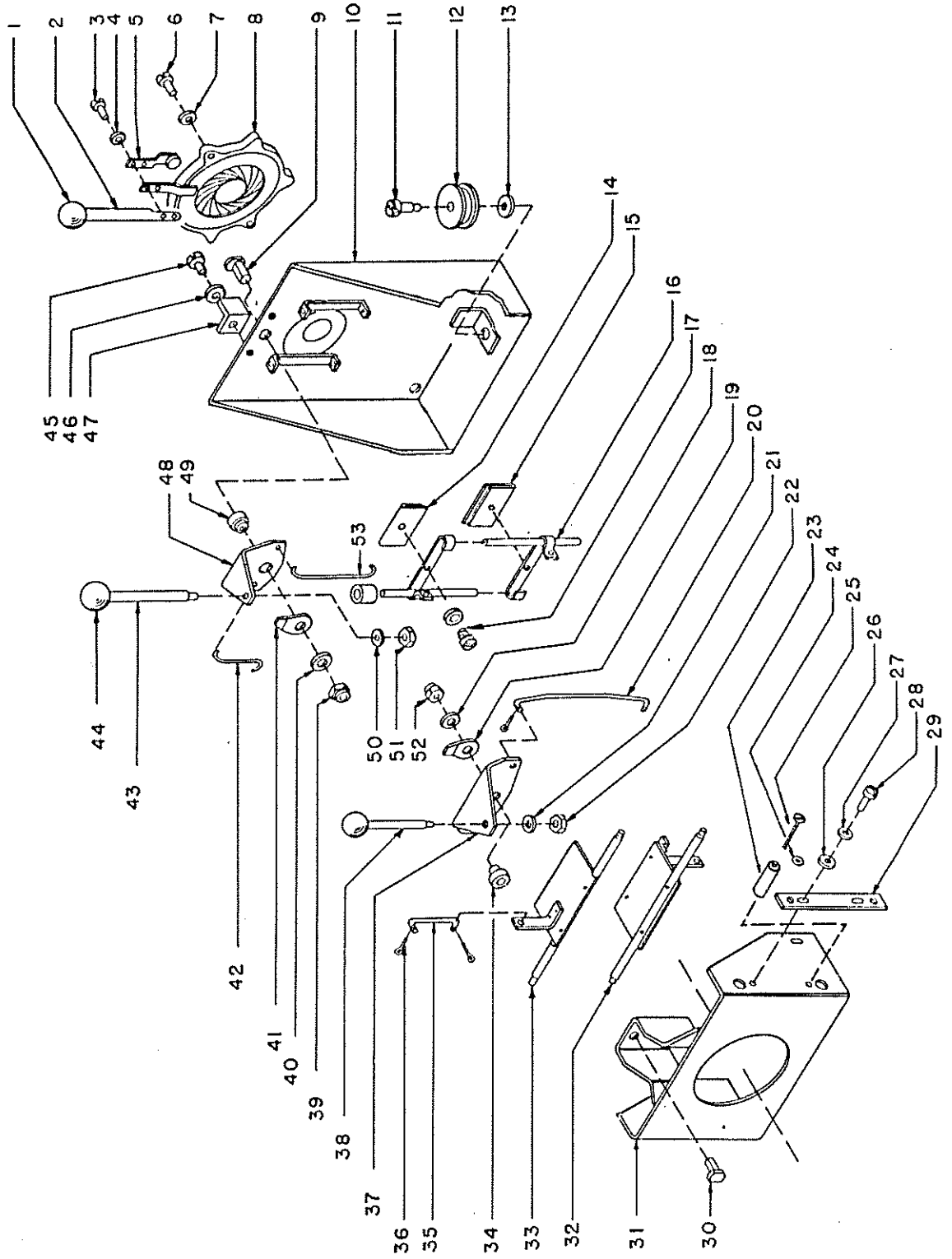


FIGURE 1

FIGURE 1

<u>Item</u>	<u>Part No.</u>	<u>Description</u>
1	10048	Knob
2	48402	Shaft, Iris
3	179	Screw, Mach., Fill.Hd. 6-32 x 1/4
4	892	Lockwasher #6 Shakeproof #1206 Internal
5	51978	Friction Spring, Iris
-	51229	Friction Pad
6	184	Screw, Mach., Fill.Hd. 6-32 x 5/8
7	892	Lockwasher #6 Shakeproof Internal
8	51979	Iris
9	51226	Stud, Chopper Blade
10	51871	Support Plate, Aperture
11	51160	Stud, Pulley
12	51157	Pulley, Small
13	830	Washer #8
14	47191	Chopper Blade
15	47191	Chopper Blade
16	47982	Slide Assy., Chopper Blade
-	MAL-64	Spacer
17	253	Screw, Mach.Fill.Hd. 8-32 x 3/16"
-	891A	Lockwasher, #8 Shakeproof #1208
18	853	Washer, 1/4" (SAE) Steel
19	51156	Plate Friction, Chopper Blade
20	51602	Rod, Lower, Blade Operating
21	876	Lockwasher, Split Ring 1/4"
22	805	Nut, 1/4-20 Steel
23	51517	Spacer
24	866	Washer, #10, Flat
25	400	Screw, 10-32 x 1-1/2 Fil.Hd.
26	831	Washer, Thick Brass, #10 7/16 OD x .200 ID x .036
27	1344	Lockwasher, #10 Internal Shakeproof #1210
28	378	Screw-Mach., Fill.Hd. 10-32 x 1/4
29	51443	Retainer, Pivot Shaft
30	51226	Stud, Chopper Blade
31	48898	Bracket Assy., Fadeout Mech.
32	48878	Blade Assy., Lower Fadeout Mech.
33	48879	Blade Assy., Upper Fadeout Mech.
34	51153	Bushing, Spacer Chopper Blade
35	51515	Rod, Upper, Blade Operating
36	919	Cotter Pin 1/16" x 1/2"
37	51520	Bracket, Fadeout Handle
38	51452	Shaft Handle, Fadeout Mech.
39	1406	Nut, Flexlock 5/16-18 x 1/4
40	853	Washer, Steel 1/4" (SAE) Std.
41	51156	Plate, Friction, Chopper Blade

Figure 1 - Pg. 2

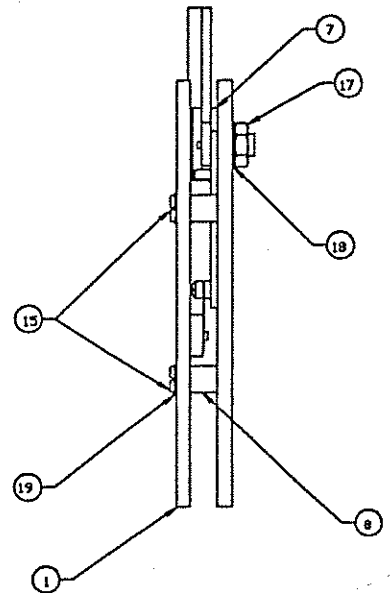
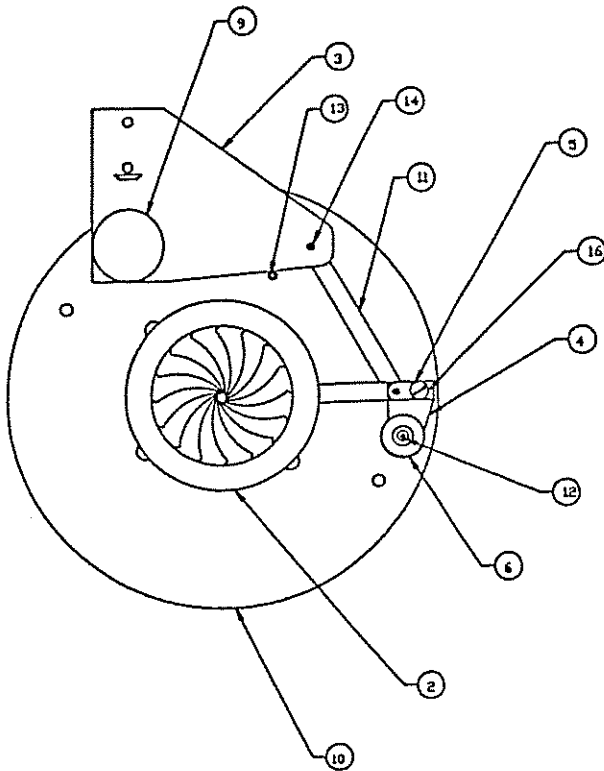
<u>Item</u>	<u>Part No.</u>	<u>Description</u>
42	51498	Pull Rod, Short
43	51155	Shaft, Chopper Blade Handle
44	10048	Knob
45	254	Screw 8-32 x 1/4" Fill.Hd.
46	891	L'Washer #8 Shakeproof (Steel)
47	47170	Stop, Iris
48	48406	Handle, Bracket
49	51153	Bushing, Spacer, Chopper Blade
50	876	L'Washer 1/4" Split Ring
51	805	Nut 1/4-20 Steel
52	1406	Locknut 5/16-18 Maclean Fogg
53	51497	Pull Rod, Long

Not Shown

(Required for Short Throw Super Trouper Only)

83181	Iris Masking Plate
83182	Retaining Clip

"NEW" IRIS ASSEMBLY



THIS PART IS REMOVED
IN OTHER VIEW

PARTS LIST

Iris Assembly, New (1992) Style

<u>Item</u>	<u>Part No.</u>	<u>Description</u>
1	51639	Rear Mounting Plate
2	51638	Iris (New Style)
3	51635	Bell Crank
4	51636	Drag Spring
5	51634	Spring Retainer
6	51633	Drag Shoe
7	51632	Pivot Washer
8	51628	Plate Bushing
9	51629	Bell Crank Pivot
10	51637	Front Mounting Plate
11	51640	Bell Crank Link Ass'y.
12	1639-2	Rivet, 1/8 x 5/16"
13	21-37004	Roll Pin, 1/8 x 1/2"
14	21-37007	Roll Pin, 3/32 x 5/16"
15	41-51090	Screw, 8-32 Pan Hd.
16	41-51015	Screw, 5-40 Pan Hd.
17	41-35066	Stop Nut, 5/16-24
18	41-70016	Lock Washer, 5/16"
19	41-70002	Washer, #8

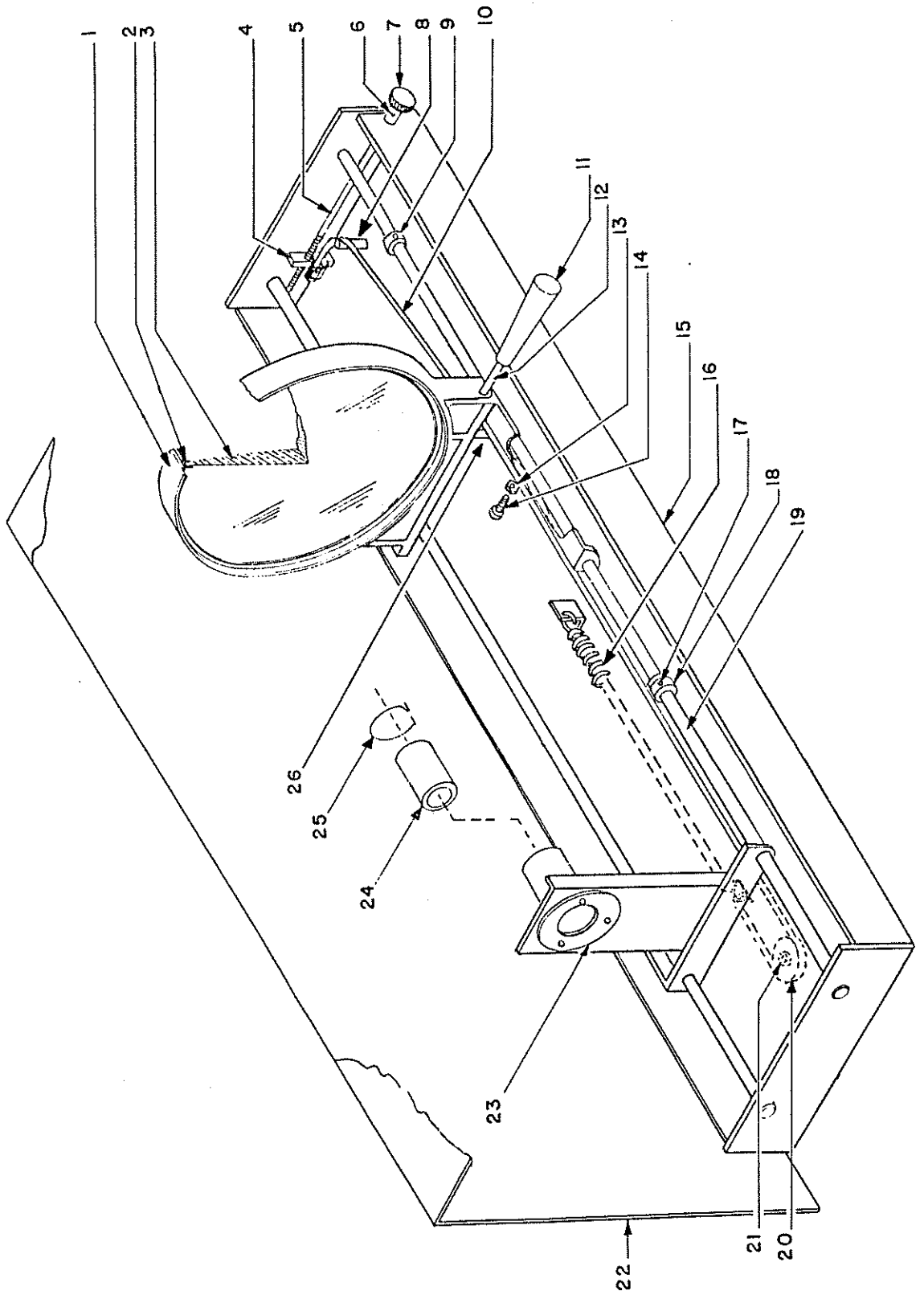


FIGURE 1A

FIGURE 1A

<u>Item</u>	<u>Part No.</u>	<u>Description</u>
1	51876	Carriage, Large Lens Assy.
2	51493	Ring, Lens Retaining
-	51492	Rubber Lens Cushion
-	217	Screw, 8-32 x 5/16" Rd.Hd.
-	830	#8 Flatwasher (Brass)
-	866	#10 Flatwasher
3	51102	Lens
4	51133	Block, Lens Focus
5	51489	Shaft, Lens Focus
-	866	#10 Flatwasher
-	1475	Cotter Pin, 1/16 x 3/8"
6	51202	Set Screw
7	51168	Knob, Lens Focus
8	51167	Stud
-	490	Screw, 1/4-20 x 1/2" Flt. Hd.
9	51114	Stop Collar
10	51992	Ribbon Assy., Lens Focus
11	51509	Handle, Large Lens Assy.
12	48401	Handle Shaft
13	1752	Hexnut, 1/4-20 (Nylon)
14	1754	Screw, 1/4-20 x 1" Hex Hd. (Nylon)
15	48899	Base Pan, Welded Assy.
16	51162	Tension Spring
17	722	Set Screw, 10-32 x 1/4"
18	51114	Stop Collar
19	51485	Slide Rod
-	48127	Retaining Clip, Truarc #5100-56
-	48147	Retaining Clip, Truarc #5101-56
20	51157	Pulley
21	51160	Pulley Stud
-	830	#8 Flatwasher (Brass)
NOTE: Items 20 & 21 shown offset for clarity. See Figure 1, Items 11, 12 and 13.		
22	48895	Housing Assy.
-	1307	Screw, 10-32 x 3/8 " Pan Hd.
-	541	Screw, 1/4-20 x 1/2" Pan Hd.
23	48896	Small Lens Carriage Assy.
-	51101	Small Lens (2.5" Focal Length)
-	48404	Mounting Plate, Small Lens (2 req'd)
-	48403	Mounting Tube, Projection Lens
-	241	Screw, 8-32 x 5/8" Flt. Hd.

<u>Item</u>	<u>Part No.</u>	<u>Description</u>
24	44239	Projection Lens (4.5" Focal Length)
25	83155	Retaining Ring
26	51160	Pulley Stud
-	830	#8 Flatwasher (Brass)

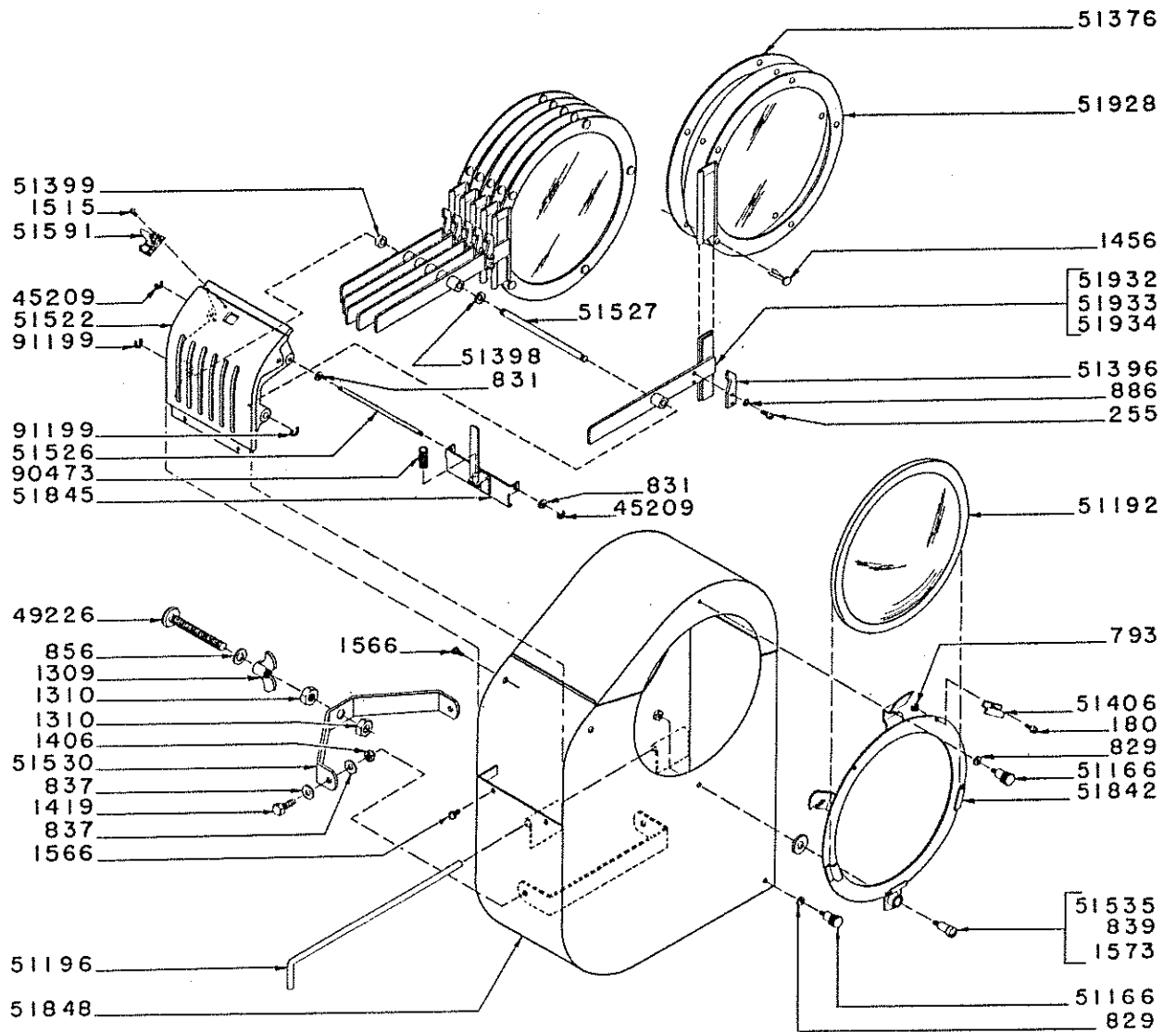
Not Shown

48891	Base Rail, Lamphouse & Len Mechanism
49342	Hand Rail, Chromed
1346	Screw, 5/16-18 x 1/2" Hex Hd.
877	5/16" L'Washer, Split

FIGURE 2
PARTS LIST

<u>Item</u>	<u>Part No.</u>	<u>Description</u>
1	49120	Tilt Axis Bolt
2	2411	Washer, Negative Spider
3	49121	Axis Tilt Washer
4	818	Hex Nut, 3/8-16
5	854	Washer, 3/8" (Flat)
6	49126	Trunnion, Clamp Plate
7	49125	Trunnion Spring
8	49124	Trunnion Clamp Bushing
9	49129	Trunnion Clamp Shaft
10	49130	Clamp Shaft Handle
11	10048	Knob
12	49179	Swivel Clamping Nut
13	49114	Handle Stud
14	48888	Base Support Column
15	1656	Screw, 5/16-18 x 2-1/2" Hex Hd.
16	877	Lockwasher, 5/16" I.D.
17	48887	Base Leg Assy.
18	49226	Leveling Foot
19	48395	Pin-Height Adjust
20	48885	Inner Tube Assy.
21	48399	Bronze Washer
22	49185	Swivel Clamp Collar
23	687	Screw, 1/4-20 x 1/2
24	1304	Screw, 8-32 x 5/16
25	48394	Yoke Cover Plate (Outlined, not shown)
26	49191	Inner Tube Retaining Collar
27	1317	Screw, 1/2-13 x 2-1/2"
28	49977	Yoke Assy.
29	689	Screw, 1/4-20 x 5/8
30	83341	Cable Clamp
31	48884	Yoke - Quadrant Plate Assy.

PLATE 2148



BOOMERANG PARTS LIST

<u>Part No.</u>	<u>Description</u>	<u>Part No.</u>	<u>Description</u>
51850	Boomerang Ass'y.	51406	Clip, U.V. Filter
00180	Screw, 6-32 x 5/16"	51522	Frame, Color Disc Housing
	Fillister Head	51526	Shaft, Rocker Catch Pivot
00255	Screw, 8-32 x 5/16"	51527	Shaft, Color Disc Pivot
	Fillister Head	51530	Yoke
00793	Nut, 6-32, Steel	51535	Screw, U.V. Filter Pivot
00829	Washer, #8 Brass, 3/8" O.D.	51591	Latch, Color Disc Housing
00831	Washer, #10 Brass, 7/16" O.D.	51842	U.V. Filter Support, Frame Ass'y.
00837	Washer, 5/16" Brass, 3/4" O.D.	51845	Rocker Catch Ass'y.
00839	Washer, 3/8" Brass, 7/8" O.D.	51848	Housing Ass'y.
00856	Washer, 1/2" S.A.E.	51928	Color Frame, Slide Channel Ass'y.
00886	Lockwasher, #8 Split Ring	51932	Arm Ass'y. (5-3/16")
01309	Wing Nut, 1/2-13	51933	Arm Ass'y. (4-11/16")
41-35065	Wing Nut, 3/8-16	51934	Arm Ass'y. (4-3/16")
01310	Hex Half Nut, 1/2-13	90473	Spring
01406	Locknut, 5/16-18 x 1/4"	91199	"E" Ring, 5/16"
01419	Screw, 5/16-18 x 3/4"		
	Hex Head Cap		
01456	Paper Fastener		
01515	Screw, 4-40 x 1/4"		
	Round Head		
01566	Screw, 10-24 x 5/16"	01319	DuaLock Nut, 3/8-16
	Pan Head	00809	Hex Nut, 3/8-16
01573	Jam Nut, 1/4-20	00854	Washer, 3/8" I.D.
45209	"E" Ring, 3/16"	41-35065	Wing Nut, 3/8-16
49226*	Adjusting Screw (Replace with 51347*)		
51166	Shoulder Screw		
51192	Ultra Violet Filter		
51196	Hinge Pin		
51347*	Adjusting Screw (Mfgr. 1991 and Later)		
51376	Cover Plate, Color Frame		
51396	Catch		
51398	Nylon Spacer Washer		
51399	Spacer		

* 49226 Stud is threaded 1/2-13. If upgrading to the 51347 Stud (threaded 3/8-16), also order:

01319	DuaLock Nut, 3/8-16
00809	Hex Nut, 3/8-16
00854	Washer, 3/8" I.D.
41-35065	Wing Nut, 3/8-16

Use ROSCOLUX® (or equivalent) high temperature color media.