Film-Tech

The information contained in this Adobe Acrobat pdf file is provided at your own risk and good judgment.

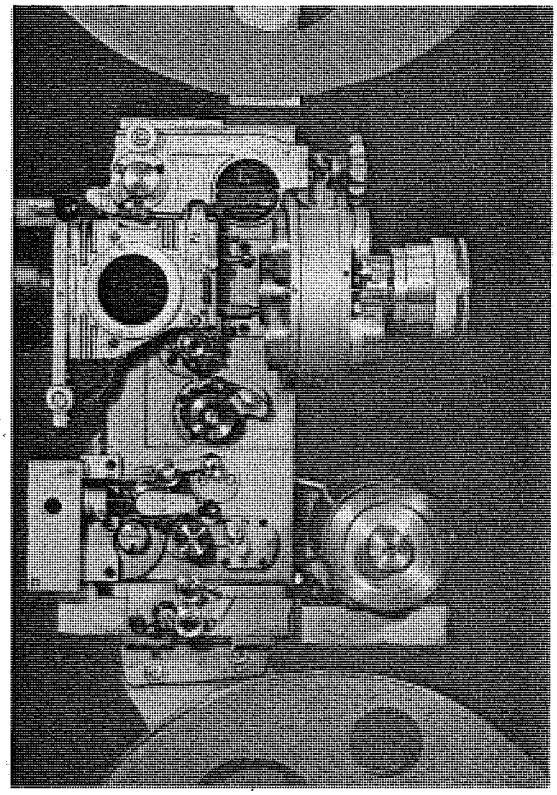
These manuals are designed to facilitate the exchange of information related to cinema projection and film handling, with no warranties nor obligations from the authors, for qualified field service engineers.

If you are not a qualified technician, please make no adjustments to anything you may read about in these Adobe manual downloads.

www.film-tech.com

INSTRUCTION MANUAL

TOKIWA TSR PROJECTORS



01-0001 TSR-1M 35mm Projector/Soundhead
01-0002 TSR-3M 35mm Projector/Soundhead with 3 Lens—Manual Turret
01-0003 TSR-2A 35mm Projector/Soundhead with 2 Lens Automatic Turret

DISTRIBUTED EXCLUSIVELY BY: AMERICAN Theatre Products
6650 Lexington Avenue • Hollywood, CA 90038 • 213-462-7750

TABLE OF CONTENTS

TOKIWA TSR PROJECTORS

PARTS LIST

TSR-A	TSR PROJECTOR BODY
TSR-BA	FILM GATE ASSEMBLY
TSR-BB	FILM TRAP ASSEMBLY
TSR-C	MANUAL SINGLE LENS-HOLDER ASSEMBLY
TSR-3C	MANUAL 3 TURRET LENS-HOLDER ASSEMBLY
TSR-D	FRAMING ASSEMBLY
TSR-E	INTERMITTENT MOVEMENT ASSEMBLY
TSR-F	SHUTTER AND SHUTTER METAL ASSEMBLY
TSR-GA	UPPER SPROCKET ASSEMBLY
TSR-GB	LOWER SPROCKET ASSEMBLY
TSR-H	MAIN DRIVE GEAR AND OIL PUMP ASSEMBLY
TSR-I	VERTICAL SHAFT ASSEMBLY
TSR-K	ANAMORPHIC LENS-HOLDER ASSEMBLY
TSR-KG	ELECTRIC PICTURE CHANGE OVER UNIT ASSEMBLY
TSR-L	HOLD-BACK SPROCKET ASSEMBLY
TSR-M	IDLE GEAR AND DAMPER ROLLER ASSEMBLY
TSR-N	ROTARY STABILIZER ASSEMBLY
TSR-R	MOTOR AND MOTOR DRIVE PULLEY ASSEMBLY
TSR-V	TAKE-UP TENSION ROLLER ASSEMBLY
TSR-WA	SOLAR CELL ARM ASSEMBLY
TSR-WB	EXCITER LAMP BOX AND SLIT ASSEMBLY (SINGLE)
TSR-WW	EXCITER LAMP BOX AND SLIT ASSEMBLY (DOUBLE)
TSR-W-DB	DOLBY STEREO SOLAR CELL ARM ASSEMBLY

DRAWINGS

TSR	TOKIWA—35mm SOUND PROJECTOR ASSEMBLY
TSR-A	PROJECTOR MAIN FRAME ASSEMBLY
TSR-BA	FILM GATE ASSEMBLY
TSR-BB	FILM TRAP ASSEMBLY
TSR-C	SINGLE-LENS MANUAL LENS TURRET ASSEMBLY
TSR-3C	TREE LENS MANUAL LENS TURRET ASSEMBLY
TSR-D	FRAMING ASSEMBLY
TSR-E	INTERMITTENT MOVEMENT ASSEMBLY
TSR-F	SHUTTER ASSEMBLY
TSR-F&KG	PROJECTOR MAIN FRAME ASSEMBLY
TSR-GA	PROJECTOR UPPER SPROCKET ASSEMBLY
TSR-GB	PROJECTOR LOWER SPROCKET ASSEMBLY
TSR-H	MAIN DRIVE GEAR AND OIL PUMP ASSEMBLY
TSR-I	VERTICAL SHAFT ASSEMBLY
TSR-L	SOUNDHEAD HOLD-BACK SPROCKET ASSEMBLY
TSR-M	IDLER GEAR AND DAMPER ROLLER ASSEMBLIES
TSR-N	ROTARY STABILIZER ASSEMBLY
TSR-R	MOTOR DRIVE PULLEY ASSEMBLY
TSR-V	TAKE UP TENSION ROLLER ASSEMBLY
TSR-WA	SOLAR CELL ASM-EXCITER LAMP AND SLIT LENS ASSEMBLY
TSR-WB	EXCITER LAMP AND SLIT LENS ASSEMBLY
TSR-E/I	VERTICAL SHAFT & INTERMITTENT MOVEMENT ASSEMBLY

INTRODUCTION

Your new Tokiwa 35mm integral projector/soundhead is the product of state-of-the-art engineering and modern, high-precision manufacturing techniques. It will provide years of dependable, trouble-free service, if given simple, routine maintenance in accordance with the instructions provided in this manual.

PLEASE READ THIS MANUAL THOROUGHLY BEFORE BEGINNING THE INSTALLATION OF YOUR TOKIWA TSR PROJECTOR. Your thorough understanding of this instruction manual will simplify your job and assure satisfactory results. Should you have any questions regarding the installation or operation of your Tokiwa TSR which require special attention, please contact your theatre equipment dealer for instructions before proceeding further. The sales, service and engineering staff of AMERICAN THEATRE PRODUCTS will be pleased to offer you prompt and courteous telephone assistance with your technical inquiries. For your convenience, we may be reached at: AMERICAN THEATRE PRODUCTS, 6650 Lexington Avenue, Hollywood, California 90038. Telephone (213) 462-7750.

UNPACKING THE UNIT

Your Tokiwa TSR projector has been thoroughly inspected, shop-tested, aligned and adjusted by AMERICAN THEATRE PRODUCTS' skilled technicians in our service facility prior to final shipment. It has been carefully packed to insure its safe, damage-free shipment to your door. Any shipping damage found to the outer container or to the projector mechanism itself should be noted and reported immediately to the freight carrier.

The unpacking of the unit should be done very carefully to avoid causing any cosmetic or mechanical damage. First, the inner fill packing material should be removed, but not discarded until it has been searched for loose or stray parts. Next, the inner bracing strips and planks should be removed to free the projector for removal. The projector may now be lifted out of the shipping container.

CAUTION: THE PROJECTOR MECHANISM ITSELF IS VERY HEAVY. TO PREVENT PHYSICAL STRAIN AND POSSIBLE INJURY, THE PROJECTOR SHOULD BE LIFTED BY TWO PEOPLE. The projector should be carefully grasped by the lift bar attached to the magazine studs - NOT BY ANY PROTRUDING PROJECTOR PARTS - and lifted slowly out of the shipping container. Place the projector in an upright position on a solid floor or sturdy table in preparation for installation.

SECTION 1.0
INSTALLATION

MOUNTING THE ELECTRIC CHANGEOVER DOWSER

1.1 Prior to mounting the projector onto the console or pedestal, the Electric Changeover Dowser (TSR-KG) should be mounted onto the rear of the Shutter Housing Assembly (TSR-A-10, A-15, etc.) using the four screws provided. When using the alternate Short Shutter Housing Assembly (TSR-A-10A) the Changeover Dowser is secured with only two mounting screws. Orient the Changeover so that the manual dowser handle is on the bottom, facing the operating side of the projector, as shown in Fig. 1-1.

MOUNTING THE PROJECTOR

1.2.1 The Tokiwa TSR, as provided, will mount directly onto all standard U.S.-type consoles and pedestals without the use of special adapter brackets. For maximum user convenience, the TSR's mounting bracket is drilled with the two most popular U.S. projector/soundhead mounting hole patterns. Measurement should be made of the console or pedestal's mounting bracket hole pattern to determine which set of mounting holes correspond and will be used on the TSR.

1.2.2 In accordance with the console or pedestal manufacturer's alignment instructions, have two people lift the projector into mounting position and secure it to the console or pedestal with the four bolts provided. Most console and pedestal mounting brackets have notched, open-ended upper mounting holes which simplify installation by enabling you to temporarily "hang" the projector in place with two mounting bolts hand-threaded into the TSR's upper mounting holes. The two lower bolts should then be installed, and all four bolts tightened securely.

1.3 After the projector is properly positioned and secured, correct optical alignment and focusing of the lamphouse components should be made in accordance with the lamphouse manufacturer's instructions. **CAUTION**: WHEN MAKING LAMPHOUSE FOCUS AND ALIGNMENT ADJUSTMENTS, BE CERTAIN THAT THE PROJECTOR IS PROPERLY FILLED WITH OIL PRIOR TO OPERATION. SEE SECTION 2.0, THE "FILLING THE OIL RESERVOIR" INSTRUCTIONS, FOR FURTHER INFORMATION.

1.4 When mounting the TSR projector onto certain console models it may be necessary to substitute one or both alternate parts TSR-A-10A Short Shutter Housing and TSR-WW Single Exciter Lamp Assembly for TSR-A-10 and TSR-WB, respectively. These substitutions may be required to provide adequate mounting clearance between the projector and the console's snoud and bulkhead. Please contact your dealer or regional ATP office with the make and model number of your console to be certain of receiving the correct TSR components.

1.5 Refer to Section 6.2 for alignment of projector/lamphouse to screen.

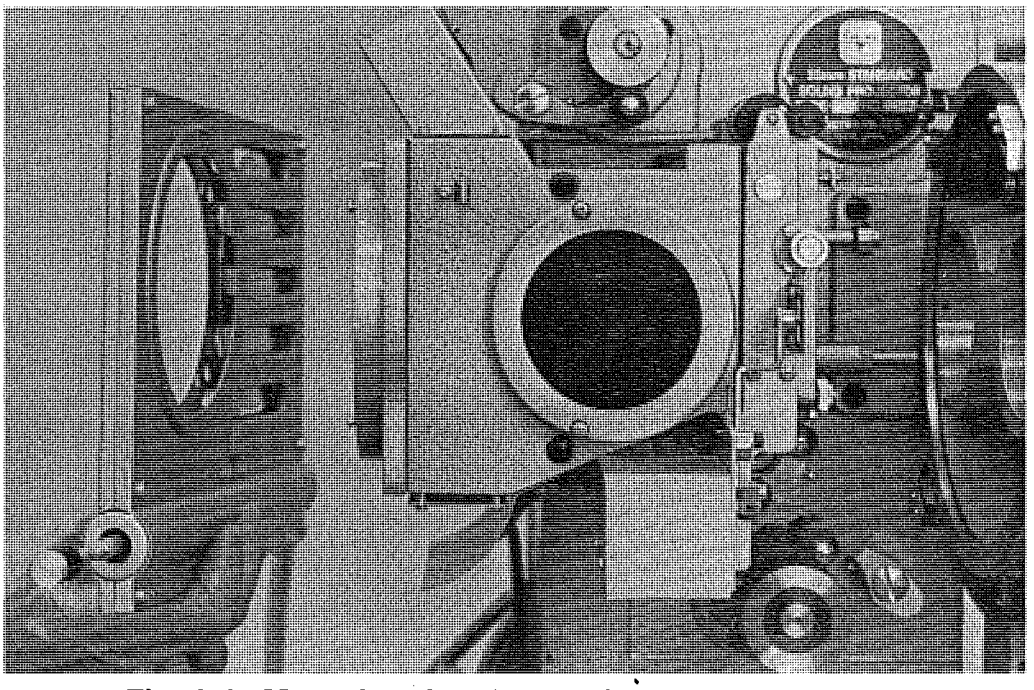


Fig. 1-1: Mounting the Electric Changeover Dowser

SECTION 2.0

FILLING THE OIL RESERVOIR

2.1 The Tokiwa TSR projector is a self-lubricating, oil bath-type mechanism which must be filled with the proper grade circulating oil, to the proper oil level, prior to operation. **CAUTION**: OPERATION OF THE TOKIWA TSR PROJECTOR - EVEN FOR BRIEF PERIODS - WITHOUT OIL FILLED TO THE PROPER RESERVOIR LEVEL MAY RESULT IN SERIOUS DAMAGE TO THE MECHANISM'S HIGH-PRECISION COMPONENTS AND WILL VOID YOUR WARRANTY.

2.2 Prior to operation, fill the TSR's oil reservoir with Tokiwa Projector Oil (TSR-ACC-1) or equivalent (see your dealer or contact ATP for oil specifications) so that the oil level reaches the Oil Gauge's (TSR-A-21) (Fig. 2-1) red "fill" line or slightly above. This is done by unscrewing the chrome-plated Oil Fill Cover (TSR-A-5) located on the back cover, (Fig. 2-2), and carefully pouring oil into the fill hole using any standard oil squirt can with a suitable nozzle. The oil capacity of the TSR's reservoir is approximately 325 cc, fluid ounces. When the reservoir is filled to the proper gauge level, replace the Oil Fill Cover and tighten it securely.

2.3 When the projector is operating, it is normal for the oil level to drop in the Oil Gauge as the oil is pumped from the reservoir and circulated throughout the mechanism. Proper oil circulation can be monitored by viewing the steady oil flow visible through the Oil Sight Window (refer to Fig. 2-1) on the rear cover.

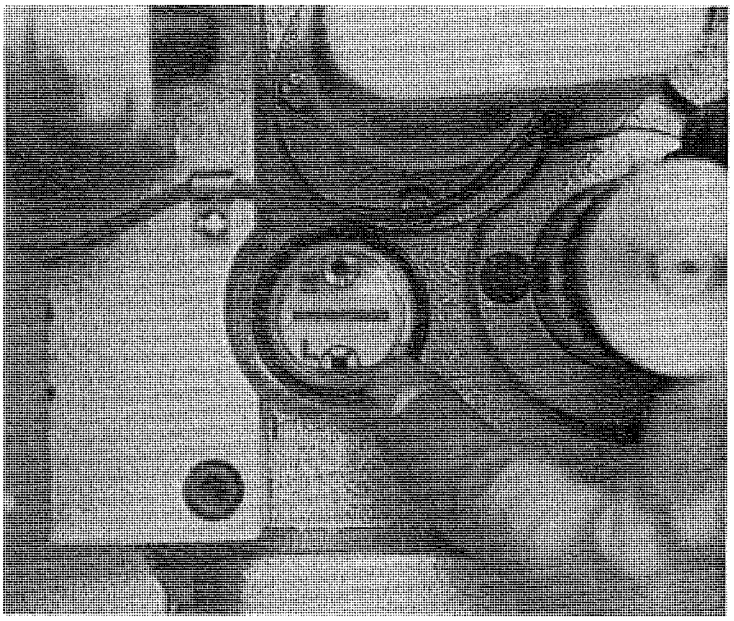


Fig. 2-1: Oil Gauge

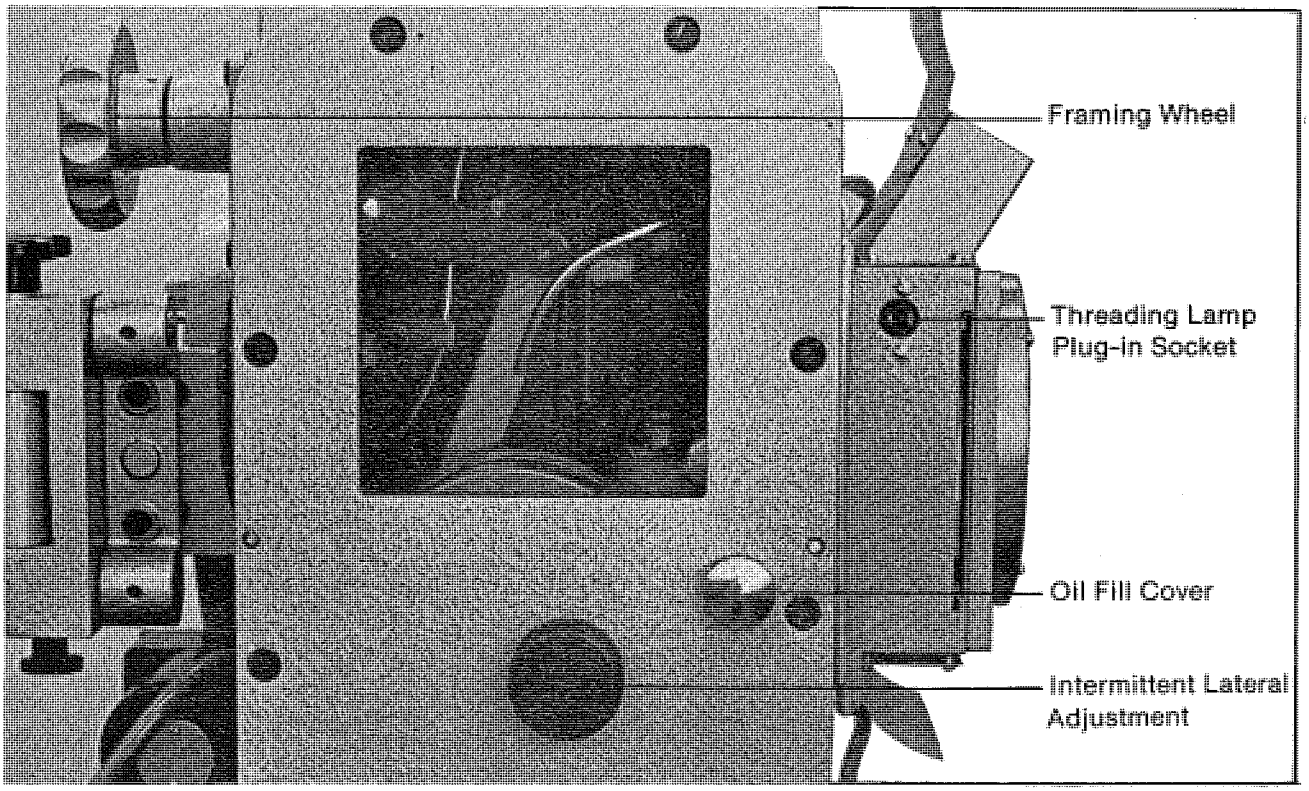


Fig. 2-2: Back Side of Projector

SECTION 3.0

MOUNTING THE REEL ARMS AND UNIVERSAL GUIDE ROLLERS

3.1 The Upper Reel Arm Assembly (TSR-6000-BU) should be mounted directly onto the upper flat side of the projector's main frame. The reel arm's mounting plate should be correctly oriented and fitted over the two threaded mounting studs protruding from the main frame. Secure the arm to the main frame by placing and tightening the supplied washers and nuts onto the threaded mounting studs.

3.2 The Lower Reel Arm Assembly (TSR-6000-BL), which includes the attached tilt extension brackets TSR-BL-28A and BL-28B, should be mounted as a complete unit to the underside of the projector using the supplied mounting bolts, nuts and washers. The forward tilt adjustment of the lower arm should be made with a 6,000 ft. take-up reel in place of the reel shaft to check for sufficient clearance between the reel and the console or pedestal base and bulkhead. To provide correct take-up clutch action, the two Felt Clutch Pads (TSR-BL-29) should be removed from the reel shaft, thoroughly soaked in Tokiwa Projector Oil, blotted gently so that they are damp but not dripping, and replaced on the reel shaft.

3.3 The Universal Guide Roller Assemblies (TSR-BG × 2), if required, are shipped to you pre-assembled. They are easily mounted onto the reel arms by screwing their main support posts directly into the threaded holes on the end of each reel arm. The rollers themselves are easily adjusted for proper projector and platter system film guidance and alignment. This is done by loosening the appropriate allen/hex-head set screw and then swiveling the roller head to the desired position. After this adjustment is made, all set screws should be tightened securely to prevent the roller head from slipping out of position when the projector is operating.

3.4 To install the Take-Up Belt (TSR-BL-36), first remove the three fastening screws which secure the Rear Lower Cover (TSR-A-28) to the main frame. Remove this cover and loop the neoprene Take-Up Belt (TSR-BL-36) over the Take-Up Pulley (TSR-R-4B). With the belt hanging from the pulley, twist the belt length ½ turn so that it crosses in the middle and slip the lower belt loop onto the Lower Reel Shaft Take-Up Pulley (TSR-BL032). **NOTE**: THE BELT MUST BE CROSSED TO PROVIDE CORRECT "A-WIND" CLOCKWISE TAKE-UP ROTATION. The slip-coupling position of the lower reel arm's Tilt Extension Brackets (TSR-BL-28A, 28B) may be adjusted to provide optimum take-up belt tension. Replace the Rear Lower Cover and its fastening screws when the belt is properly installed.

3.5 Before final tightening of both the upper and lower reel arms' mounting hardware, film should be observed running reel-to-reel and platter-to-platter (if used) through the projector. This is to verify that the arms and rollers are properly aligned to permit the film to feed smoothly through the projector. Readjust the arms and pulleys as necessary and tighten all mounting hardware securely.

SECTION 4.0

ELECTRICAL CONNECTIONS

4.1.1 The Projector Drive Motor is designed to operate from a 115VAC, 60 cycle power source. The induction type motors have a length of cord attached which should be routed to either the appropriate automation system connections or to a manually operated switch for motor control.

4.1.2 The Bodine Syncronous type motors will accept standard ½" conduit fittings to allow flexible conduit to be used. Motor rotation is counter clockwise and may be changed if required by reversing the two blue wires coming out of the motor.

4.2.1 The current models of TSR Projectors have a hole in the bottom of the exciter lamp housing to accommodate ½" conduit fittings. The ½" conduit is to be provided by your electrical contractor.

4.2.2 The conduit is to be routed to the sound system with two wires connected to the exciter lamp supply. A shielded, two conductor cable should be used to connect the solar cell to the sound system input. The exciter supply required shall provide a d.c. output of 9 VDC at 4 amperes.

4.3 The Framing Lamp (TSR-A-45) (Fig. 4-1) and its connecting cable (TSR-A-44), which is provided with the projector, should be connected to a suitable Class II Transformer having an output of 8-12 VAC. The transformer shall be provided by your electrical contractor and may be located at any convenient point.

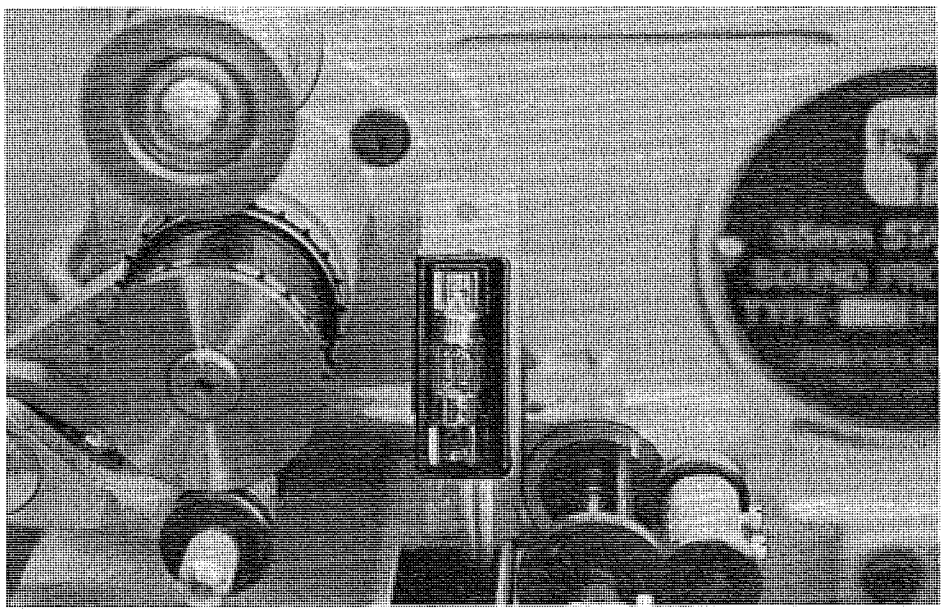


Fig. 4-1: Framing Lamp Assembly (Open)

4.4.1 The electrically operated Changeover (TSR-KG) operates on 115 VAC line current. The unit utilizes dual solenoids designed for momentary operation. Continuous or prolonged application of power will burn out the solenoid coils.

4.4.2 To protect the Changeover unit from accidental burn-out it is recommended that your electrical contractor provide a fuse or circuit breaker in the 115 VAC hot line as indicated on Fig. 4-2. Some automation systems have this protection built in.

There are five wires coming out of the Changeover Unit:

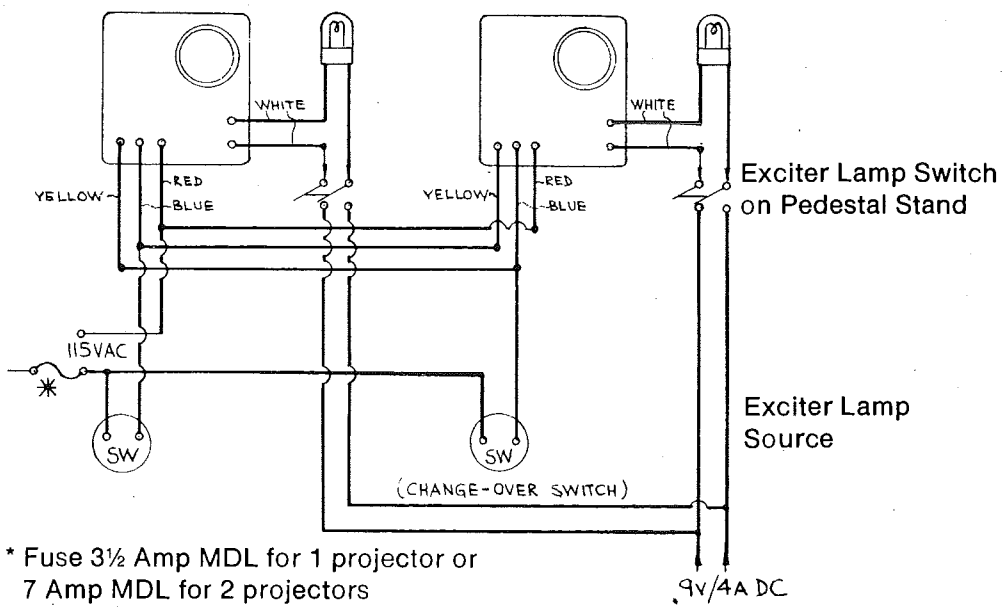
Blue - Open Coil
Yellow - Close Coil
Red - Common
White - SPST Switch
White - SPST Switch

4.4.3 The two white wires are connected to a SPST switch which is open when the dowser is open, and closed with the dowser is closed. This is a light duty switch and should only be used to control a suitable load relay.

4.5.1 The standard Monaural Solar Cell Assembly (TSR-WA) connections are color-coded to industry standards: RED = SIGNAL HIGH; BLACK = SIGNAL LOW. The cell should be connected, in standard fashion, to the sound system input according to the manufacturer's instructions.

4.5.2 The optional Stereo Solar Cell Assembly (TSR-W-DB) connections are also color-coded to industry standards: RED = LEFT CHANNEL; GREEN = RIGHT CHANNEL; BLACK = COMMON. The cell should be connected to an appropriate stereo sound system input according to the manufacturer's instructions. The Stereo Solar Cell Assembly may also be used with standard monaural sound systems for monaural reproduction of stereo and non-stereo soundtracks. This is accomplished by strapping together the RED and GREEN cell connections and using this combined lead as a monaural SIGNAL HIGH lead; use the BLACK lead as a standard SIGNAL LOW connection.

4.6 The optional Automatic Lens Turret and Aperture Changer Assemblies (TSR-2AC, TSR-AC-400) are shipped to you pre-wired to the System Control Box (TSR-AC-100). The power cable from the System Control Box may be plugged in (or hard-wired) to any standard 110-120 Volt, 60 Hz AC booth receptacle. The System Control Box may be mounted in any suitable convenient location, such as the console's front panel, etc.



4-2: Connection Diagram for Changeover Switch

SECTION 5.0
THREADING AND OPERATING INSTRUCTIONS

5.1.1 To thread the projector, place all sprocket pad roller arms in the open position and open the film gate by pulling the Gate Release Knob (TSR-B-25) (Fig. 5-1). While observing the intermittent sprocket, rotate the Motor Handwheel (TSR-R-5) (Fig. 5-2) in a counter-clockwise direction until the sprocket stops in its "rest" position. Unwind a suitable length of film from the supply reel or the platter transport and thread the film through the projector according to the Threading Diagram (Fig. 5-3). Be careful to provide the correct size film loops in between the various sprockets and rollers. As the film is threaded over each sprocket (with the exception of the intermittent sprocket) close the corresponding pad roller arm to secure the film.

5.1.2 When threading the film through the gate it is helpful to hold the film by the loop directly above the gate with the left hand. Lead the film through the trap area with the right hand and carefully view as it passes in front of the illuminated framing sight line. Position the film so that a frame line is directly over the illuminated horizontal slit. Then, with the film held in this position, thread it over the intermittent sprocket. Pull gently on the upper film loop so that the film remains secured to the intermittent sprocket teeth when hand contact is broken. With fingers clear of the gate area, snap the gate closed by pushing on the Gate Close Button (TSR-B-15) (Fig. 5-4) with firm finger pressure.

5.2 Because the Tokiwa TSR utilizes "loose-loop/rotary stabilizer" soundhead design, the projectionist should pay particular attention to threading the proper size film loop between the Projector Lower Take Up Sprocket (TSR-G-14B) and the Sound Drum Damper Roller (TSR-M-8) (Fig. 5-5). To obtain optimum, flutter-free soundtrack reproduction, it is important that this loop be made loose enough (see Fig. 5-5) so that the Damper Roller rides with its full weight on the Sound Drum (TSR-N-3). If the Damper Roller rides in the air with any space in between it and the Sound Drum, the film loop is too small and must be increased for proper soundhead operation.

5.3 When the film is threaded completely through the projector and onto the take-up device (either reel or platter), rotate the Motor Handwheel (TSR-R-5) several turns in a counter-clockwise direction. Observe the film path to verify that all sprockets properly engage the film and that the film advances correctly through the projector. You are now ready to start your show. Activate the booth automation system or the manual booth controls to start the projector.

5.4.1 By utilizing dual, upper and lower gate tension adjustments, the Tokiwa TSR permits a wide range of gate tension settings to provide optimum picture stability and minimum print wear with all print stocks. The Upper and Lower Gate Pressure Pad Adjustment Collars (TSR-B-32A) (Fig. 5-6) should be adjusted by the projectionist while the film is running through the projector to obtain maximum vertical image steadiness and minimum operating noise.

5.4.2 It is recommended that the projectionist initially set both the Upper and Lower Pressure Pad Adjustment Collars at their maximum counter-clockwise position for minimum gate pad tension. (Be careful not to unscrew the collars too far so that they do not come off of the threaded studs.) If required, the Adjustment Collars can then be tightened, individually or together, to increase gate tension for optimum picture steadiness. When another print is run, return the Collars to the minimum tension setting and proceed accordingly.

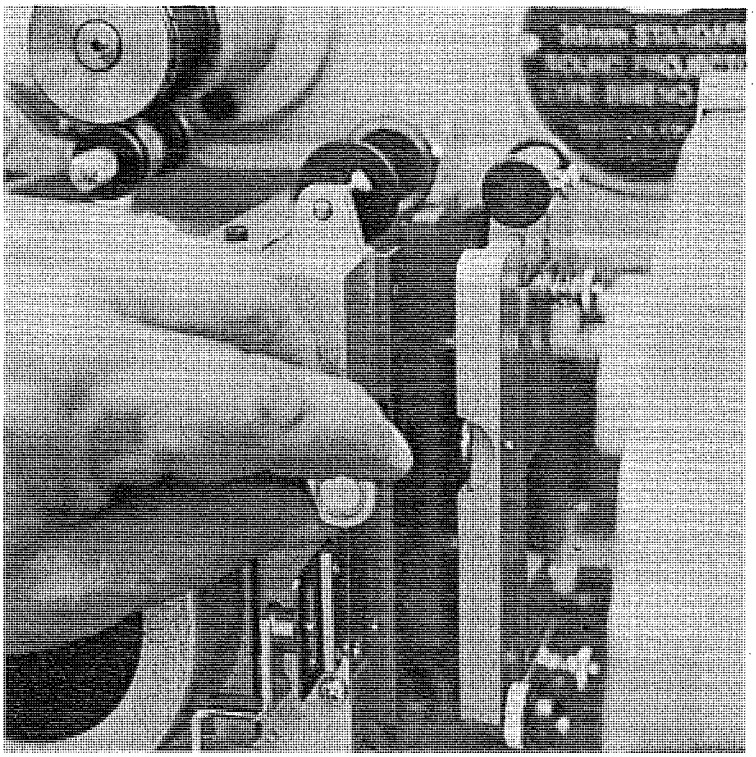


Fig. 5-1: Gate Release Knob

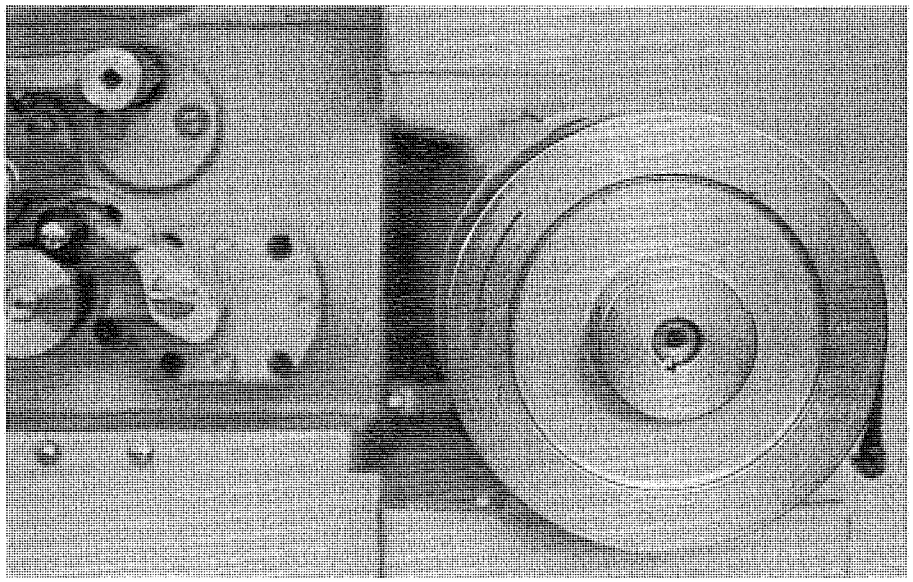


Fig. 5-2: Motor Hand Wheel

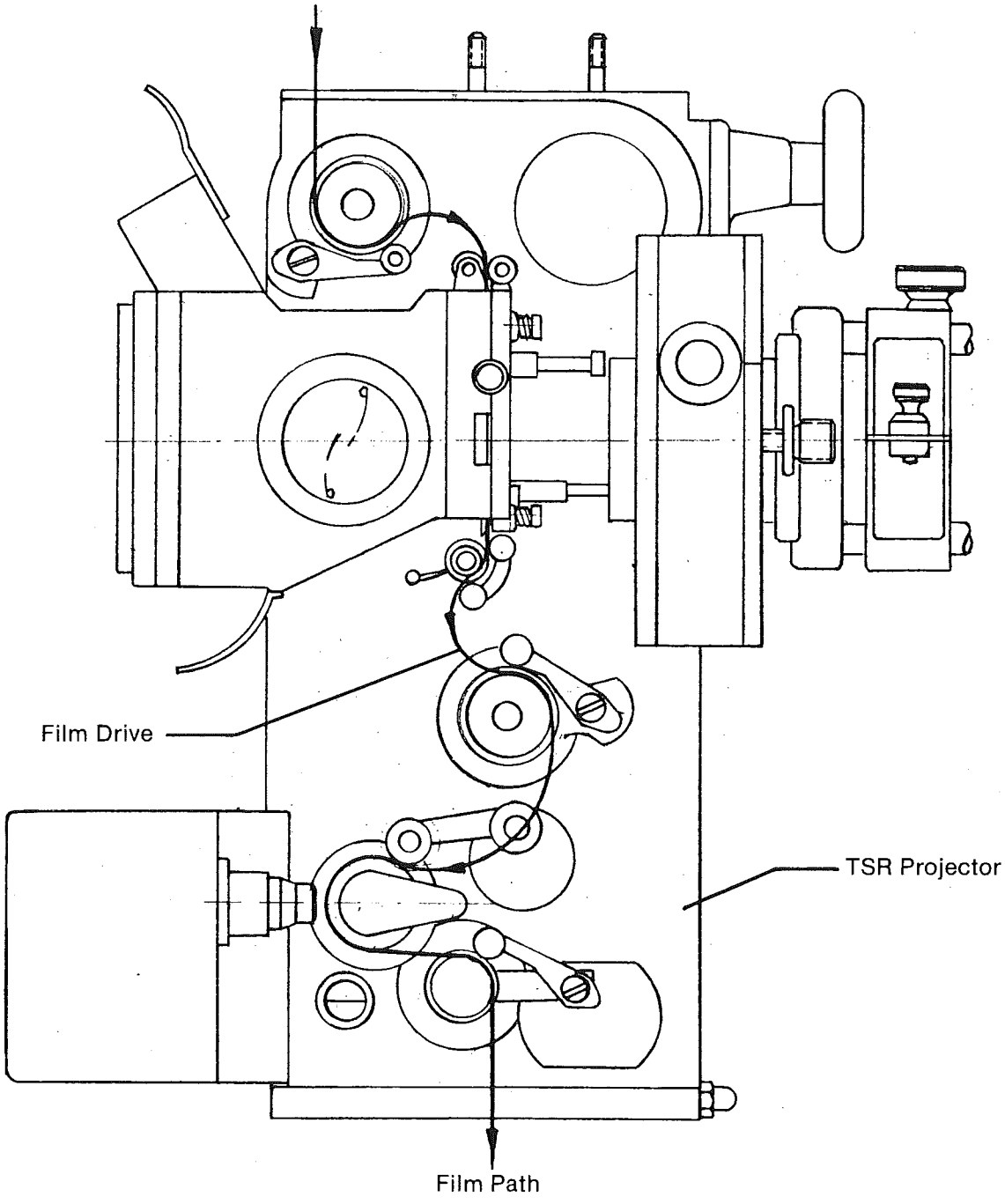


Fig. 5-3: Threading Diagram

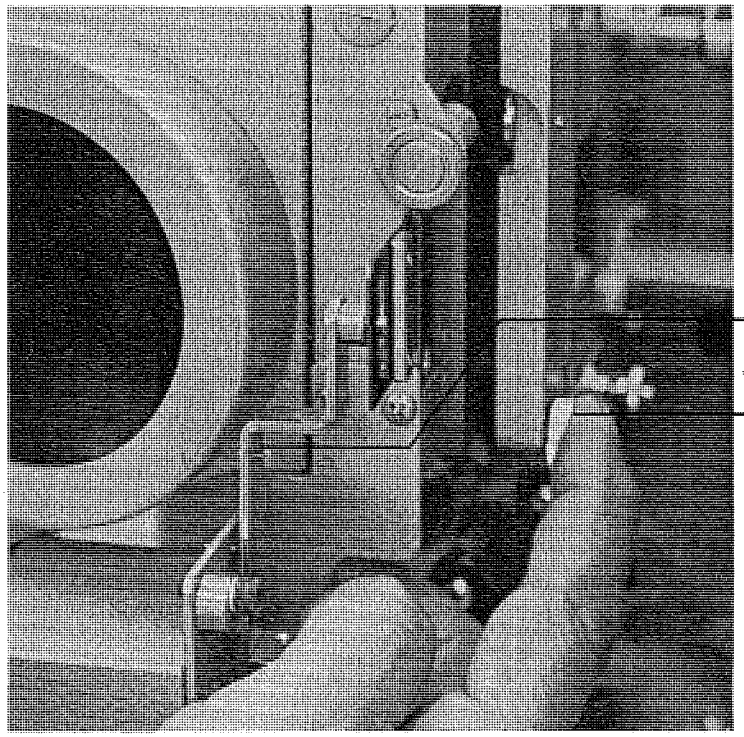


Fig. 5-4: Gate Close Button

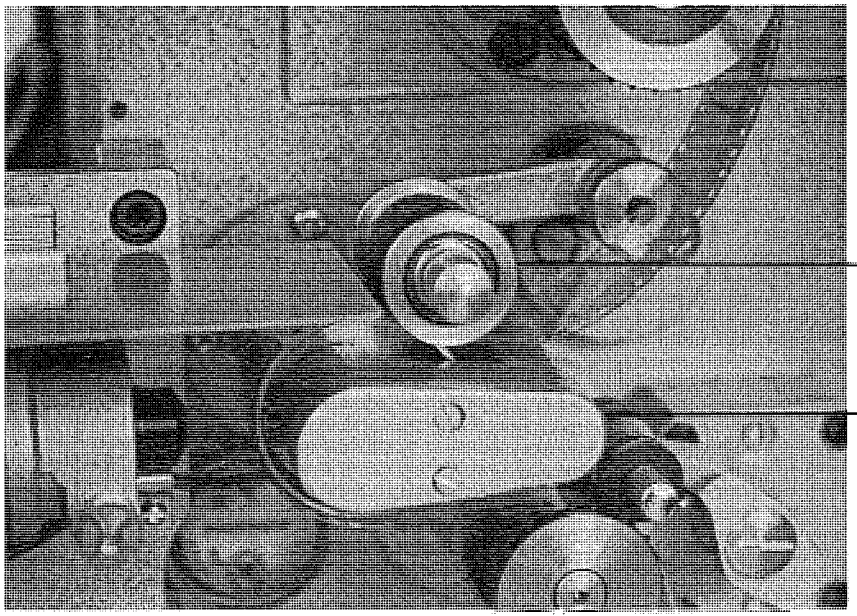


Fig. 5-5: Soundhead Threading

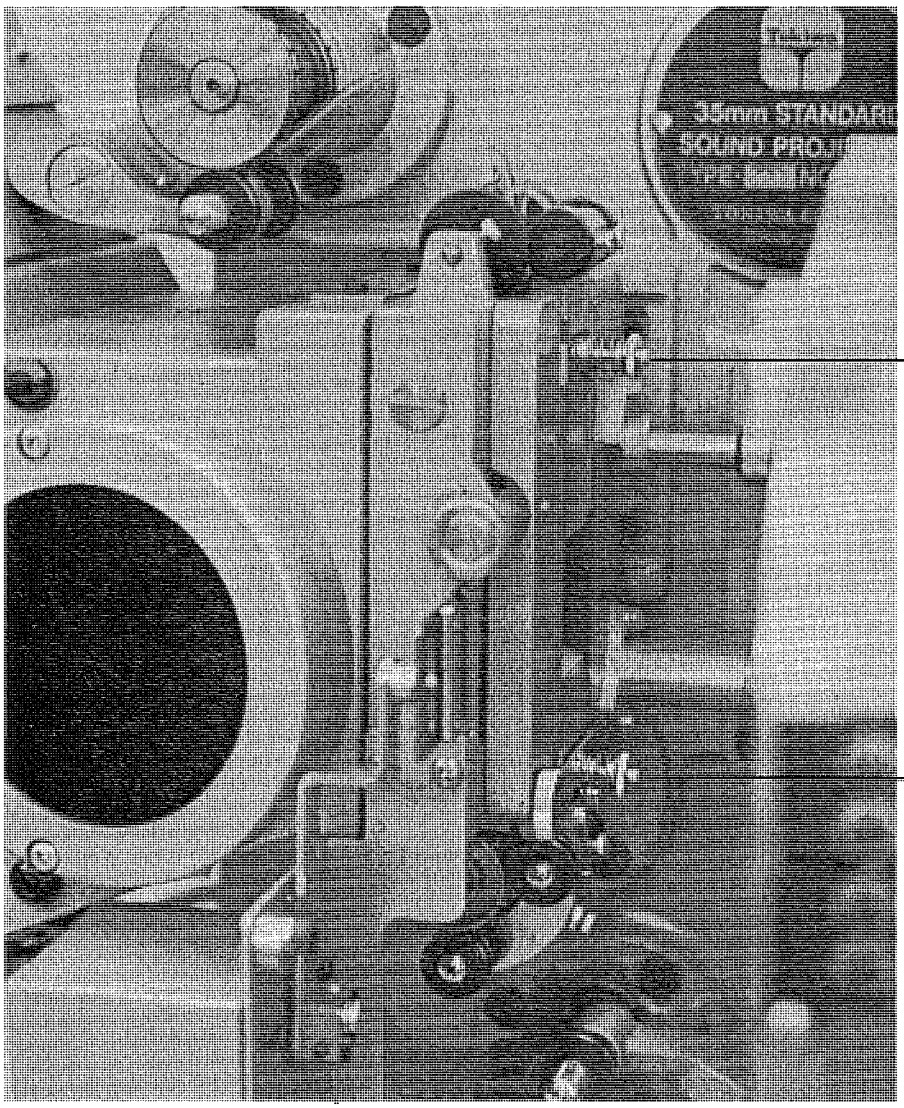


Fig. 5-6: Gate Pad Adjustment Collars

SECTION 6.0
SERVICE ALIGNMENT AND ADJUSTMENT PROCEDURES

6.1 The various alignments and adjustments described in the following section have all been carefully made to your Tokiwa TSR projector in ATP's service facility prior to shipment. However, if it is determined that these settings have shifted slightly due to rought handling during shipment or after long periods of use, and that they require checking or readjustment, we recommend that these adjustments be made in accordance with the procedures described herein to assure optimum TSR performance.

CAUTION: THESE SERVICE ADJUSTMENTS REQUIRE HIGH PRECISION AND, IN SOME INSTANCES, SPECIALIZED TOOLS AND TEST EQUIPMENT. TO AVOID DAMAGING THE MECHANISM OR WORSENING OF AN EXISTING CONDITION, REFER ALL SERVICING OF THE TOKIWA TSR PROJECTOR TO QUALIFIED SERVICE PERSONNEL.

ALIGNMENT OF PROJECTOR AND SCREEN

6.2.1 This alignment is actually a function of the console or pedestal and is made, with the projector mounted, as a complete unit. To make this alignment, we strongly recommend the use of SMPTE Projector Alignment Test Film (No. 35-PA) which is made in accordance with, and is often referred to as, "RP-40" (SMPTE Recommended Practice RP-40-1971). This multi-purpose test film, and the other SMPTE test films and data sheets referred to in this manual, may be ordered from : The Society of Motion Picture and Television Engineers (SMPTE), 862 Scarsdale Avenue, Scarsdale, New York 10583.

6.2.2 The alignment procedure is very simple, requiring only that the console or pedestal be tilted up or down and pivoted to the left or to the right so that the appropriate reference guide lines on the test film are properly centered when projected on the screen.

ALIGNMENT OF FILM PATH THROUGH SOUNDHEAD

6.3.1 This alignment is necessary to assure the correct lateral positioning of the film in relation to the sound scanning light beam and the solar cell pickup for optimum soundtrack reproduction.

6.3.2 Thread a loop (or reel-to-reel length) of SMPTE Buzz Track Test Film (P35-BT) through the projector, and run the projector with the exciter lamp, sound system and booth monitor speaker on. If you hear either a high or low frequency buzz through the system, turn the projector off and loosen the Locking Screw (TSR-M-7E) in the knurled Damper Arm Adjusting Collar (TSR-M-7A) (Fig. 6-1). Turn the projector on again and, with finger tip, slowly turn the Collar either clockwise or counter-clockwise until the scanning light beam scans only the center silent portion of the soundtrack and no buzz is heard. The film path is now correctly centered in its lateral plane. Carefully tighten the Locking Screw while listening to the sound output to be certain that the adjustment does not shift as the Screw is tightened. Readjust if necessary.

6.3.3 If your TSR projector is equipped with a Stereo Solar Cell Assembly (TSR-W-DB), this alignment procedure remains the same, but you must be certain to monitor both the Left and Right Channel sound outputs simultaneously while adjusting for minimum buzz.

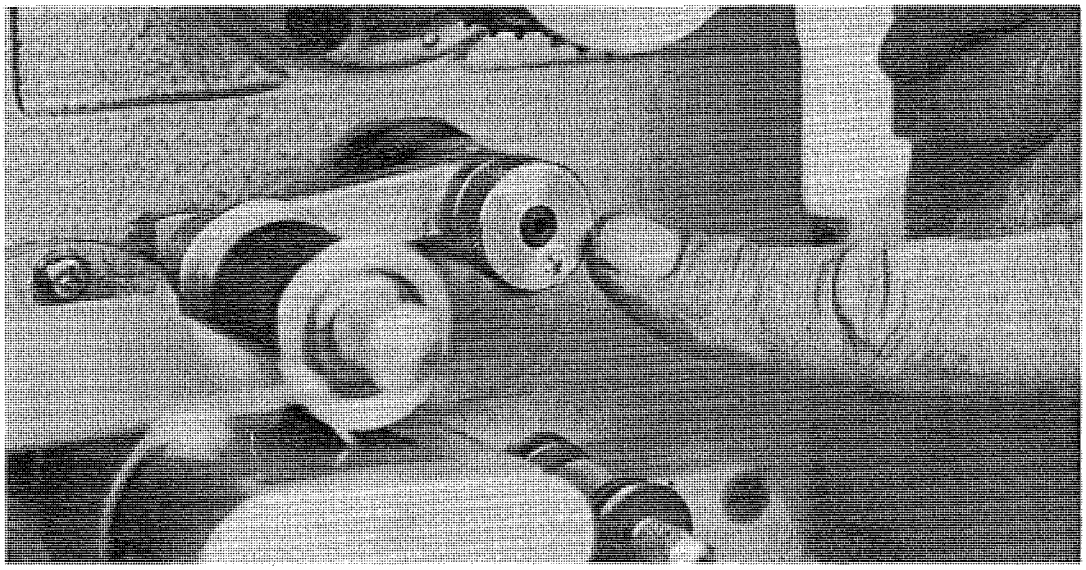


Fig. 6-1: Damper Arm Adjusting Collar

SLIT LENS AZIMUTH ALIGNMENT AND FOCUS ADJUSTMENT

6.4.1 These adjustments are necessary to achieve both maximum high frequency and overall sound level outputs from the TSR soundhead.

6.4.2 Thread a loop (or reel-to-reel length) of SMPTE Sound Focus and Azimuth Alignment Test Film through the projector. (Note: this test film is available in two versions: P35-SF-A reproduces a 9 KHz test tone and is used where high precision is required; P35-SF-B reproduces a 7 KHz test tone and can be used in general theatre installations where lower precision is adequate.) Connect a meter to the sound system output and adjust this meter to read out on a scale of 0-10 Volts AC. Carefully loosen the Slit Lens Locking Nut (TSR-W-13) (Fig. 6-2) just to the point where the lens may be moved by hand. The less play you allow the lens, the easier the adjustment will be. Turn the projector, exciter lamp and sound system on. Carefully rotate the Slit Lens (TSR-W-14) (Fig. 6-3) while moving it back and forth laterally until its optimum focus and azimuth position is found. This optimum position is the one which produces the maximum meter reading on the meter. When this position is found, carefully tighten the Slit Lens Locking Nut to secure the lens in place.

6.4.3 This procedure requires patience and precision, but once the proper lens setting is achieved it should not be necessary to readjust the lens unless a new lens is installed. (Hint: while making this adjustment you may actually view the scanning light beam as it projects onto the film's soundtrack area. While moving the lens, observe when the light slit is best focused and horizontally oriented on the film. This visual guide will help you to achieve a close approximation of the correct lens setting; fine adjustment of the lens should be made using the meter reading for total accuracy.)

6.4.4 If your TSR projector is equipped with a Stereo Solar Cell Assembly (TSR-W-DB), this alignment procedure remains the same, but you must use two meters or a dual trace oscilloscope to monitor both the Left and Right Channel sound outputs simultaneously while adjusting the lens for maximum sound output.

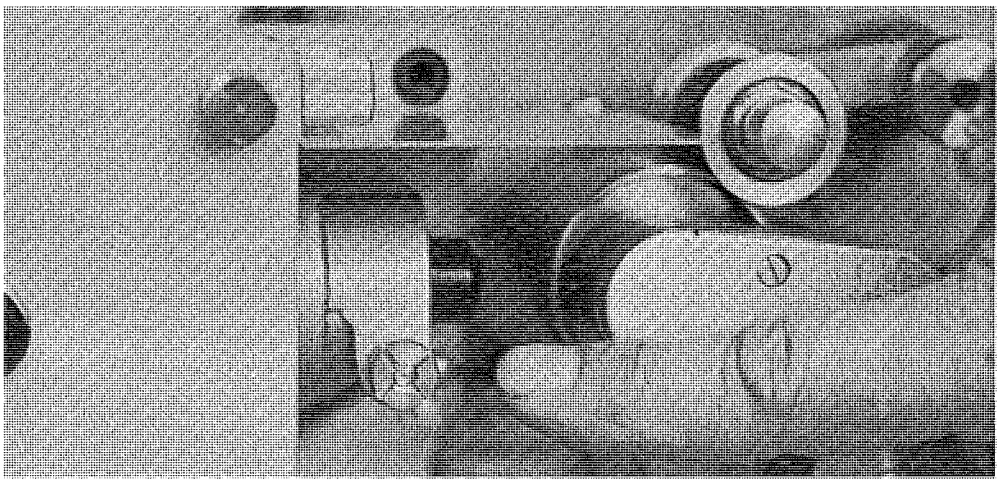


Fig. 6-2: Slit Lens Locking Nut

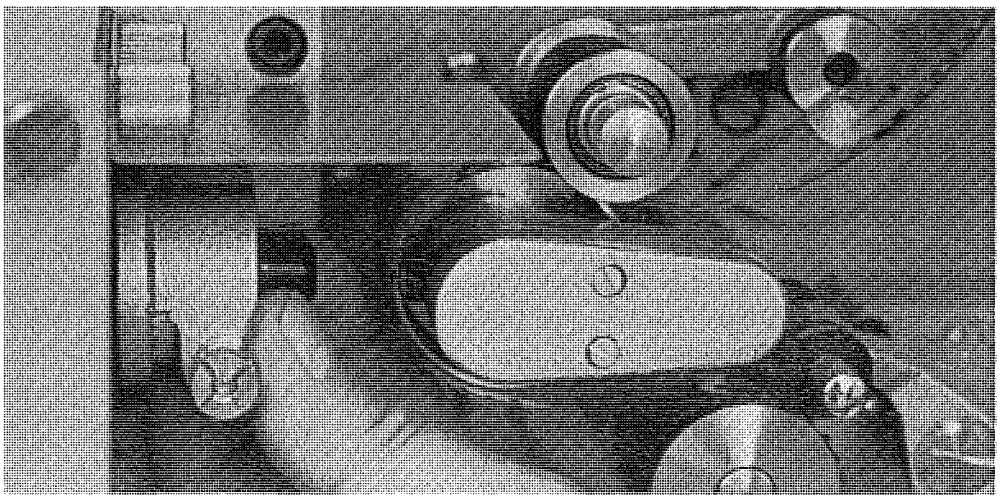


Fig. 6-3: Rotating Slit Lens

ALIGNMENT OF STEREO SOLAR CELL TO FILM SOUNDTRACK

6.5.1 This alignment procedure is applicable only to TSR projectors equipped with a Stereo Solar Cell Assembly (TSR-W-DB). Correct alignment of the Stereo Solar Cell to the film soundtrack is necessary to achieve optimum sound output and left/right stereo separation when playing prints with stereo (bilateral) optical soundtracks. This alignment should be made only after the Film Path Alignment and Slit Lens Azimuth/Focus Adjustments have been made in accordance with the instructions in this manual.

6.5.2 Connect a dual trace oscilloscope to the stereo sound system processor/preamp unit in accordance with the manufacturer's instructions so that the scope's CRT will display the separate Left and Right Channel outputs simultaneously. Loosen and remove the two Solar Cell Assembly Cover Plate Fastening Screws (TSR-W-DB-5B × 2) and remove the Cover Plate (TSR-W-DB-6). Carefully loosen, but do not remove, the Solar Cell Holder Retaining Screw (TSR-W-DB-20) and the Solar Cell Lateral Retaining Screw (TSR-W-DB-21) so that the Solar Cell Holder (TSR-W-DB-19) may be moved within its cylindrical housing.

6.5.3 Thread a loop (or reel-to-reel length) of Dolby Laboratories Optical 35mm Left-Right Stereo Cell Alignment Test Film (CAT-97) through the projector. (This test film is available from: Dolby Laboratories, Inc., 731 Sansome Street, San Francisco, California 94111.) Turn on the exciter lamp, sound system and the projector and view the Left and Right Channel output signals on the oscilloscope. Carefully rotate the Solar Cell Holder back and forth, approximately ⅛" in either direction, until maximum output level is registered on the oscilloscope; at the same time carefully move the Solar Cell Holder back and forth laterally within its cylindrical housing, also approximately ⅛" in either direction, until a position yielding balanced Left/Right Channel outputs, with a minimum of adjacent channel crosstalk, is found. This is determined by comparing the staggered, alternating Left and Right Channel output CRT displays for optimum, uniform performance. (Note: the Dolby CAT-97 Test Film is recorded with staggered, alternating Left and Right Channel test tones.) When the optimum Cell Holder position is found, first securely tighten the Solar Cell Holder Retaining Screw, and then tighten - but do not overtighten! - the Solar Cell Lateral Retaining Screw. These screw fastenings must be done very carefully so as not to disturb the Cell Holder's position. After tightening the screws, it is recommended that the Cell Holder's position be rechecked by running the test film again to be certain that the cell has not moved. If it has, readjust as necessary.

6.5.4 This procedure requires patience and precision, but once the optimum cell setting has been achieved it should not be necessary to readjust the cell unless a replacement cell is installed.

6.5.5 If your TSR projector is equipped with a Stereo Solar Cell Assembly but you are using a conventional monaural amplifier/sound system, this alignment procedure remains essentially the same with the following exception: since both the Left and Right Channel signals will be combined into a single output, a single meter may be used to monitor this combined output while performing the cell adjustment. Also, as the alternating Left and Right Channel test tones on the test film will be reproduced monophonically as a continuous tone, the optimum cell position is found when maximum output level is read on the meter.

6.5.6 For further detailed information on stereo solar cell and stereo sound system alignment and adjustment procedures, it is recommended that the user refer to the instruction manual provided with the sound system.

TAKE-UP TENSION ROLLER ADJUSTMENT

6.6.1 The Take-Up Tension Roller Assembly (TSR-V-1, etc.) provides gentle damping action to reduce film take-up strain, isolate take-up tension fluctuations from the soundhead, and to provide the correct film wrap around the Soundhead Holdback Sprocket (TSR-L-4).

6.6.2 The tension setting of the Tension Take-Up Roller Assembly is non-critical. It may be easily adjusted by slightly loosening the Tension Arm Retaining Screw (TSR-V-5B) and moving the Tension Arm (TSR-V-5A) either to the left, to decrease film tension, or to the right, to increase film tension. The proper setting should have the Arm positioned at approximately 45° to the right of true vertical when viewed from the projector's operating side, or at the position where the film disengages the Holdback Sprocket with the smoothest and quietest action. The optimum setting may vary depending upon the take-up method being used.

6.6.3 The Take-Up Tension Roller Assembly is not required when platter systems are in use.

DRIVE BELT IDLER ROLLER TENSION ADJUSTMENT

6.7.1 Proper adjustment of the Drive Belt Idler Tension Roller Assembly (TSR-R-6, etc.) is necessary to provide correct drive belt tension for smooth mechanism operation. Incorrect belt tension may result in excessive shaft and bearing stress or mechanism vibration.

6.7.2 To adjust the Drive Belt Idler Tension Roller Assembly, first remove the three fastening screws which secure the Rear Lower Cover (TSR-A-2B) to the projector's main frame. Remove the Cover, loosen the two Idler Arm Retaining Bolts (TSR-R-6A × 2) and position the Idler Arm (TSR-R-6) so that: 1) it tilts slightly toward the Motor Drive Pulley (TSR-R-2B), leaving a gap of 0.5-0.8mm (approximately 1/32") between the Idler Arm and the Drive Pulley's outer flange when viewed from the projector's gear side; 2) the Tension Idler Bearing Rollers (TSR-R-7 × 2) depress the Drive Belt (TSR-R-3B) 5mm (approximately 3/16") below the horizontal center line of the Motor Drive Pulley when viewed from the projector's gear side (see Fig. 6-4). Securely tighten the Idler Arm Retaining Bolts and replace the Rear Lower Cover when the adjustment is completed.

6.7.3 Because the Tokiwa TSR uses a notched timing belt for positive mechanism drive, it is unnecessary to provide excessive belt idler roller tension. Thus the moderate belt idler tension required by the TSR greatly reduces motor and projector shaft and bearing stress, resulting in longer and trouble-free mechanism life.

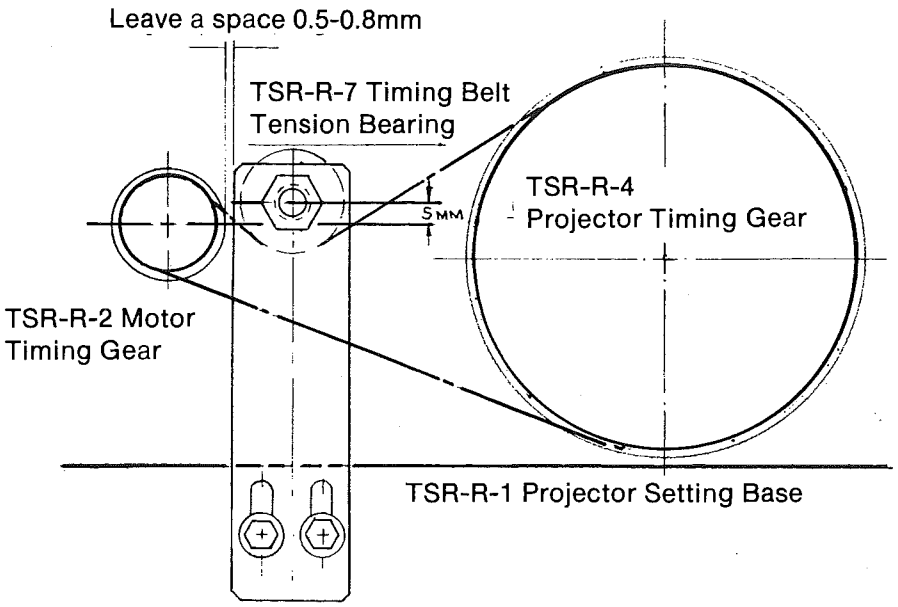


Fig. 6-4: Timing Belt Tension Bearing Setting Point

FEED, TAKE-UP AND HOLDBACK SPROCKET PAD ROLLER ADJUSTMENT

6.8.1 Proper adjustment of the various sprocket pad rollers is necessary to insure smooth film wrap and guidance as the film travels over the sprockets.

6.8.2 The Feed, Take-Up and Holdback Sprocket Pad Rollers (TSR-G-6A, G-6B and L-7, respectively) are mounted on eccentric shafts to facilitate easy adjustment. To adjust the film clearance and/or lateral positioning of these Pad Rollers, first thread two film thicknesses over the appropriate sprocket and loosen the corresponding Pad Roller Shaft Set Screw (TSR-G-21A, G-22B or L-5F). With the pad arm in the closed position, grasp the knurled tip of the roller shaft and rotate the shaft slowly in either direction to raise or lower the Pad Rollers, as required, so that they just touch the double film thickness. Also check the lateral alignment of the rollers to be certain that each roller's middle slot is properly centered over the corresponding row of sprocket teeth. Move the roller shaft in or out laterally to correct any misalignment. When these adjustments are completed, securely tighten the Roller Shaft Set Screw.

INTERMITTENT SPROCKET PAD ROLLER ADJUSTMENT

6.9.1 Unlike most other projector models, the Tokiwa TSR utilizes intermittent sprocket pad rollers - not abrasive shoes - to reduce film wear and mechanism noise and to better stabilize and control the critical film wrap around the intermittent sprocket. The correct Intermittent Sprocket Pad Roller Assembly (TSR-B-11, B-12, etc.) setting is, therefore, necessary to provide accurate film wrap and guidance around the Intermittent Sprocket (TSR-E-25) for a steady picture, quiet mechanism operation and minimum film wear.

6.9.2 To adjust the Intermittent Sprocket Pad Roller Assembly, first thread two film thicknesses through the Gate (TSR-BA), over the Intermittent Sprocket and over the Take-Up Sprocket (TSR-G-14B), being careful to maintain the correct size film loop between these two sprockets. Push the Gate Assembly closed to secure the film over the Intermittent Sprocket. Carefully loosen, but do not remove, the two Pad Roller Assembly Fastening Screws (TSR-B-11B × 2), grasp the Pad Roller Upper Mounting Bracket (TSR-B-11) and position same so that both the upper and lower pairs of Intermittent Sprocket Pad Rollers (TSR-B-13 ×4) are in the correct azimuth and lateral position in relation to the Intermittent Sprocket. This is determined by viewing the Pad Assembly head-on, from the front of the projector, to see that each of the four Rollers' middle slot is properly centered over its corresponding row of sprocket teeth. When the correct setting is achieved, securely tighten the two Pad Roller Assembly Fastening Screws (Fig. 6-5).

6.9.3 There are two roller assemblies which hold the film in a proper wrap around the Intermittent Sprocket. The Upper Roller Assembly should be adjusted for two thicknesses of film by loosening the Set Screw (B-12C) and rotating the eccentric shaft to a proper position. The Lower Roller Assembly is mounted on a spring loaded Radius Arm (B-12). This roller assemby should just touch the sprocket with no film in the gate. This roller assembly may be adjusted in two ways. The roller assembly is on an eccentric shaft and may be adjusted in the same manner as other similar assemblies on the projector. Additional adjustment is provided by a Screw and Lock Nut (B-12B) located in the center of the radius arm and just above the lower roller shaft set screw (see Fig. 6-5).

FILM TRAP LATERAL GUIDE ROLLERS ADJUSTMENT

6.10.1 The Tokiwa TSR projector's Film Gate/Trap Assembly (TSR-B) (Fig. 6-5) utilizes a unique combination of precision lateral guide rollers, gate pad rollers and elongated film guide and gate pressure shoes to provide maximum film control for outstanding picture stability. Correct adjustment of the Film Trap Lateral Guide Rollers (TSR-B-5 × 2) provides proper guidance and stabilization of the film as it travels through the Gate/Trap Assembly and past the Main Aperture (TSR-B-2). This subsequently limits the amount of horizontal picture movement ("side weave") to percentages that are well within industry standards and far superior to performance figures obtained with other projector models.

6.10.2 The Inner Lateral Guide Roller is spring loaded and requires no adjustment. The Outer Lateral Guide Roller is secured by a retaining collar and set screw. Adjustment of the Outer Guide Roller may be accomplished using a straight edge or a La Vezzi gate alignment tool. The Outer Guide Roller should be in mechanical alignment with the outer film gate in the gate assembly. Movement in or out of the retaining collar will determine the position of the outer roller.

6.10.3 You may wish to confirm the optimum Lateral Guide Roller setting by threading a loop (reel-to-reel length) of SMPTE Universal Jitter, Weave and Travel Ghost Test Film (U35-JW) through the projector and examining the projected image for any discernable "side weave." The Tokiwa TSR will typically not exceed 0.125% (1/8%) "side weave," which is considerably better than the SMPTE's recommended maximum acceptable "side weave" figure of 0.20% (1/5%) for critical review room screenings (see SMPTE RP-105-1981). If necessary, readjust the Outer Lateral Guide Roller setting for optimum performance.

6.10.4 **Hint**: prior to adjusting the Outer Lateral Guide Roller it is recommended that both of the Rollers and the Roller Shaft (TSR-B-4) be carefully cleaned of film dust and residue deposits, and that the Rollers and Shaft be sparingly lubricated with a light weight machine oil so that the Rollers spin freely without binding. This cleaning and lubrication will help to assure greater accuracy when adjusting the Outer Lateral Guide Roller.

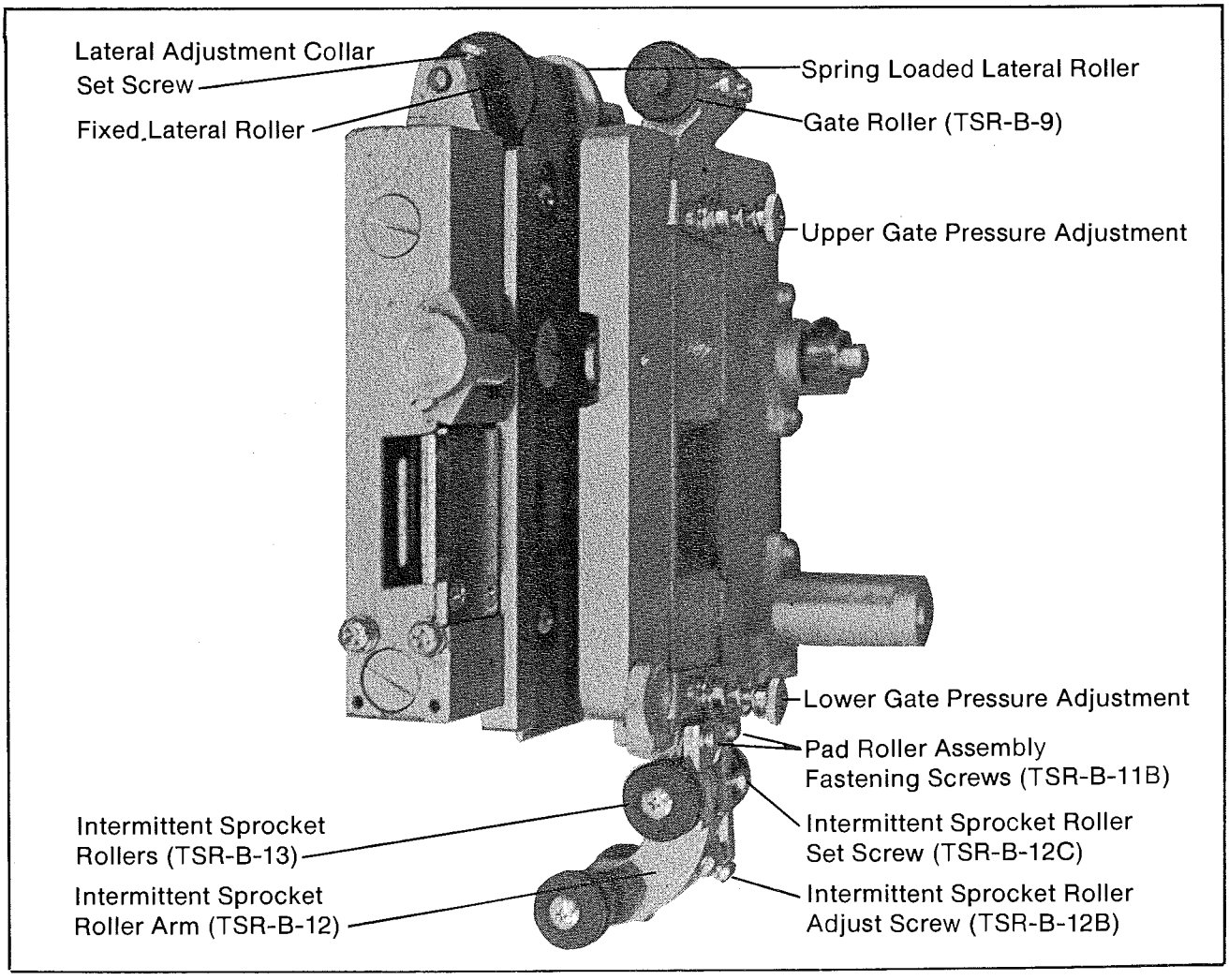


Fig. 6-5:

FILM GATE UPPER PAD ROLLERS ADJUSTMENT

6.11.1 The Film Gate Upper Pad Rollers (TSR-B-9 × 2) (Fig. 6-5) are designed to gently stabilize excessive film loop "slap" as the film passes through the Lateral Guide Rollers (TSR-B-5 × 2) and the Film Trap Guide Shoes (TSR-B-3A, 3B). The Rollers' damping action helps to eliminate picture "jitter" (vertical instability), "side weave" (horizontal instability) and excessive operating noise.

6.11.2 Each of the two Rollers is mounted on its own eccentric shaft and may be individually adjusted as required. To make this adjustment, loosen the appropriate Roller Shaft Set Screw (TSR-B-10A × 2) and, with film running normally through the projector, rotate the Roller Shaft (TSR-B-10) so that the Roller just touches the film surface. Securely tighten the Set Screw when completed.

SHUTTER TIMING ADJUSTMENT

6.12.1 Correct shutter timing is necessary to properly synchronize the shutter's opening and closing action with the intermittent film advance past the aperture. Incorrect shutter timing will result in excessive image flicker, "travel ghost" (image smearing) and inefficient light transmission.

6.12.2 To adjust the shutter timing, first remove the two Shutter Sight Glass Retaining Screws (TSR-A-19A × 2) (Fig. 6-6) and then remove the complete Shutter Sight Glass Assembly (TSR-A19, A-30, etc.) to gain access to the Shutter (TSR-F-4). With a length of film threaded through the Film Gate/Trap Assembly (TSR-B) and over the Intermittent Sprocket (TSR-E-25), slowly rotate the Motor Handwheel (TSR-R-5) in a counter-clockwise direction until a frame line on the film is horizontally centered over the Film Trap's aperture. Slightly loosen the two Shutter Timing Set Screws (TSR-F-9 × 2) located in the elongated slots inside the Shutter cylinder and carefully rotate the Shutter by hand so that its two solid "black-out" sections are level in their vertical plane and perfectly in line with the projection light path. The Shutter should now be oriented so as to completely block the projection light beam. It will be helpful to hold the Motor Handwheel steady while rotating the Shutter so that the Intermittent Sprocket and the test film do not shift in position while the Shutter adjustment is being performed. When the Shutter is properly adjusted, carefully tighten the Shutter Timing Set Screws and replace the Shutter Sight Glass Assembly.

6.12.3 To verify that the Shutter timing is correctly adjusted you may wish to run a loop (or reel-to-reel length) of SMPTE Universal Jitter, Weave and Travel Ghost Test Film (U35-JW) through the projector and carefully examine the projected image for the presence of "travel ghost." If any "travel ghost" is visible, repeat the Shutter Timing Adjustment procedure until optimum performance is obtained.

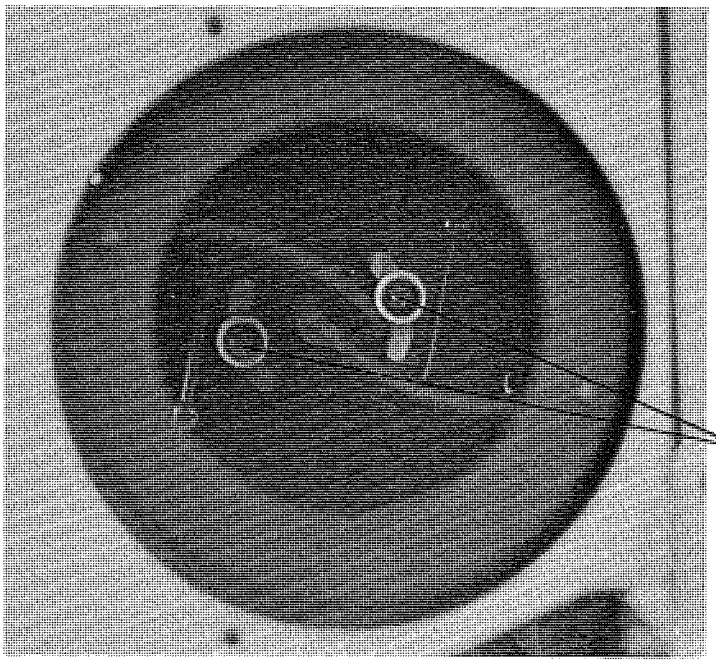


Fig. 6-6: Shutter

INTERMITTENT MOVEMENT LATERAL SIDE THRUST SCREW ADJUSTMENT

6.13.1 The correct setting of the Intermittent Movement Side Thrust Screw (TSR-A-6) assures that the Intermittent Movement (TSR-E) is properly seated against the Projector Main Frame's (TSR-A-1) center wall to eliminate excessive Movement chatter and vibration. This, in turn, assures maximum picture steadiness, quiet operation, and minimum wear of the Movement's high-precision Starwheel (TSR-E-8), Cam (TSR-E-4), bearings and other critical components.

6.13.2 To adjust the Intermittent Movement Side Thrust Screw, unscrew and remove the knurled Side Thrust Screw Cover (TSR-A-8) (refer to Fig. 2-2) located on the gear side of the projector. Slightly loosen the Side Thrust Screw Lock Nut (TSR-A-6B) while holding the Side Thrust Adjusting Screw (TSR-A-6) steady with a screwdriver. Thread a loop (or reel-to-reel length) of SMPTE Universal Jitter, Weave and Travel Ghost Test Film (U35-JW) through the projector and project same onto the screen. (Note: SMPTE Projector Alignment Test Film, 35-PA, may be used as an alternate test film for this adjustment.) Adjust the Side Thrust Screw by carefully loosening or tightening it, as required, until optimum picture steadiness is observed on the screen and minimum mechanism "chatter" is heard. Do not over-tighten the Screw - this will cause excessive and unnecessary wear on the Movement and associated drive components. When the optimum Screw setting is found, tighten the Lock Nut while holding the Screw position steady with a screwdriver. Replace the Side Thrust Screw Cover.

SECTION 7.0

PARTS SERVICING AND REPLACEMENT PROCEDURES

7.1 If you are unable to obtain satisfactory projection quality and performance from your Tokiwa TSR after following the alignment and adjustment procedures described in this manual, it will be necessary to examine the mechanism carefully for worn or deteriorated component parts such as gate pads, sprockets, bearings, gears, shafts, rollers, etc. In most instances the simple replacement of a worn film path part will restore the TSR's performance specifications to factory standards. Because the Tokiwa TSR is a self-lubricating oil bath-type mechanism which provides constant lubrication to all internal moving parts, it is unlikely that any gear, shaft or bearing replacement will be required until the projector has been in service for many years. However, if this is the case, the TSR's simplified, easily accessible drive train assures that all internal parts can be serviced and replaced quickly and without difficulty by following the service procedures in this manual.

7.2 **CAUTION:** IT IS AGAIN RECOMMENDED THAT ALL SERVICING OF YOUR TOKIWA TSR PROJECTOR BE REFERRED TO QUALIFIED SERVICE PERSONNEL. SERVICING OF THE CRITICAL INTERMITTENT MOVEMENT ASSEMBLY (TSR-E) SHOULD BE REFERRED TO AMERICAN THEATRE PRODUCTS TO ASSURE STRICT COMPLIANCE WITH FACTORY PERFORMANCE SPECIFICATIONS.

TOKIWA TSR 35mm PROJECTOR/SOUNDHEAD

PARTS LISTS

Number	Description
TSR-A	TSR PROJECTOR BODY
TSR-BA	FILM GATE ASSEMBLY
TSR-BB	FILM TRAP ASSEMBLY (APERTURE BODY ASSEMBLY)
TSR-C	MANUAL SINGLE LENS-HOLDER ASSEMBLY
TSR-3C	MANUAL 3 TURRET LENS-HOLDER ASSEMBLY
TSR-D	FRAMING ASSEMBLY
TSR-E	INTERMITTENT MOVEMENT ASSEMBLY
TSR-F	SHUTTER AND SHUTTER METAL ASSEMBLY
TSR-GA	UPPER SPROCKET ASSEMBLY
TSR-GB	LOWER SPROCKET ASSEMBLY
TSR-H	MAIN DRIVE GEAR AND OIL PUMP ASSEMBLY
TSR-I	VERTICAL SHAFT ASSEMBLY
TSR-K	ANAMORPHIC LENS-HOLDER ASSEMBLY
TSR-KG	ELECTRIC PICTURE CHANGE OVER UNIT ASSEMBLY
TSR-L	HOLD-BACK SPROCKET ASSEMBLY
TSR-M	IDLE GEAR AND DAMPER ROLLER ASSEMBLY
TSR-N	ROTARY STABILIZER ASSEMBLY
TSR-R	MOTOR AND MOTOR DRIVE PULLEY ASSEMBLY
TSR-V	TAKE-UP TENSION ROLLER ASSEMBLY
TSR-WA	SOLAR CELL ARM ASSEMBLY (STANDARD CELL)
TSR-WB	EXCITER LAMP BOX AND SLIT LENS ASSEMBLY (DOUBLE TYPE)
TSR-WW	EXCITER LAMP BOX AND SLIT LENS ASSEMBLY (SINGLE TYPE)
TSR-W-DB	DOLBY STEREO SOLAR CELL ARM ASSEMBLY
TSR-2AC	AUTOMATIC 2 TURRET LENS-HOLDER ASSEMBLY
TSR-AC-400	AUTOMATIC APERTURE ASSEMBLY (FILM GATE ASSEMBLY)
TSR-AC-400	AUTOMATIC APERTURE ASSEMBLY (APERTURE BODY)
TSR-AC-100	CONTROL BOX FOR TSR-AC-400
TSR-SS	PROJECTOR SETTING BASE (STAND BRACKET)
TSR-BU	TSR-6000-FT UPPER MAGAZINE ARM ASSEMBLY
TSR-BG	TSR-6000-FT UNIVERSAL GUIDE ROLLER
TSR-BL	TSR-6000-FT LOWER MAGAZINE ARM ASSEMBLY
TSR-6000-AU	6000FT. UPPER MAGAZINE COMPLETE, TYPE (A)
TSR-6000-AL	6000FT. LOWER MAGAZINE COMPLETE, TYPE (A)
TSR-6000-AR	REWINDER SWITCH ARM COMPLETE

PARTS LIST

DRAWING TSR-A: TSR PROJECTOR BODY

Parts Number	Description
TSR-A	TSR PROJECTOR BODY
A-1	Body
A-2A	Body Cover
A-2B	Motor Cover
A-3	Magazine set bolt
A-3A	Magazine set bolt washer
A-3B	Magazine set bolt nut
A-4	Rubber packing
A-5	Oiling hole nut
A-5A	Oil seal
A-6	Pressure seal for intermittent movement assembly
A-6A	Pressure screw (Nylon)
A-6B	Pressure screw nut
A-7	Pressure metal for intermittent movement assembly
A-7A	Pressure metal tight screw
A-8	Pressure metal cover
A-10	Shutter cover
A-11	Ventilation tube
A-12	Upper film protector
A-12A	Lower film protector
A-15	Receiver for lamphouse cone
A-16	Rear window glass frame
A-17	Rear window glass
A-19	Red glass frame
A-19A	Red glass frame screw
A-19B	Red glass frame washer
A-21	Oil gauge
A-23	Shutter cover screw (2)
A-24	Oil cock with washer
A-24A	Oil cock collar
A-24B	Oil cock screw
A-25	Oil pipe
A-26	Pilot lamp holder mounting piece
A-30	Red glass
A-30A	Red glass set spring
A-31	Red glass sash
A-41	Pilot socket
A-42	Pilot lamp holder
A-43	Pipe holder
A-43A	Pipe holder screw
A-43B	Pipe holder spring washer
A-44	Pilot cord
A-45	Pilot lamp
A-47	Oil
A-48	Pilot connector

Parts Number	Description
TSR-A-49	Name plate
A-49A	Name plate set screw
A-50	Pin
A-51	Screw
A-52	Screw
A-53	Screw
A-54	Screw
A-55	Screw
A-56	Spring washer
A-57	Screw

DRAWING TSR-BA: FILM GATE ASSEMBLY

Parts Number	Description
TSR-BA	FILM GATE ASSEMBLY
B-6	Film gate body
B-7A	Aperture skate (Inner)
B-7B	Aperture skate (Outer)
B-9	Gate roller (2)
B-10	Gate roller shaft
B-11	Intermittent sprocket roller arm, A
B-11A	Screw
B-11B	Screw
B-11C	Spring washer
B-11D	Washer
B-12	Intermittent sprocket roller arm, B
B-12A	Intermittent sprocket roller arm, B spring
B-12B	Intermittent sprocket roller adjust screw
B-12C	Intermittent sprocket roller set screw
B-13	Intermittent sprocket roller (2)
B-13B	Intermittent sprocket roller tight screw
B-14	Intermittent sprocket roller shaft
B-15	Film gate push button
B-17	Skate pressure plate
B-18	Skate pressure plate spring
B-19	Skate pressure plate set screw
B-20A	Slide metal, A
B-20A-1	Slide metal, A bearing collar
B-20A-2	Ball bearing
B-20A-3	Slide metal, A tight screw
B-20A-4	Slide metal, A tight screw washer
B-20A-5	Slide metal, A bearing collar
B-20B	Slide metal, B
B-20B-1	Slide metal, B bearing collar
B-27	Screw
B-32A	Skate pressure plate screw
B-32B	Skate pressure place collar

PARTS LIST

DRAWING TSR-BB: FILM TRAP ASSEMBLY (APERTURE BODY ASSEMBLY)

Parts Number	Description
TSR-BB	FILM TRAP ASSEMBLY (APERTURE BODY ASSEMBLY)
B-1	Aperture body
B-1A	Aperture body set pin
B-1B	Aperture body tight screw
B-2	Aperture plate
B-2A	Aperture plate set screw
B-3A	Film side rail (Inner)
B-3B	Film side rail (Outer)
B-3C	Film side rail tight screw
B-3D	Film side rail tight screw washer
B-4	Guide roller shaft
B-5	Guide roller (2)
B-21	Slide shaft, A
B-21A	Slide shaft, A set screw
B-22	Slide shaft, B
B-22A	Slide shaft, B spring
B-22B	Slide shaft, B seal ring
B-22C	Slide shaft, B set collar
B-22D	Slide shaft, B set collar screw
B-24	Aperture stop
B-24A	Aperture stop pin
B-25	Aperture stop knob
B-25A	Aperture stop knob metal
B-25B	Aperture stop knob metal screw
B-25C	Aperture stop knob metal washer
B-26A	Aperture mask for S/T
B-26B	Aperture mask for C/S
B-26C	Aperture mask for V/V
B-26D	Aperture mask for (pin hole type)
B-26E	Aperture mask knob
B-26F	Aperture mask knob pin
B-28	Aperture mask guide plate
B-28A	Aperture mask guide plate set screw
B-29	Water pipe bracket
B-29A	Water pipe, A
B-29B	Water pipe, B
B-29C	Water pipe bracket set screw
B-29D	Water pipe bracket set screw washer
B--30	Slide spring

Parts Number	Description
TSR-B-31	Aperture stop spring
B-33	Guide roller set collar
B-33A	Guide roller set collar screw
B-34	Aperture heat protector plate
B-34A	Aperture heat protector plate tight screw
B-34B	Aperture heat protector plate tight screw
B-35	Aperture mask push ball
B-36	Aperture mask push spring
B-37	Water seal
B-37A	Water seal screw
B-38	Automatic aperture motor bracket set screw
B-38A	Water seal
B-38B	Water seal screw

PARTS LIST

DRAWING TSR-C: MANUAL SINGLE LENS HOLDER-ASSEMBLY

Parts Number	Description
TSR-C	MANUAL SINGLE LENS-HOLDER ASSEMBLY
C-1	Master lens-holder
C-2	Focusing pinion
C-3	Lens sleeve fixing pin, A
C-4	Lens sleeve fixing pin, B
C-5	Lens sleeve fixing pin spring
C-6	Lens sleeve fixing knob
C-7	Eccentric metal for pinion shaft
C-8	Focusing rack
C-8A	Focusing rack screw
C-9	Focusing knob
C-10	Lens sleeve
C-10A	Lens sleeve complete (C-8, 8A, 10, 14, 15)
C-11	Lens sleeve ring (optional)
C-12	Lens holder mounting
C-13	Knob pin
C-14	Lens tight screw
C-15	Lens sleeve spring
C-16	Pin
C-17	Screw
C-18	Screw
C-19	Screw
C-20	Pin
C-21	Pin
C-22	Screw

PARTS LIST

DRAWING TSR-3C: MANUAL 3 TURRET LENS-HOLDER ASSEMBLY

Parts Number	Description
TSR-3C	MANUAL 3 TURRET LENS-HOLDER ASSEMBLY
3C-1	Lens-holder assembly
3C-1A	Pin
3C-1B	Screw
3C-1C	Pin
3C-1D	Screw
3C-2	3 lens-holder
3C-3	3 lens-holder attach ring
3C-4	3 lens-holder set ring
3C-4A	3 lens-holder set ring screw
3C-5	Lens sleeve (3)
3C-5A	Lens sleeve complete (3C-5, 10. 12) (3)
3C-6	Stopper knob
3C-6A	Stopper knob screw
3C-7	Stopper knob metal
3C-7A	Stopper knob spring
3C-7D	Screw
3C-7E	Spring washer
3C-8	Ball push screw
3C-8A	10mm steel ball
3C-9	Focusing screw (3)
3C-10	Lens sleeve spring (3)
3C-11	Lens sleeve fixing spring (3)
3C-12	Lens tight screw (3)
3C-13	Focusing screw spring collar (6)
3C-14	Focusing screw spring (3)
3C-14A	Focusing screw tight screw
3C-14B	Focusing screw tight screw washer
3C-15	Lens ring (3) (optional)

DRAWING TSR-D: FRAMING ASSEMBLY

Parts Number	Description
TSR-D	FRAMING ASSEMBLY
D-1	Framing gear box
D-1	Screw
D-2	Framing shaft
D-3	Framing handle
D-4	Framing gear, A
D-4A	Framing gear, A pin
D-5	Framing gear, B

Parts Number	Description
TSR-D-6	Framing gear shaft
D-6A	Screw
D-6B	Spring washer
D-7	Framing gear arm
D-8	Framing arm
D-8A	Washer
D-9	Framing arm pin
D-11	Spring collar
D-11A	Collar
D-12	Spring
D-13	Framing stopper
D-13A	Nut
D-13B	Spring washer
D-14	Framing handle knock pin
D-15	Framing gear, B set screw
D-16	Leather packing
D-17	Screw
D-18	Screw
D-19	Nut
D-20	Spring washer

PARTS LIST

DRAWING TSR-E: INTERMITTENT MOVEMENT ASSEMBLY

Parts Number	Description
TSR-E	INTERMITTENT MOVEMENT ASSEMBLY
E-1	Pin
E-1A	Screw
E-2	Intermittent movement case cover
E-2A	intermittent movement case net
E-2B	Intermittent movement case net set screw
E-3	Intermittent cam, gear & pin assembly
E-3A	Knock pin
E-4	Intermittent cam plate
E-4A	Intermittent cam pin
E-4B	Screw
E-4C	Washer
E-4D	Screw
E-5	Intermittent cam gear
E-6	Intermittent flywheel
E-6A	Intermittent flywheel tight screw
E-7	Framing gear with cam shaft metal
E-7A	Framing gear tight screw
E-7B	Framing gear tight screw washer
E-7C	Pin

Parts Number	Description
TSR-E-8	Starwheel & shaft
E-8A	Thrust washer
E-9	Starwheel shaft collar
E-9A	Pin
E-10	Intermittent movement set metal
E-10A	Intermittent movement set metal tight screw
E-11	Intermittent movement oil seal
E-12	Ring gear (Cam shaft drive gear)
E-13	Cam shaft metal
E-13A	Cam shaft metal set screw
E-14	Cam shaft thrust washer (10mm) (2)
E-15	Cam shaft thrust bearing
E-16	Cam shaft thrust washer (16mm) (2)
E-17	Cam shaft thrust bearing
E-18	Intermittent sprocket set screw
E-19	Gear thrust bearing (22mm)
E-20	Gear thrust washer (22mm) (2)
E-21	Gear thrust bearing (26mm)
E-22	Gear thrust washer (26mm) (2)
E-E-24	Intermittent sprocket stripper stud
E-E-25	Intermittent sprocket
E-26	Intermittent sprocket stripper plate
E-26A	Intermittent sprocket stripper plate set screw
E-27	Framing arm hinge pin

PARTS LIST

DRAWING TSR-F: SHUTTER AND SHUTTER METAL ASSEMBLY

Parts Number	Description
TSR-F	SHUTTER AND SHUTTER METAL ASSEMBLY
F-1	Shutter shaft metal
F-1A	Shutter metal bush, upper
F-1B	Shutter metal bush, lower
F-1C	Shutter metal set screw
F-2	Shutter shaft
F-3	Shutter gear
F-3A	Shutter gear pin
F-4	Shutter
F-5	Oil seal
F-5A	Thrust washer
F-6	Fire shutter
F-7	Fire shutter spring

Parts Number	Description
TSR-F-8	Fire shutter shaft
F-8A	Nut
F-8B	Washer
F-8C	Spring washer
F-9	Shutter set screw
F-9A	Spring washer
F-9B	Washer
F-10	Shutter thrust washer (10mm) (2)
F-11	Shutter thrust bearing
F-12	Screw
F-12A	Spring washer
F-12B	Nut
FA	Shutter complete (F-4, 6, 7, 8, 8A, 8B, 8C)
FB	Shutter metal assembly

PARTS LIST

DRAWING TSR-GA: UPPER SPROCKET ASSEMBLY

Parts Number	Description
TSR-GA	UPPER SPROCKET ASSEMBLY
G-1A	Upper sprocket shaft metal
G-2	Upper sprocket shaft
G-3	Upper sprocket gear
G-3A	Upper sprocket gear pin
G-4A	Upper sprocket pad roller arm assembly
G-5A	Pad roller shaft
G-6A	Pad roller (2)
G-11A	Oil seal
G-12A	Pad roller knob
G-13A	Upper sprocket set screw
G-14A	Upper sprocket (24 teeth)
G-15A	Pad roller arm spring (2)
G-16A	Pad roller set screw
G-17A	Upper sprocket metal bearing
G-18A	Upper sprocket pad arm
G-19A	Upper sprocket pad arm set screw
G-20A	Upper sprocket pad arm shaft
G-21A	Screw
G-22A	Screw
G-25A	Washer
G-26A	Spring washer
G-27A	Nut
G-28A	Pin
G-29A	Pin

PARTS LIST

DRAWING TSR-GB: LOWER SPROCKET ASSEMBLY

Parts Number	Description
TSR-GB	LOWER SPROCKET ASSEMBLY
GB-1B	Lower sprocket shaft metal
GB-4B	Lower sprocket pad roller arm assembly
GB-5B	Pad roller shaft
GB-6B	Pad roller (2)
GB-7	Lower sprocket shaft
GB-8	Lower sprocket gear
GB-8B	Lower sprocket gear pin
GB-9B	Lower sprocket thrust washer (12mm) (2)
GB-10B	Lower sprockert thrust bearing (12mm) (2)
GB-11B	Oil seal
GB-12B	Pad roller knob
GB-13B	Lower sprocket set screw
GB-14B	Lower sprocket (32 teeth)
GB-15B	Pad roller arm spring (2)
GB-16B	Pad roller set screw
GB-17B	Pad roller arm pin
GB-18B	Lower sprocket shaft metal bush
GB-19B	Lower sprocket pad arm set screw
GB-20B	Lower sprocket pad arm shaft
GB-21B	Lower sprocket pad roller arm
GB-22B	Screw
GB-23B	Screw
GB-25B	Screw
GB-26B	Washer
GB-27B	Spring washer
GB-28B	Nut
GB-29B	Pin

PARTS LIST

DRAWING TSR-H: MAIN DRIVE GEAR AND OIL PUMP ASSEMBLY

Parts Number	Description
TSR-H	MAIN DRIVE GEAR AND OIL PUMP ASSEMBLY
H-1	Main drive shaft metal
H-1A	Main drive shaft metal pin
H-1B	Main drive shaft metal screw
H-2	Main drive gear shaft
H-3	Main drive gear
H-3A	Main drive gear knock pin

Parts Number	Description
TSR-H-4	Oil seal
H-5A	Ball bearing
H-5B	Ball bearing
H-6	Oil pump case
H-7	Oil pump case cover
H-7A	Screw
H-7B	Screw
H-8A	Oil pump gear, A
H-8B	Oil pump gear, B
H-9	Thrust washer
H-10	Main drive shaft key
H-11	Main drive shaft pin
H-12	Oil pump nylon pipe

PARTS LIST

DRAWING TSR-I: VERTICAL SHAFT ASSEMBLY

Parts Number	Description
TSR-I	VERTICAL SHAFT ASSEMBLY
I-1	Vertical shaft
I-2	Vertical upper metal
I-2A	Vertical upper metal screw
I-3	Vertical lower gear
I-3A	Vertical lower gear pin
I-4	Cam shaft driving gear
I-5	Vertical shaft screw
I-6	Thrust washer (2)
I-7	Gear holder
I-8	Gear holder protect ring
I-8A	Gear holder protect ring screw
I-9	Shutter drive nylon gear
I-10	Thrust washer (14mm) (2)
I-11	Thrust bearing (14mm)
I-12	Vertical lower metal
I-12A	Vertical lower metal pin
I-12B	Vertical lower metal screw
I-13	Upper drive gear
I-13A	Upper drive gear pin
I-14	Vertical shaft collar
I-14A	Vertical shaft collar pin

PARTS LIST

TSR-K: ANAMORPHIC LENS-HOLDER ASSEMBLY

Parts Number	Description
TSR-K	ANAMORPHIC LENS-HOLDER ASSEMBLY
K-1	Anamorphic lens-holder body
K-2	Anamorphic lens-holder suspender
K-3	Anamorphic lens-holder bracket
K-4	Guide bar
K-5	Anamorphic lens-holder shaft
K-6	Anamorphic lens-holder set screw
K-7	Anamorphic lens-holder set washer
K-8A	Anamorphic lens set screw
K-8B	Anamorphic lens set washer
K-9	Anamorphic lens-holder stopper, A
K-10	Anamorphic lens-holder stopper, B
K-11	Anamorphic lens-holder stopper, A pin
K-12	Anamorphic lens-holder stopper, A nut (6mm)
K-13	Anamorphic lens-holder stopper, A washer

PARTS LIST

TSR-KG: ELECTRIC PICTURE CHANGEOVER UNIT ASSEMBLY

Parts Number	Description
TSR-KG	ELECTRIC PICTURE CHANGEOVER UNIT ASSEMBLY
KG-1	Front cover
KG-2	Rear cover
KG-3	Picture changeover shutter
KG-3A	Washer
KG-3B	Nut
KG-4	Changer coil
KG-5	Changer coil cover
KG-6	Changer shaft knob
KG-6A	Changer shaft knob screw
KG-7	Changer shaft
KG-8	6P connector
KG-9	Isolation board
KG-10	Isolation switch
KG-11	Collar
KG-12	Collar
KG-12A	Collar
KG-13	Changer switch, front side
KG-13A	Washer
KG-13B	Nut

Parts Number	Description
TSR-KG-14	Changer switch, rear side
KG-15	Changer switch holder
KG-16	Picture changer over shutter shaft
KG-16A	Washer
KG-16B	Collar
KG-17	Stopper
KG-17B	Screw
KG-18	Screw
KG-18A	Washer
KG-18C	Screw
KG-18D	Nut
KG-18E	Spring washer

PARTS LIST

DRAWING TSR-L: HOLD-BACK SPROCKET ASSEMBLY

Parts Number	Description
TSR-L	HOLD-BACK SPROCKET ASSEMBLY
L-1	Hold-back sprocket shaft metal
L-1A	Hold-back sprocket shaft metal screw
L-1B	Hold-back sprocket shaft metal pin
L-1C	Hold-back sprocket shaft metal bush
L-2	Hold-back sprocket gear
L-2A	Hold-back sprocket gear pin
L-3	Hold-back sprocket shaft
L-4	Hold-back sprocket (24 teeth)
L-5	Hold-back sprocket pad roller arm assembly
L-5A	Hold-back sprocket pad roller arm
L-5B	Hold-back sprocket pad arm set screw
L-5C	Hold-back sprocket pad arm pin
L-5E	Screw
L-5F	Screw
L-6	Hold-back sprocket pad roller arm shaft
L-6A	Nut
L-6B	Spring washer
L-6C	Washer
L-7	Hold-back sprocket pad roller (2)
L-8	Pad roller shaft
L-9	Oil seal
L-10	Hold-back sprocket thrust washer (12mm) (2)
L-11	Hold-back sprocket thrust bearing
L-12	Pad roller knob
L-13	Hold-back sprocket set screw
L-14	Hold-back sprocket pad roller arm spring (2)
L-15	Pad roller set screw

PARTS LIST

DRAWING TSR-M: IDLE GEAR AND DAMPER ROLLER ASSEMBLY

Parts Number	Description
TSR-M	IDLE GEAR AND DAMPER ROLLER ASSEMBLY
M-2	Idle gear
M-2A	Idle gear bearing
M-2B	Screw
M-3	Idle gear shaft
M-3A	Idle gear shaft pin
M-4	Idle gear set washer
M-4A	Idle gear set screw
M-5	Tension roller shaft
M-5A	Tension roller shaft screw
M-7	Tension roller arm
M-7A	Tension roller arm stopper
M-7B	Tension roller arm collar
M-7C	Tension roller arm bush
M-7D	Tension roller arm spring
M-7E	Tension roller arm stopper screw
M-8	Rubber roller
M-9	Rubber roller shaft
M-10	Ball bearing (2)

PARTS LIST

DRAWING TSR-N: ROTARY STABILIZER ASSEMBLY

Parts Number	Description
TSR-N	ROTARY STABILIZER ASSEMBLY
N-1	Stabilizer case
N-2	Stabilizer case cover
N-2A	Screw
N-2B	Spring washer
N-3	Rotary stabilizer
N-4	Rotary stabilizer case set screw
N-5	Rotary stabilizer case set spring washer
N-6	Collar
N-7	Rotary flywheel
N-7A	Rotary flywheel set screw
N-8	Ball bearing
N-9	Ball bearing
N-10	Thrust spring (2)
N-11	Oil seal

PARTS LIST

DRAWING TSR-R: MOTOR AND MOTOR DRIVE PULLEY ASSEMBLY

Parts Number	Description
TSR-R	MOTOR AND MOTOR DRIVE PULLEY ASSEMBLY
R-1	Motor
R-1A	Motor shaft key
R-1B	Motor flywheel set screw
R-1C	Motor set bolt
R-1D	Motor set bolt washer
R-2A	Motor timing gear, 50Hz
R-2B	Motor timing gear, 60Hz
R-2C	Motor timing gear screw
R-3A	Timing belt, 50Hz
R-3B	Timing belt, 60Hz
R-4A	Projector timing gear, 50Hz
R-4B	Projector timing gear, 60Hz
R-5	Motor flywheel
R-6	Timing belt tension arm
R-6A	Timing belt tension arm screw
R-6B	Timing belt tension arm washer
R-7	Timing belt tension bearing (2)
R-7A	Tension bearing washer
R-7B	Tension bearing nut
R-7C	Tension bearing spring washer
R-7D	Tension bearing set shaft
R-7E	E washer

PARTS LIST

DRAWING TSR-V: TAKE-UP TENSION ROLLER ASSEMBLY

Parts Number	Description
TSR-V	TAKE-UP TENSION ROLLER ASSEMBLY
V-1	Tension roller
V-2	Tension roller bearing (2)
V-3	Tension roller shaft
V-4	Switch roller arm
V-4A	Switch roller screw
V-4B	Switch roller arm collar
V-4C	Switch roller arm collar
V-4D	Switch roller shaft
V-4E	Switch roller
V-4F	Switch roller bearing (2)
V-4G	Switch roller knob

Parts Number	Description
TSR-V-5	Tension roller spring
V-5A	Tension roller spring arm
V-5B	Tension roller arm screw
V-5C	Tension roller arm spring washer
V-5D	Tension roller arm washer
V-6	Lower tension roller bearing shaft
V-7	Spacer
V-8	Lower tension roller
V-9	Lower tension roller set screw
V-10	Tension roller arm
V-10B	Tension roller screw
V-11	Tension roller mount plate
V-11A	Tension roller mount plate set screw
V-11B	Tension roller mount plate set screw spring
V-11C	Tension roller mount plate set pin

PARTS LIST

DRAWING TSR-W: SOLAR CELL ARM, EXCITER LAMP BOX AND SLIT LENS ASSEMBLY

DRAWING TSR-WA: SOLAR CELL ARM ASSEMBLY

Parts Number	Description
TSR-W	SOLAR CELL ARM, EXCITER LAMP BOX AND SLIT LENS ASSEMBLY
TSR-WA	SOLAR CELL ARM ASSEMBLY
W-5	Photocell case
W-5A	Collar
W-5B	Photocell case screw
W-5C	Photocell case set screw
W-5D	Spring washer
W-6	Photocell case cover
W-16	Silicon photo diode
W-16A	Cord
W-17	Terminal
W-17A	Terminal cover
W-17C	Screw
W-17D	Screw

PARTS LIST

DRAWING TSR-WB: EXCITER LAMP BOX AND SLIT LENS ASSEMBLY

Parts Number	Description
TSR-WB	EXCITER LAMP BOX AND SLIT LENS ASSEMBLY
W-1	Slit lens set plate
W-1A	Screw
W-1B	Pin
W-1C	Pin
W-1D	Screw
W-1E	Spring washer
W-1F	Washer
W-2	Exciter lamp box
W-3	Exciter lamp box cover
W-3A	Exciter lamp box pilot
W-3B	Exciter lamp box cover knob
W-3C	Screw
W-3D	Washer
W-3E	Nut
W-4	Exciter lamp socket mounting board
W-4A	Screw
W-4B	Spring washer
W-7	Exciter lamp socket complete (Double type)
W-8	Guide shaft, A
W-8A	Spring washer
W-8B	Screw
W-8C	Washer
W-8D	Spring washer
W-8E	Nut
W-9	Guide shaft, B
W-10	Collar
W-10A	Washer
W-11	Slit lens-holder
W-12	Locking pin
W-13	Locking nut
W-14	Slit lens
W-15	Exciter lamp
W-18	Slit lens cover plate
W-18A	Slit lens cover plate set screw

PARTS LIST

TSR-W: EXCITER LAMP BOX AND SLIT LENS ASSEMBLY (SINGLE)

Parts Number	Description
TSR-WW	EXCITER LAMP BOX AND SLIT LENS ASSEMBLY (SINGLE)
WW-1	Slit lens set plate
WW-1A	Screw
WW-1B	Pin
WW-1C	Pin
WW-1D	Screw
WW-1E	Spring washer
WW-1F	Washer
WW-2	Single exciter lamp box
WW-3	Single exciter lamp box cover
WW-3A	Single exciter lamp box pilot
WW-3B	Single exciter lamp box cover knob
WW-3C	Screw
WW-3D	Washer
WW-3E	Nut
WW-4	Exciter lamp mounting board
WW-4A	Screw
WW-4B	Spring washer
WW-7	Exciter lamp socket complete (Single type)
WW-8	Collar (2)
WW-8A	Mounting board set screw
WW-8B	Mounting board set screw washer
WW-8C	Exiter lamp socket set screw
WW-8D	Exciter lamp socket set screw washer
WW-11	Slit lens-holder
WW-12	Locking pin
WW-13	Locking nut
WW-14	Slit lens, type D-3
WW-15	Exciter lamp
WW-18	Slit lens cover plate
WW-18A	Slit lens cover plate set screw

PARTS LIST

TSR-W-DB: DOLBY STEREO SOLAR CELL ARM ASSEMBLY

Parts Number	Description
TSR-W-DB	DOLBY STEREO SOLAR CELL ARM ASSEMBLY
W-DB-5	Photocell case
W-DB-5B	Photocell case screw
W-DB-5C	Photocell case set screw
W-DB-5D	Spring washer
W-DB-6	Photocell case cover
W-DB-16	Dolby stereo photo diode
W-DB-17	Terminal
W-DB-17A	Terminal cover
W-DB-17C	Screw
W-DB-17D	Screw
W-DB-18	Dolby stereo cell main holder
W-DB-19	Dolby stereo cell adjusting holder
W-DB-20	Dolby stereo cell main holder tight screw
W-DB-21	Dolby stereo cell adjusting holder screw

PARTS LIST

TSR-2AC: AUTOMATIC 2 TURRET LENS-HOLDER ASSEMBLY

Parts Number	Description
TSR-2AC	AUTOMATIC 2 TURRET LENS-HOLDER ASSEMBLY
2AC-1	Lens-holder mounting
2AC-1A	Pin
2AC-1B	Screw
2AC-1C	Pin
2AC-1D	Screw
2AC-2	2 lens-holder
2AC-3	2 lens-holder attach ring
2AC-4	2 lens-holder set ring
2AC-4A	2 lens-holder set ring screw
2AC-5	Lens sleeve (2)
2AC-5A	Lens sleeve complete (2AC-5, 10, 12) (2)
2AC-9	Focusing screw (2)
2AC-10	Lens sleeve spring (2)
2AC-11	Lens sleeve fixing spring (2)
2AC-12	Lens tight screw (2)
2AC-13	Focusing screw spring collar (4)
2AC-14	Focusing screw spring (2)
2AC-14A	Focusing screw tight screw
2AC-14B	Focusing screw tight screw washer

Parts Number	Description
TSR-2AC-15	Lens ring (2) (By option)
2AC-101	Gear holder
2AC-102	Worm gear
2AC-103	Bearing pad
2AC-104	Motor setting base
2AC-105	Motor cup-ring
2AC-106	Motor, RM-F6A4PM
2AC-107	Bearing pad
2AC-108	Micro switch holder (2)
2AC-109	Micro switch pad base (2)
2AC-110	Stopper pin (2)
2AC-110A	Stopper ring (6)
2AC-110B	O ring set screw (2)
2AC-111A	Upper stopper
2AC-111B	Lower stopper
2AC-112	Cord cover
2AC-113	Micro switch cover (2)
2AC-114	Ring gear cover
2AC-115	Manual knob

PARTS LIST

TSR-AC-400: AUTOMATIC APERTURE ASSEMBLY (FILM GATE ASSEMBLY)

Parts Number	Description
TSR-AC-400	AUTOMATIC APERTURE ASSEMBLY (FILM GATE ASSEMBLY
B-6	Film gate body
B-7A	Aperture skate (Inner)
B-7B	Aperture skate (Outer)
B-9	Gate roller (2)
B-10	Gate roller shaft
B-11	Intermittent sprocket roller arm, A
B-11A	Screw
B-11B	Screw
B-11C	Spring washer
B-11D	Washer
B-12	Intermittent sprocket roller arm, B
B-12A	Intermittent sprocket roller arm, B spring
B-12B	Intermittent sprocket roller adjust screw
B-12C	Intermittent sprocket roller set screw
B-13	Intermittent sprocket roller (2)
B-13B	Intermittent sprocket roller tight screw
B-14	Intermittent sprocket roller shaft
B-15	Film gate push button
B-17	Skate pressure plate
B-18	Skate pressure plate spring

Parts Number	Description
TSR-B-19	Skate pressure plate set screw
B-20A	Slide metal, A
B-20A-1	Slide metal, A bearing collar
B-20A-2	Ball bearing
B-20A-3	Slide metal, A tight screw
B-20A-4	Slide metal, A tight screw washer
B-20A-5	Slide metal, A bearing collar
B-20B	Slide metal, B
B-20B-1	Slide metal, B bearing collar
B-27	Screw
B-32A	Skate pressure plate screw
B-32B	Skate pressure plate collar

PARTS LIST

TSR-AC-400: AUTOMATIC APERTURE ASSEMBLY (APERTURE BODY)

Parts Number	Description
TSR-AC-400	AUTOMATIC APERTURE ASSEMBLY (APERTURE BODY)
B-1	Aperture body
B-1A	Aperture body set pin
B-1B	Aperture body tight screw
B-2	Aperture plate
B-2A	Aperture plate set screw
B-3A	Film side rail (Inner)
B-3B	Film side rail (Outer)
B-3C	Film side rail tight screw
B-3D	Film side rail tight screw washer
B-4	Guide roller shaft
B-5	Guider roller (2)
B-21	Slide shaft, A
B-21A	Slide shaft, A set screw
B-22	Slide shaft, B
B-22A	Slide shaft, B spring
B-22B	Slide shaft, B seal ring
B-22C	Slide shaft, B set collar
B-22D	Slide shaft, B set collar screw
B-24	Aperture stop
B-24A	Aperture stop pin
B-25	Aperture stop knob
B-25A	Aperture stop knob metal
B-25B	Aperture stop knob metal screw
B-25C	Aperture stop knob metal washer

Parts Number	Description
TSR-B-28	Aperture mask guide plate
B-28A	Aperture mask guide plate set screw
B-29	Water pipe bracket
B-29A	Water pipe, A
B-29B	Water pipe, B
B-29C	Water pipe bracket set screw
B-29D	Water pipe bracket set screw washer
B-30	Slide spring
B-31	Aperture stop spring
B-33	Guide roller set collar
B-33A	Guide roller set collar screw
B-34	Aperture heat protector plate
B-34A	Aperture heat protector plate tight screw
B-34B	Aperture heat protector plate tight screw washer
B-35	Aperture mask push ball
B-36	Aperture mask push spring
B-37	Water seal
B-37A	Water seal screw
B-38	Automatic aperture motor bracket screw
B-38A	Water seal
B-38B	Water seal screw
AC-401	Synchronous motors inductor, SR1G51M
AC-404	Aperture mask for pin hole
AC-405	Aperture mask for C/S-S/T
AC-406	Aperture mask for C/S-V/V
AC-407	Aperture mask for S/T-V/V
AC-408	Stopper plate
AC-409	Aperture motor bracket
AC-410	Arm
AC-410B	Slide roller
AC-411	Setting knob
AC-412	Eccentric stopper
AC-413	Harp spring
AC-414	Terminal holder
AC-415	Motor cover

TSR-AC-100: CONTROL BOX FOR AUTO TURRET LENS-HOLDER AND AUTO APERTURE ASSEMBLY

Parts Number	Description
TSR-AC-100	CONTROL BOX FOR AUTO TURRET LENS-HOLDER AND AUTO APERTURE ASSEMBLY

PARTS LIST

TSR-SS: PROJECTOR SETTING BASE (STAND BRACKET)

Parts Number	Description
TSR-SS	PROJECTOR SETTING BASE (STAND BRACKET)
SS-1	USA Projector setting base (8 hole)
SS-2	USA Projector setting base (No hole)
SS-17	Screw
SS-18	Washer

TSR-BU: TSR-6000-FT UPPER MAGAZINE ARM ASSEMBLY

Parts Number	Description
TSR-BU	TSR-6000-FT UPPER MAGAZINE ARM ASSEMBLY
BU-4	Upper magazine arm
BU-7	Bearing metal
BU-8	Bearing
BU-13	Upper arm shaft
BU-23	Spring case
BU-24	Fraction
BU-25	Collar
BU-29	Fraction felt
BU-31	Fraction flange
BU-32	Disk spring
BU-33	Spring
BU-34	Spring collar
BU-35	Spring tight screw
BU-14	Reel knob
BU-13A	Shaft flange

TSR-BG: TSR-6000-FT UNIVERSAL GUIDE ROLLER

Parts Number	Description
TSR-BG	TSR-6000-FT UNIVERSAL GUIDE ROLLER
BG-1	Guider roller (with bearing)
BG-1A	Bearing
BG-2	Guide roller shaft
BG-2A	Roller stop ring
BG-3	Small roller
BG-3A	O ring
BG-4	Small roller
BG-4A	E washer
BG-5	Roller setting base
BG-6	Arm

Parts Number	Description
TSR-BG-7	Ball
BG-8	Arm
BG-8A	Arm tight screw
BG-9	Arm
BG-10	Screw bar 3/8" x 75
BG-11	Stopper
BG-11A	Spring 5 x 25
BG-12	Stopper base
BG-13	Arm

TSR-BL: TSR-6000-FT LOWER MAGAZINE ARM ASSEMBLY

Parts Number	Description
TSR-BL	TSR-6000-FT LOWER MAGAZINE ARM ASSEMBLY
BL-4	Lower magazine arm
BL-7	Bearing metal
BL-8	Bearing
BL-13	Magazine shaft
BL-13A	Shaft flange
BL-14	Reel knob
BL-28A	Lower arm bracket
BL-28B	Lower arm bracket
BL-29	Fraction felt
BL-30	Fraction flange
BL-31	Fraction flange
BL-32	Pulley
BL-33	Spring
BL-34	Spring collar
BL-35	Spring tight screw
BL-36	Take-up belt

TSR-BG: TSR-6000-FT UNIVERSAL GUIDE ROLLER

Parts Number	Description
TSR-BG	TSR-6000-FT UNIVERSAL GUIDE ROLLER
BG-1	Guide roller (with bearing)
BG-1A	Bearing
BG-2	Guide roller shaft
BG-2A	Roller stop ring
BG-3	Small roller
BG-3A	O ring
BG-4	Small roller shaft
BG-4A	E washer
BG-5	Roller setting base

Parts Number	Description
TSR-BG-6	Arm
BG-7	Ball
BG-8	Arm
BG-8A	Arm tight screw
BG-9	Arm
BG-10	Screw 3/8" x 75
BG-11	Stopper
BG-11A	Spring 5 x 25
BG-12	Stopper base
BG-13	Arm

TSR-6000-AU: 6000 FT UPPER MAGAZINE COMPLETE, TYPE (A)

Parts Number	Description
TSR-6000-AU	6000FT UPPER MAGAZINE COMPLETE, TYPE (A)
AU-1	Upper magazine rear cover
AU-2	Upper magazine net
AU-3	Upper magazine net set ring
AU-4	Upper magazine arm
AU-5	Torque motor
AU-6	Gear head
AU-7	Bearing metal
AU-8	Bearing (2)
AU-9	Metal flange
AU-10	Motor flange
AU-11	Stud (4)
AU-12	Coupling rubber
AU-13	Magazine shaft
AU-14	Reel knob
AU-15	Fire trap
AU-16	Fire trap roller (2)
AU-17	Fire trap shaft (2)
AU-18	Rewinder roller frame
AU-19	Rewinder roller A
AU-20	Rewinder roller B
AU-21	Rewinder roller shaft (2)
AU-22	Nylon switch roller
AU-23	Nylon switch roller shaft
AU-24	Nylon roller arm
AU-25	Nylon roller arm shaft
AU-26	Micro switch
AU-27	6000ft wire reel

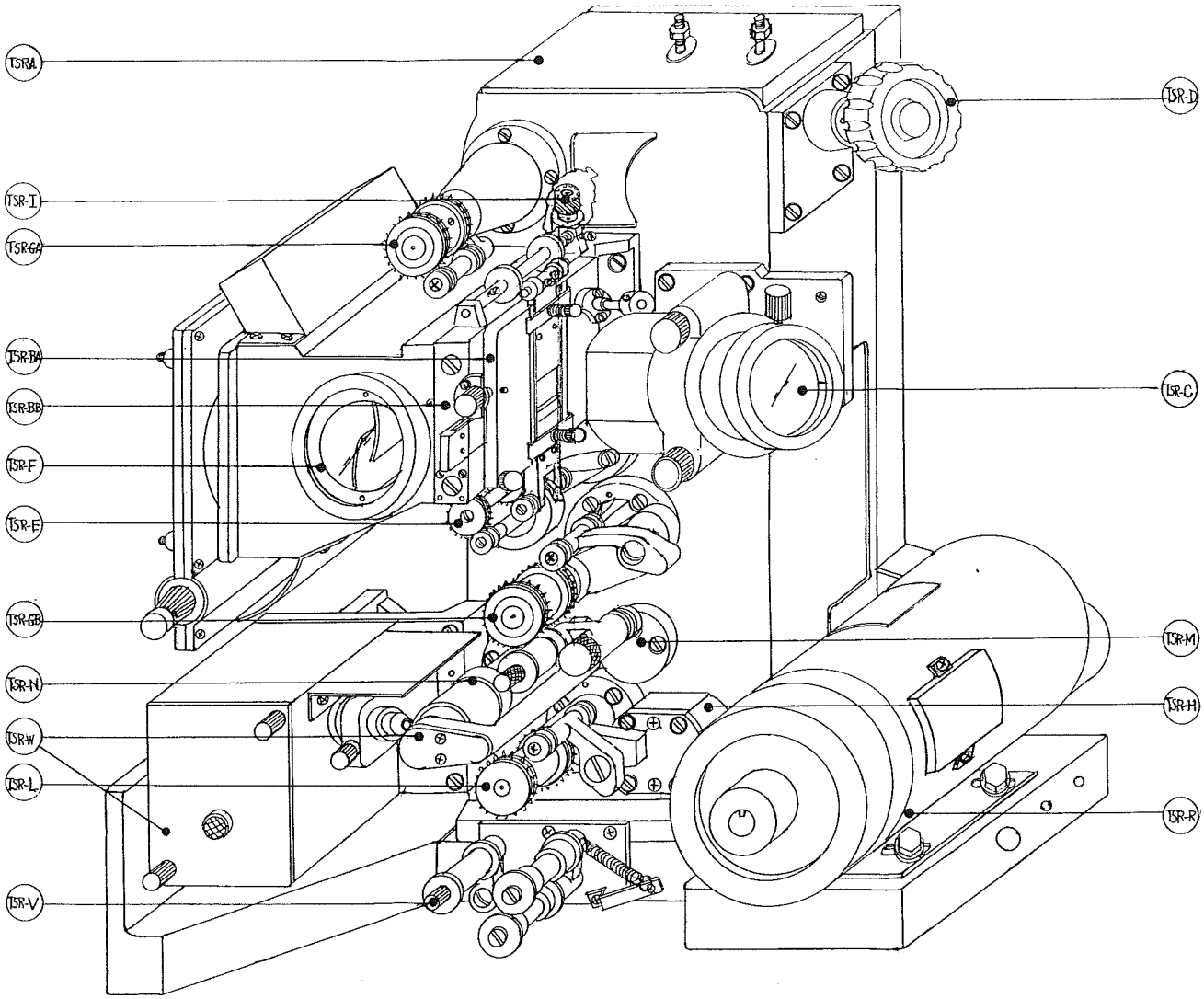
PARTS LIST

TSR-6000-AL: 6000 FT LOWER MAGAZINE COMPLETE, TYPE (A)

Parts Number	Description
TSR-6000-AL	6000FT LOWER MAGAZINE COMPLETE, TYPE (A)
AL-1	Lower magazine rear cover
AL-2	Lower magazine net
AL-3	Lower magazine net set ring
AL-4	Lower magazine arm
AL-5	Torque motor
AL-6	Gear head
AL-7	Bearing metal
AL-8	Bearing (2)
AL-9	Metal flange
AL-10	Motor flange
AL-11	Stud (4)
AL-12	Coupling rubber
AL-13	Magazine shaft
AL-14	Reel knob
AL-15	Switch roller frame
AL-16	Tension roller
AL-17	Fire trap roller
AL-18	Switch roller
AL-19	Tension arm
AL-20	Switch arm
AL-21	Tension shaft
AL-22	Switch arm shaft
AL-23	Switch roller shaft
AL-24	Tension roller shaft
AL-25	Tension spring
AL-26	Tension spring arm
AL-27	Micro switch
AL-28	Lower magazine bracket (2)
AL-29	6000ft wire reel

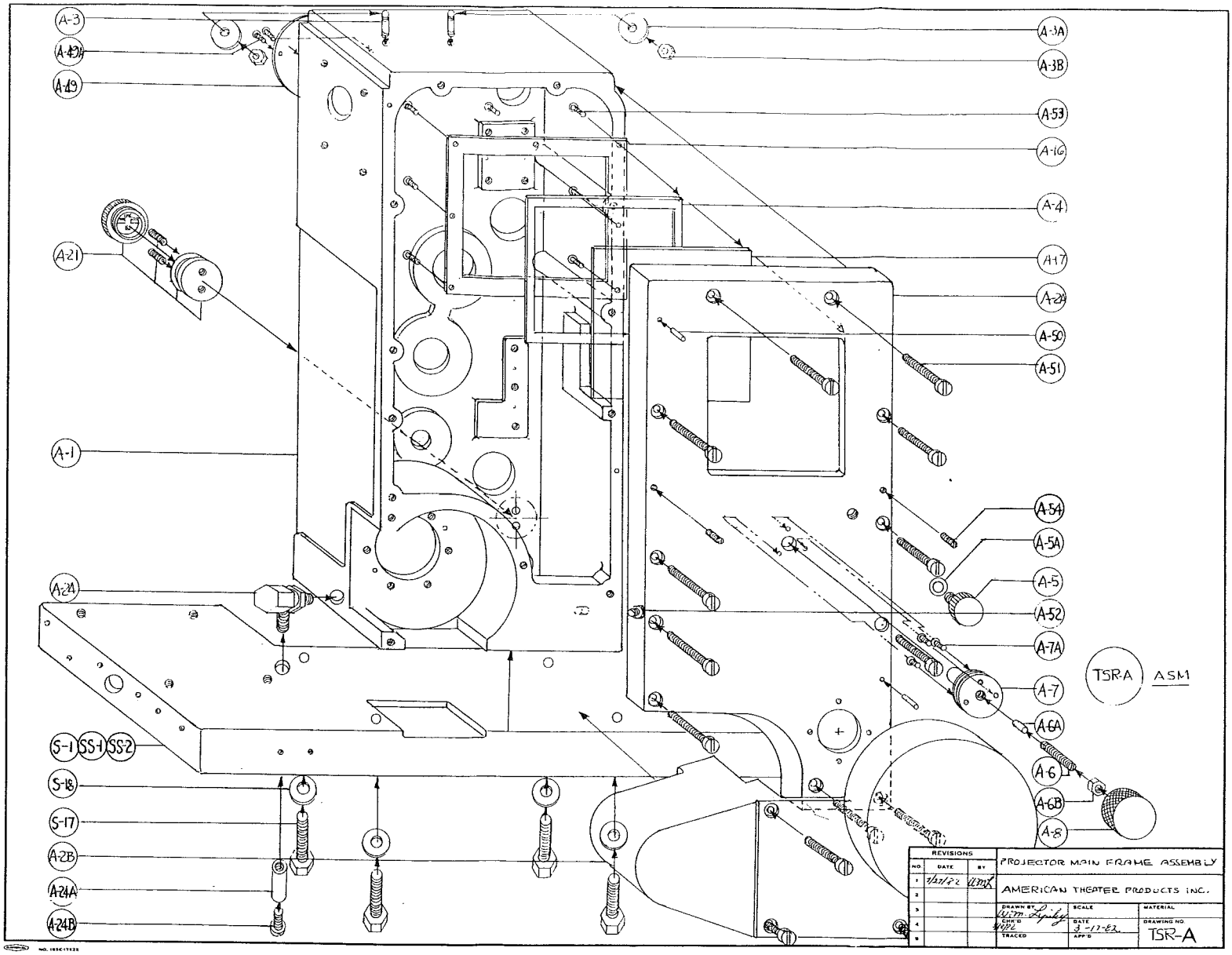
TSR-6000-AR: REWINDER SWITCH ARM COMPLETE

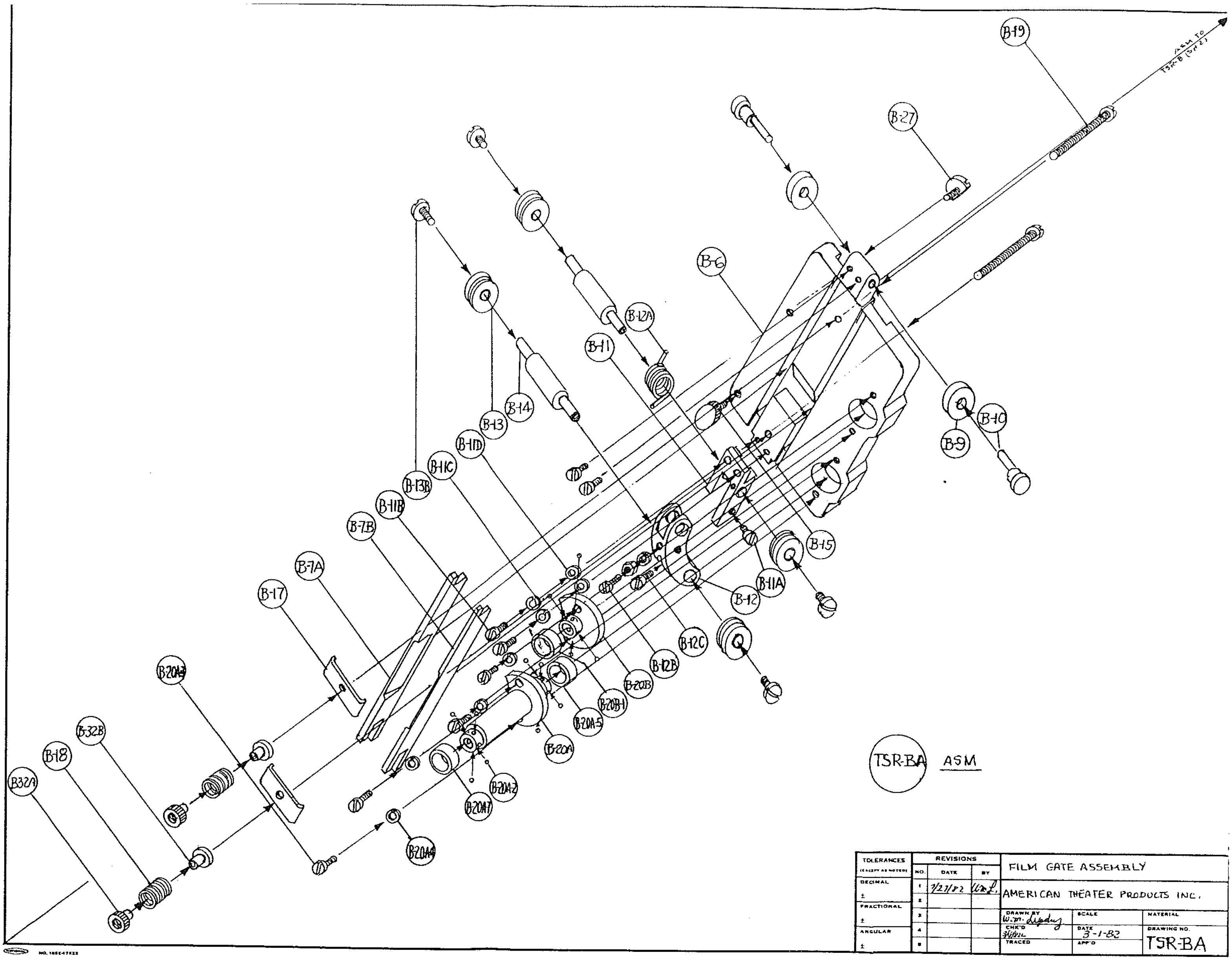
Parts Number	Description
TSR-6000-AR	REWINDER SWITCH ARM COMPLETE
AR-1	Switch roller frame
AR-2	Fire trap roller
AR-3	Switch roller
AR-4	Switch arm
AR-5	Switch arm shaft
AR-6	Switch roller shaft
AR-7	Fire trap roller shaft
AR-10	Micro switch



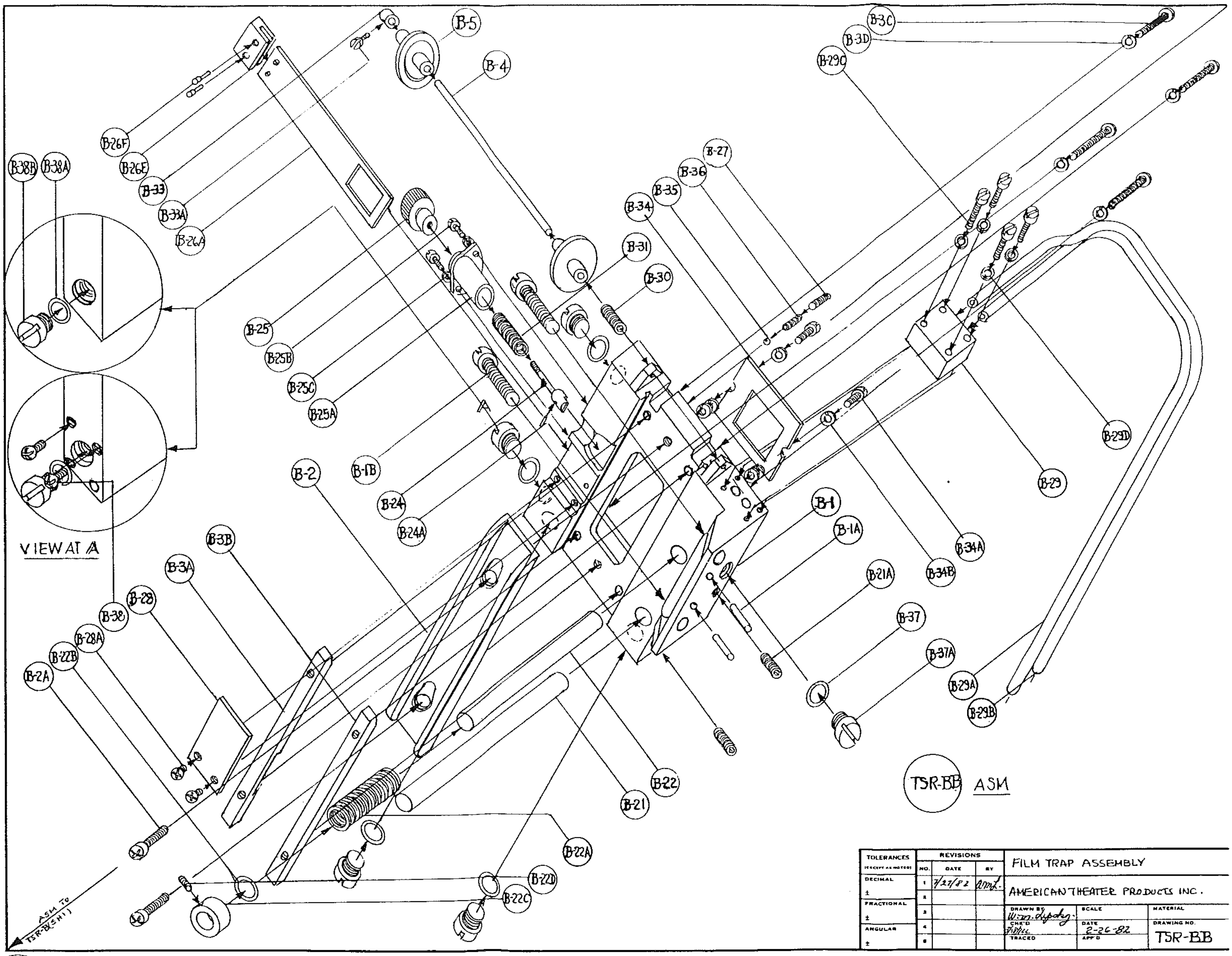
TSR ASM

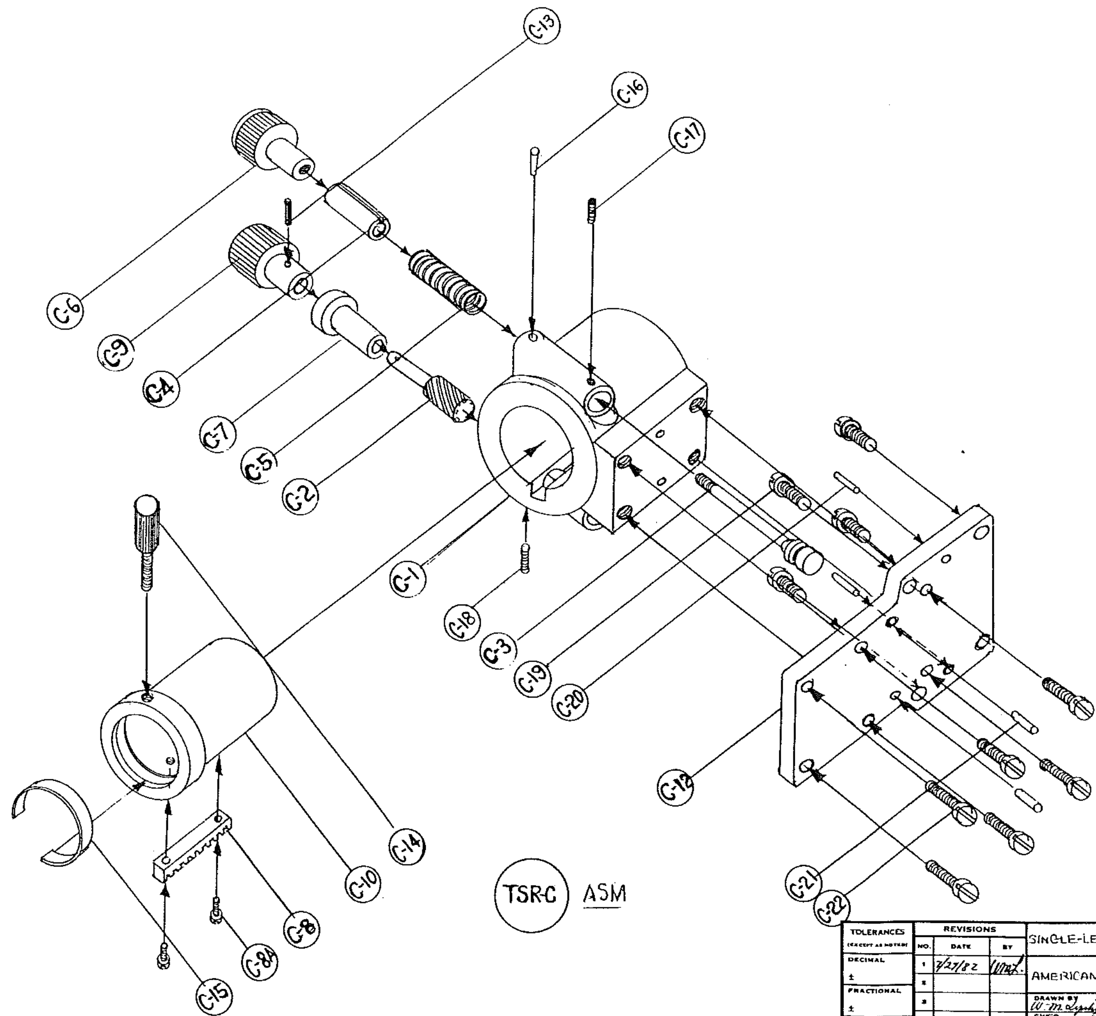
TOLERANCES (EXCEPT AS NOTED)	REVISIONS			TOKIWA
	NO.	DATE	BY	TSR 35MM SOUND PROJECTOR ASM
DECIMAL ±	1	7/27/82	[illegible]	AMERICAN THEATER PRODUCTS INC.
	2			
FRACTIONAL ±	3			DRAWN BY [illegible] SCALE — MATERIAL
	4			CHK'D [illegible] DATE 9-12-82 DRAWING NO. TSR
ANGULAR ±	5			TRACED — APP'D


A-3
A-42A
A-49
A-3A
A-3B
A-53
A-16
A-4
A-17
A-21
A-24
A-50
A-51
A-1
A-54
A-5A
A-5
A-52
A-7A
A-24A
A-7
A-6A
S-1
SS-1
SS-2
A-6
A-6B
S-18
A-8
S-17
A-28
A-24A
A-24B
TSR-A ASM
REVISIONS
NO. DATE BY
PROJECTOR MAIN FRAME ASSEMBLY
AMERICAN THEATER PRODUCTS INC.
DRAWN BY
CHK'D
TRACED
SCALE
DATE
APP'D
MATERIAL
DRAWING NO.
TSR-A

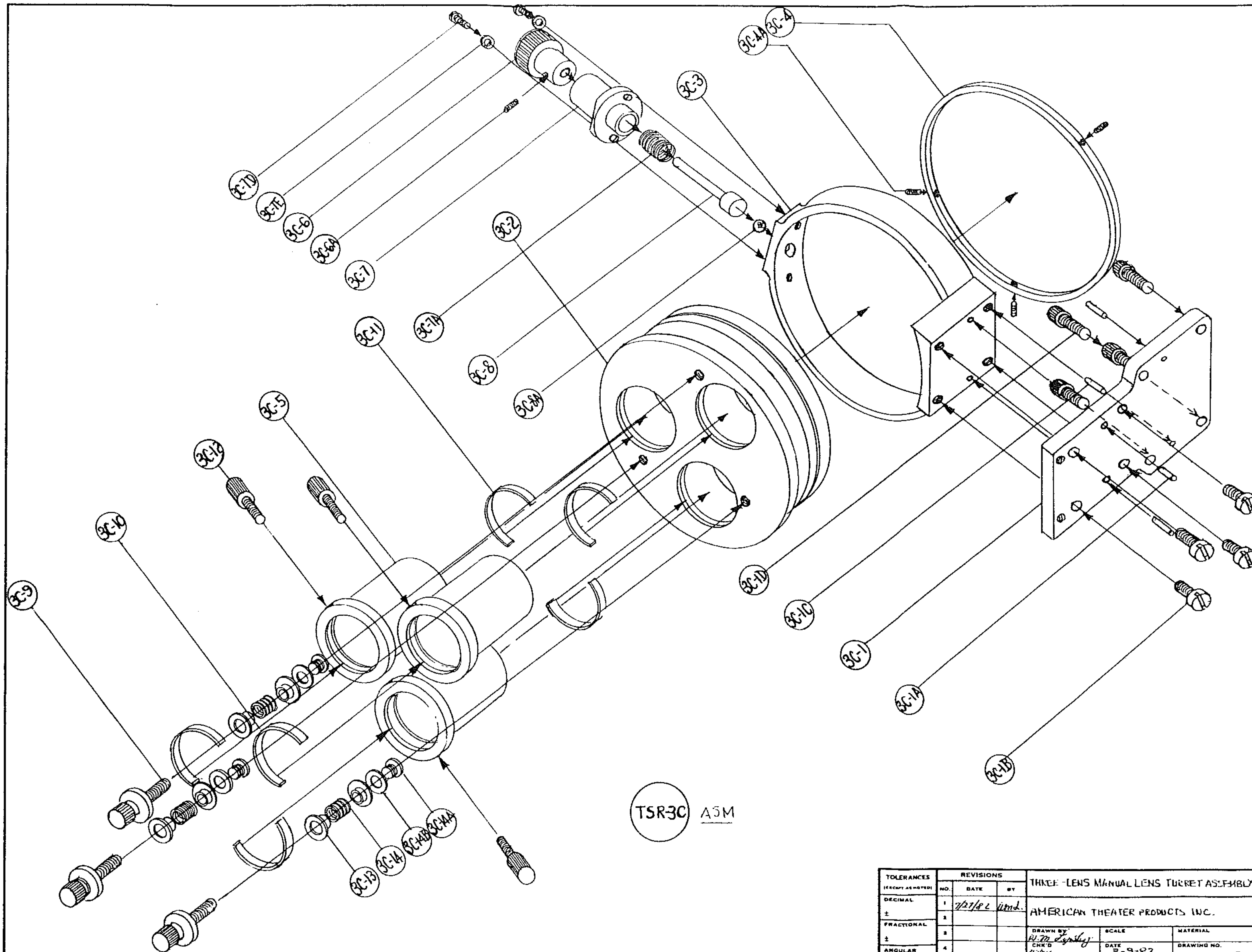


TOLERANCES (EXCEPT AS NOTED)	REVISIONS			FILM GATE ASSEMBLY		
	NO.	DATE	BY	AMERICAN THEATER PRODUCTS INC.		
DECIMAL ±	1	7/27/82	W.L.	DRAWN BY	SCALE	MATERIAL
FRACTIONAL ±	2			CHK'D	DATE 3-1-82	DRAWING NO.
ANGULAR ±	3			TRACED	APP'D	TSR-BA
	4					
	5					

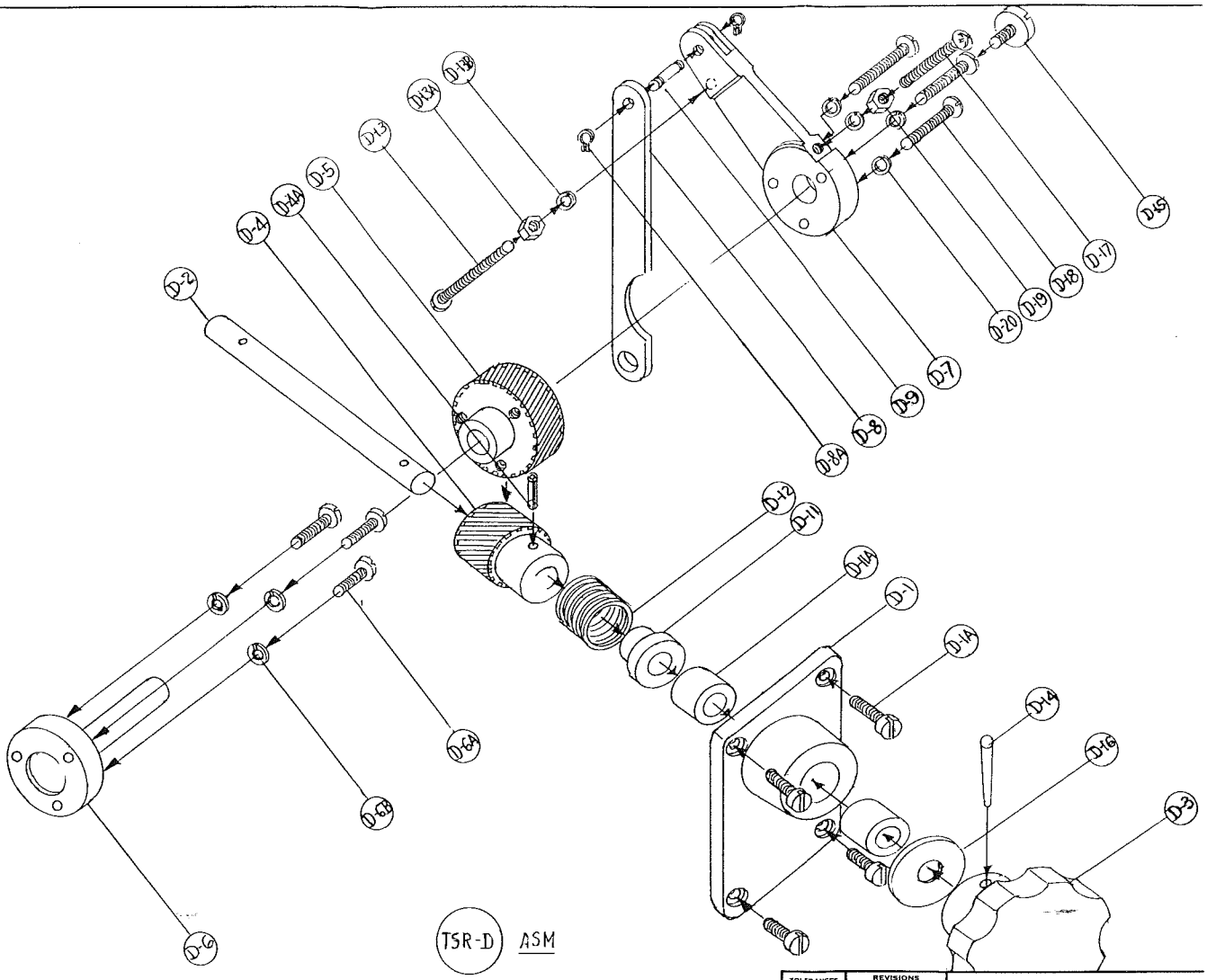

B-5
B-4
B-3C
B-3D
B-29C
B-26F
B-26E
B-33
B-33A
B-26A
B-38B
B-38A
B-27
B-36
B-35
B-34
B-31
B-30
B-25
B-25B
B-25C
B-25A
A
B-1B
B-24
B-24A
B-2
B-1
B-1A
B-21A
B-37
B-37A
B-29A
B-29B
B-29D
B-29
B-34A
B-34B
VIEW AT A
B-3B
B-3A
B-28
B-38
B-28A
B-22B
B-2A
B-22
B-21
B-22A
B-22D
B-22C
ASM TO TSR-B (SH 1)
TSR-BB ASM
TOLERANCES (EXCEPT AS NOTED)
DECIMAL ±
FRACTIONAL ±
ANGULAR ±
REVISIONS
NO. DATE BY
1 7/27/82 AMT.
FILM TRAP ASSEMBLY
AMERICAN THEATER PRODUCTS INC.
DRAWN BY
CHK'D
TRACED
SCALE
DATE 2-26-82
APP'D
MATERIAL
DRAWING NO.
TSR-BB



TOLERANCES (EXCEPT AS NOTED)	REVISIONS			SINGLE-LENS MANUAL LENS TURRENT ASSEMBLY		
	NO.	DATE	BY			
DECIMAL ±	1	7/27/82	WML.	AMERICAN THEATER PRODUCTS INC.		
	2					
FRACTIONAL ±	3			DRAWN BY W. M. Lipsky	SCALE	MATERIAL
	4			CHK'D Hobu	DATE 3-5-82	DRAWING NO. TSR-C
ANGULAR ±	5			TRACED	APP'D	

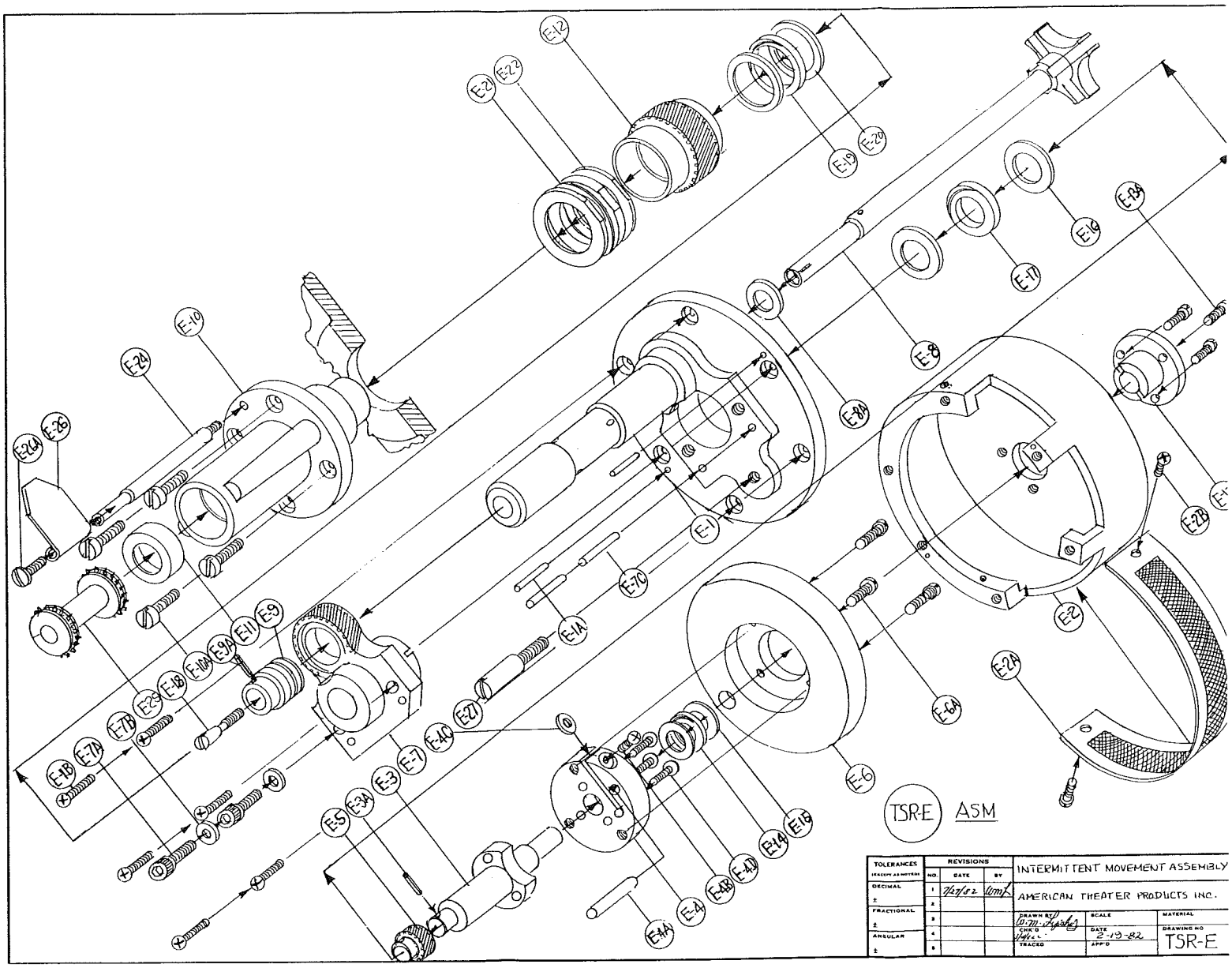


TOLERANCES (EXCEPT AS NOTED)	REVISIONS			THREE -LENS MANUAL LENS TURRET ASSEMBLY		
	NO.	DATE	BY			
DECIMAL ±	1	7/27/82	wmd.	AMERICAN THEATER PRODUCTS INC.		
	2					
FRACTIONAL ±	3			DRAWN BY: W.M. [illegible]	SCALE	MATERIAL
ANGULAR ±	4			CHK'D [illegible]	DATE 3-9-82	DRAWING NO. TSR-3C
	5			TRACED	APP'D	

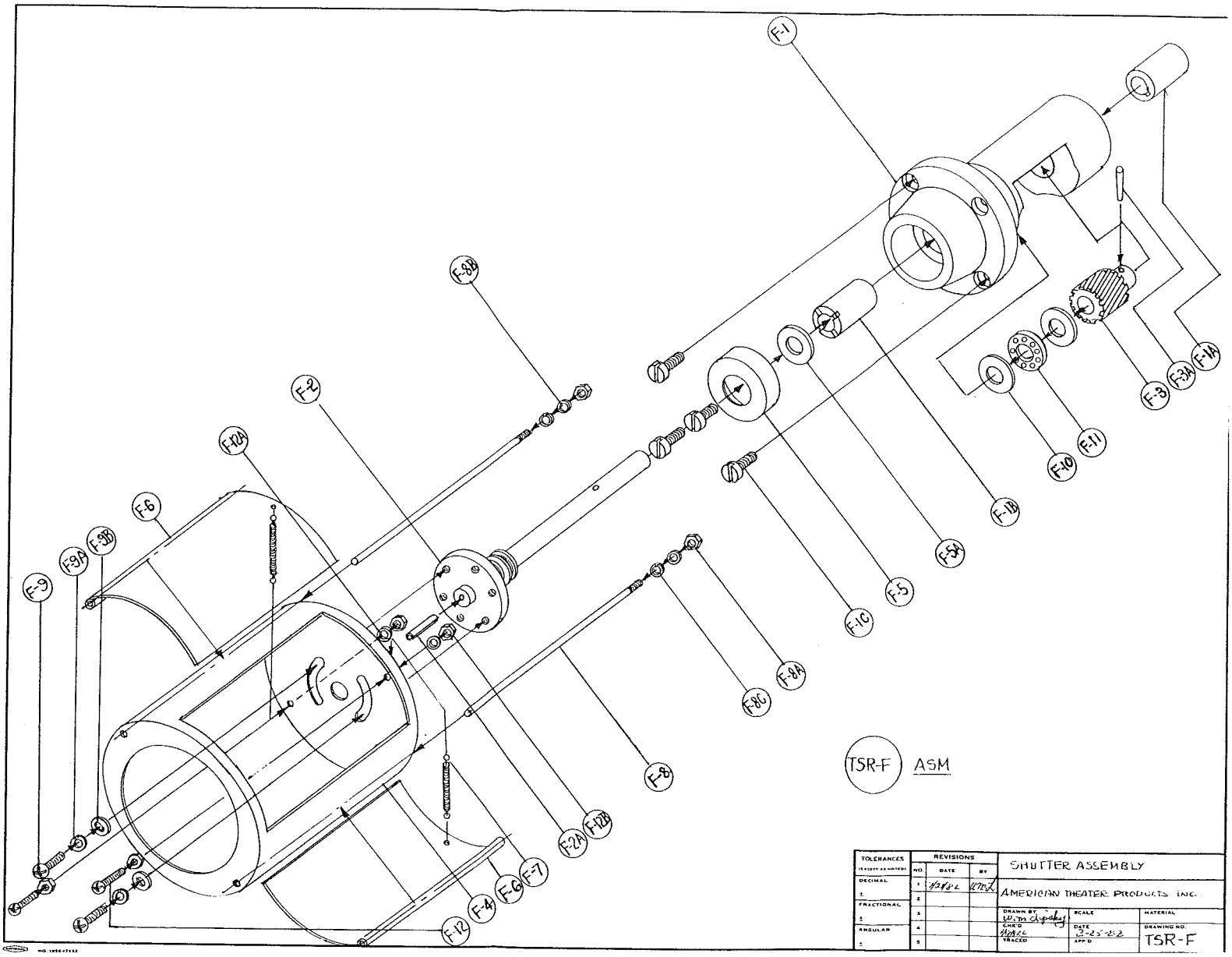


TSR-D ASM

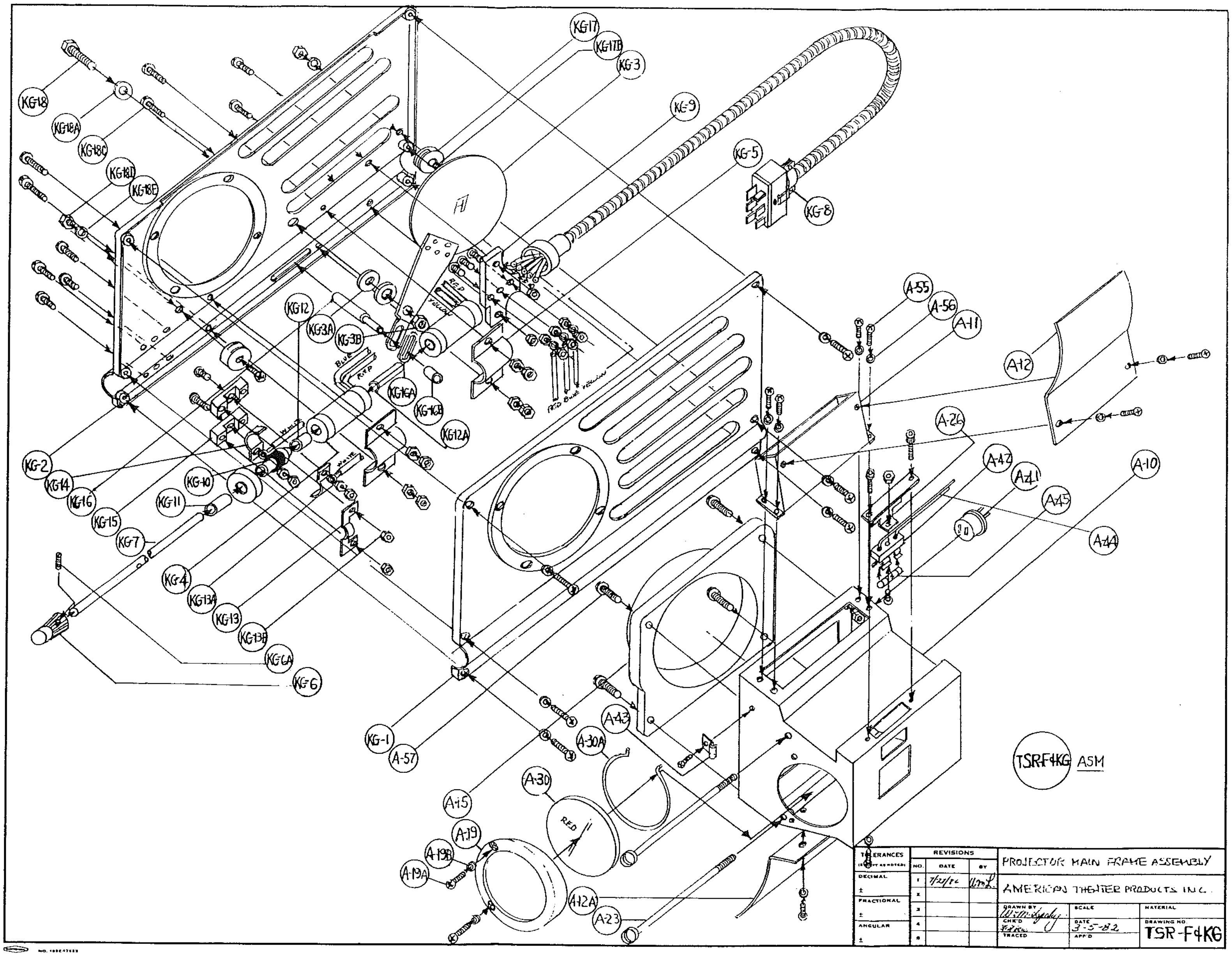
TOLERANCES	REVISIONS			FRAMING ASSEMBLY
DECIMAL	NO.	DATE	BY	
±	1	7/27/02	Vmz	AMERICAN THEATER PRODUCTS INC.
FRACTIONAL	2			
±	3			DRAWN BY: SCALE MATERIAL
	4			CHK'D DATE DRAWING NO

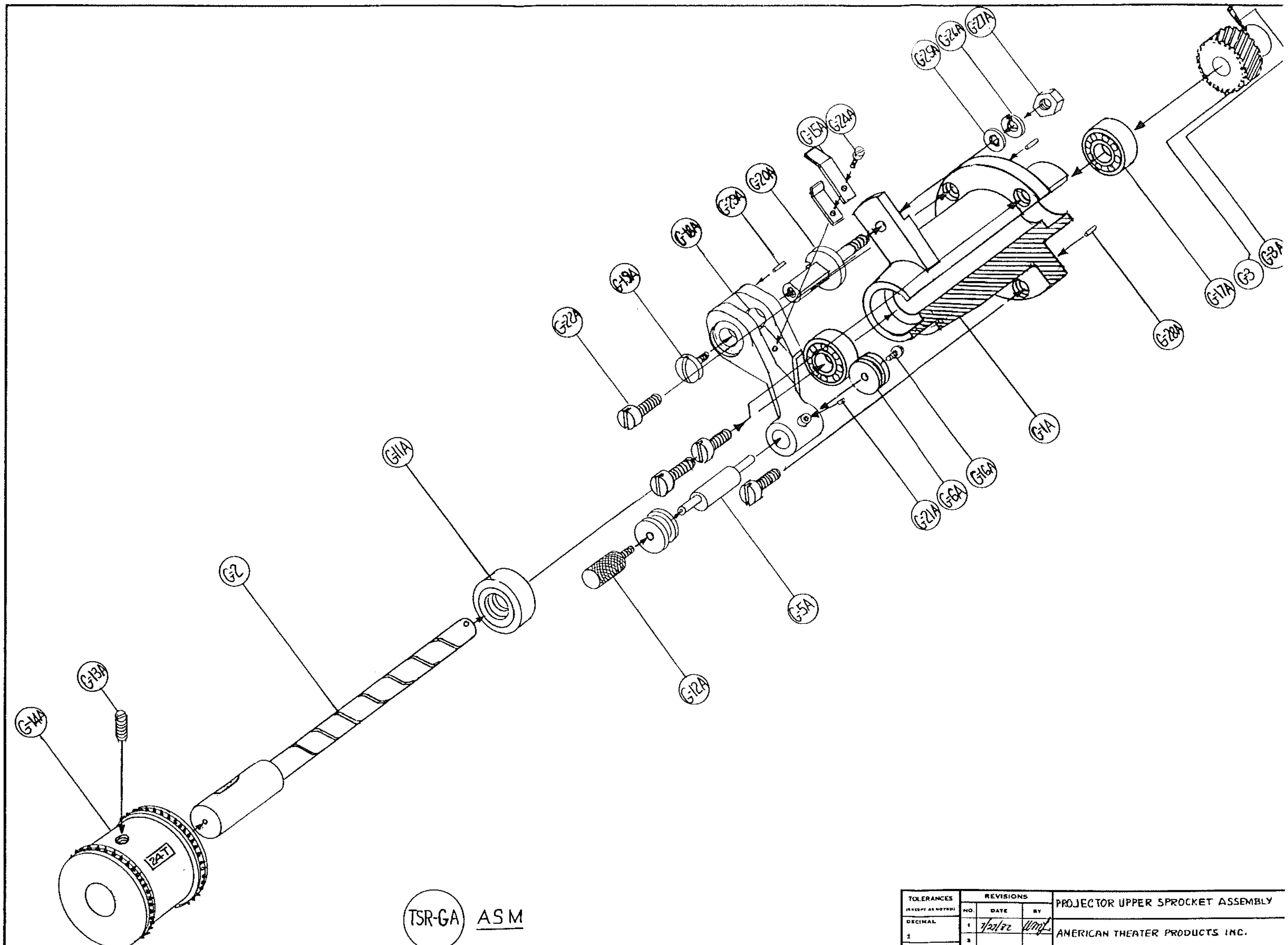


TOLERANCES (EXCEPT AS NOTED)	REVISIONS NO.	DATE	BY	INTERMITTENT MOVEMENT ASSEMBLY
DECIMAL ±	1	7-27-82	tom	AMERICAN THEATER PRODUCTS INC.
FRACTIONAL ±	2			DRAWN BY: D.M. Lyster
ANGULAR ±	3			CHK'D:
	4			TRACED:
	5			SCALE:
				DATE: 8-19-82
				APP'D:
				MATERIAL:
				DRAWING NO: TSR-E



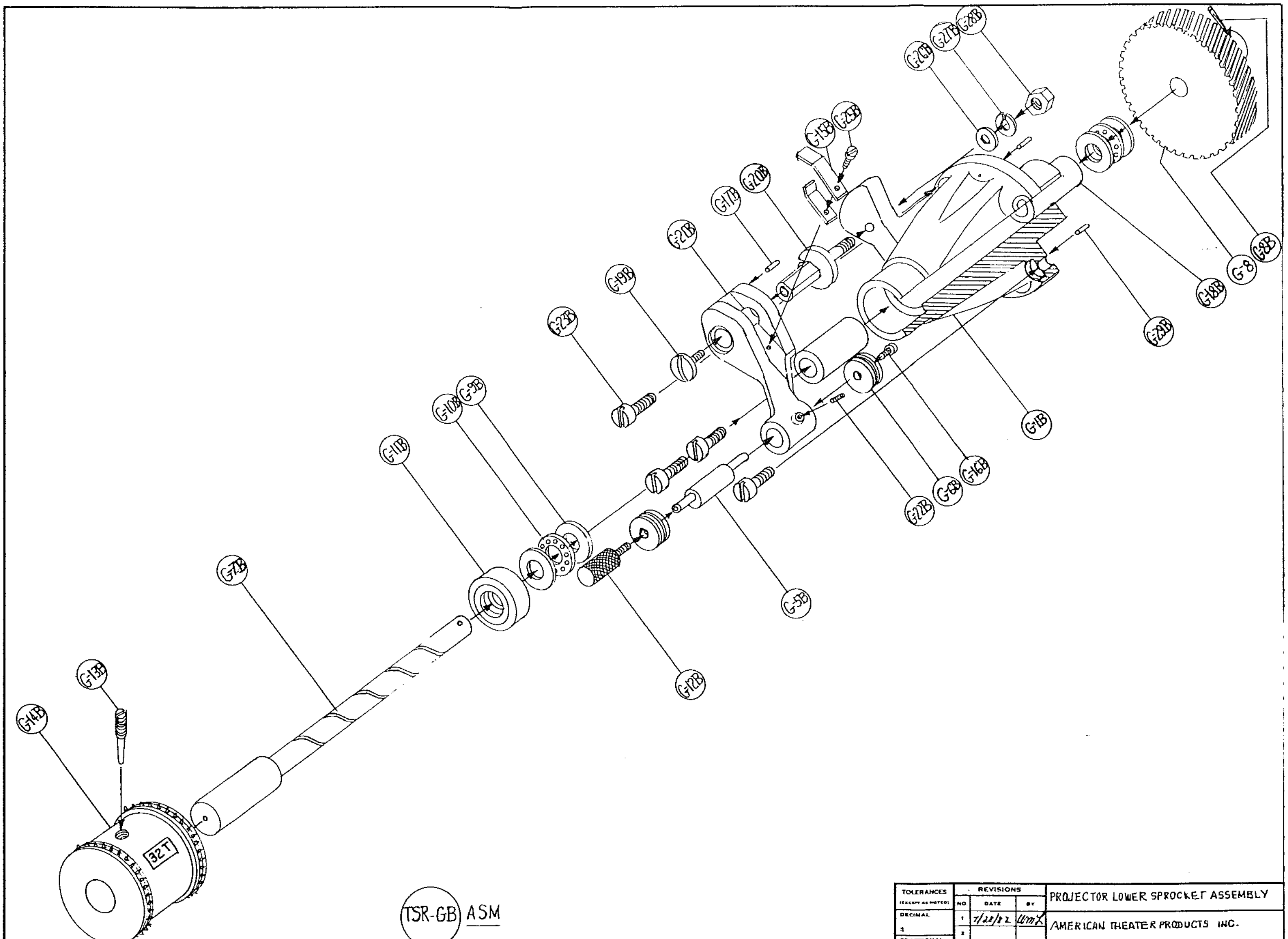
TOLERANCES (UNLESS AS NOTED)	REVISIONS			SHUTTER ASSEMBLY		
	NO	DATE	BY			
DECIMAL ±	1	4/28/82	WMC	AMERICAN THEATER PRODUCTS INC.		
FRACTIONAL ±	2					
	3			DRAWN BY: Wm Clipsaddle	SCALE	MATERIAL
ANGULAR ±	4			CHK'D: WMC	DATE: 2-25-82	DRAWING NO. TSR-F
	5			TRACED	APP'D	


KG-18
KG-18A
KG-18C
KG-18D
KG-18E
KG-17
KG-17B
KG-3
KG-9
KG-5
KG-8
KG-12
KG-3A
KG-3B
KG-16A
KG-16B
KG-12A
KG-2
KG-14
KG-16
KG-15
KG-10
KG-11
KG-7
KG-4
KG-13A
KG-13
KG-13B
KG-6A
KG-6
KG-1
A-57
A-55
A-56
A-11
A-12
A-26
A-42
A-41
A-45
A-44
A-10
A-43
A-30A
A-30
A-15
A-19
A-19B
A-19A
A-12A
A-23
RED
YELLOW
BLUE
WHITE
TSR-F4KG ASM
TOLERANCES (EXCEPT AS NOTED)
DECIMAL ±
FRACTIONAL ±
ANGULAR ±
REVISIONS
NO. DATE BY
1 7/22/82
PROJECTOR MAIN FRAME ASSEMBLY
AMERICAN THEATER PRODUCTS INC.
DRAWN BY
SCALE
MATERIAL
CHK'D
DATE 3-5-82
TRACED
APP'D
DRAWING NO. TSR-F4KG



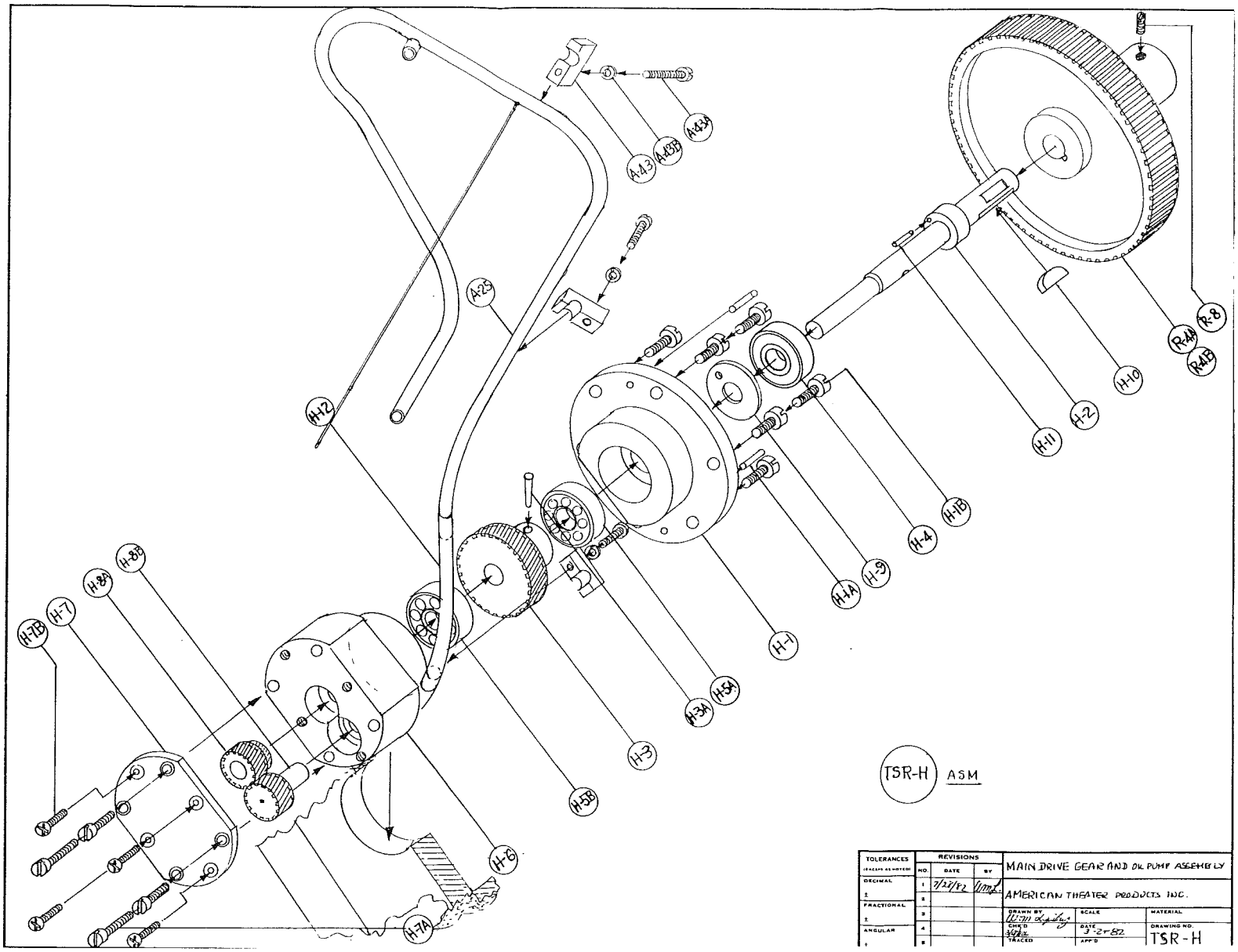
TSR-GA ASM

TOLERANCES (EXCEPT AS NOTED)	REVISIONS			PROJECTOR UPPER SPROCKET ASSEMBLY		
	NO.	DATE	BY	AMERICAN THEATER PRODUCTS INC.		
DECIMAL ±	1	7/22/82	WmL			
	2					
FRACTIONAL ±	3			DRAWN BY Wm Lipsky	SCALE	MATERIAL
ANGULAR	4			CHK'D 3/17/82	DATE 2-15-82	DRAWING NO. TSR-GA
	5			TRACED	APP'D	



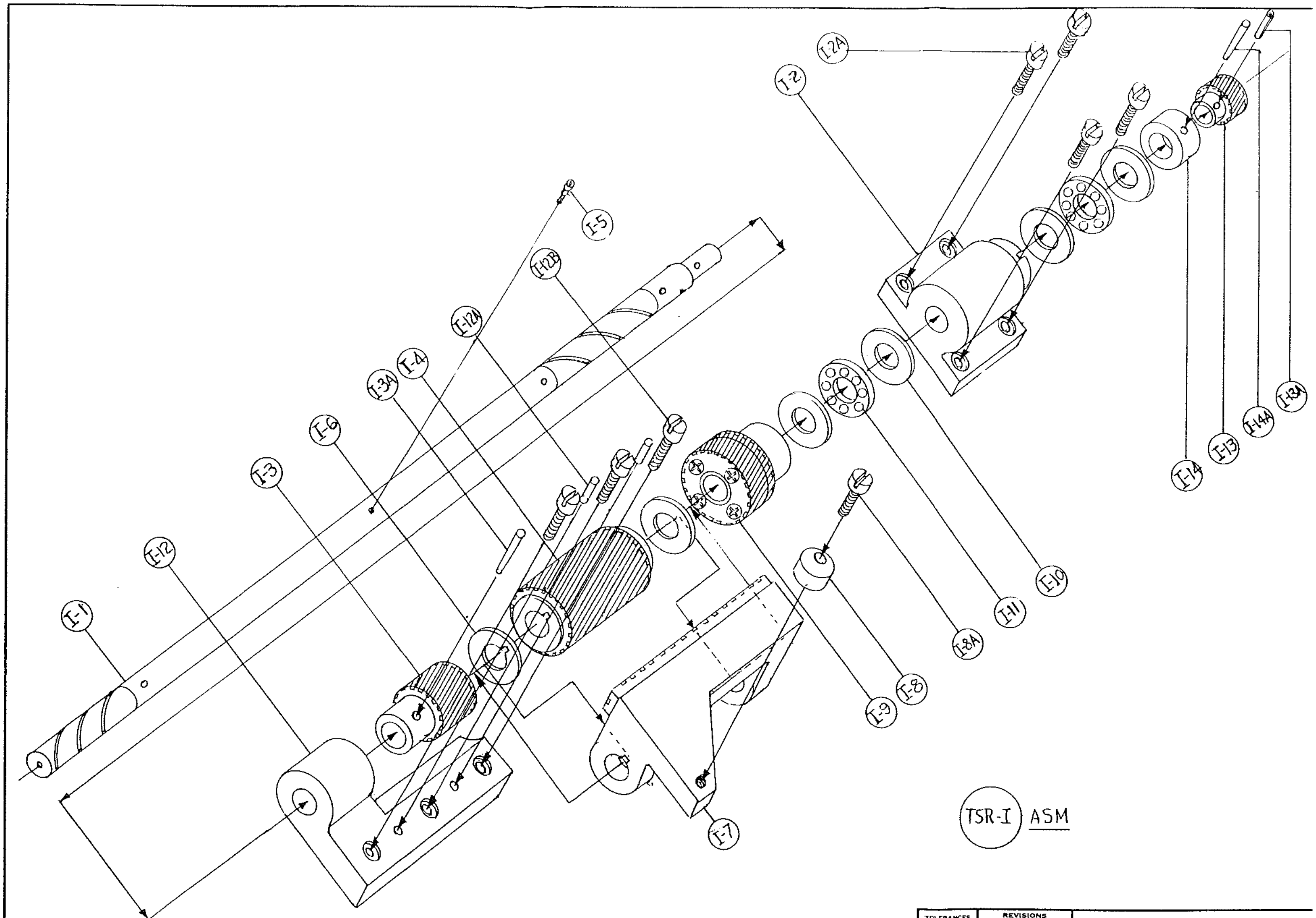
TSR-GB ASM

TOLERANCES (EXCEPT AS NOTED)	REVISIONS			PROJECTOR LOWER SPROCKET ASSEMBLY		
	NO.	DATE	BY			
DECIMAL ±	1	7/28/82	WmL	AMERICAN THEATER PRODUCTS INC.		
	2					
FRACTIONAL ±	3			DRAWN BY: Wm M. Lipsky	SCALE	MATERIAL
ANGULAR	4			CHK'D 3/12/82 L	DATE 2-16-82	DRAWING NO. TSR-GB
	5			TRACED	APP'D	



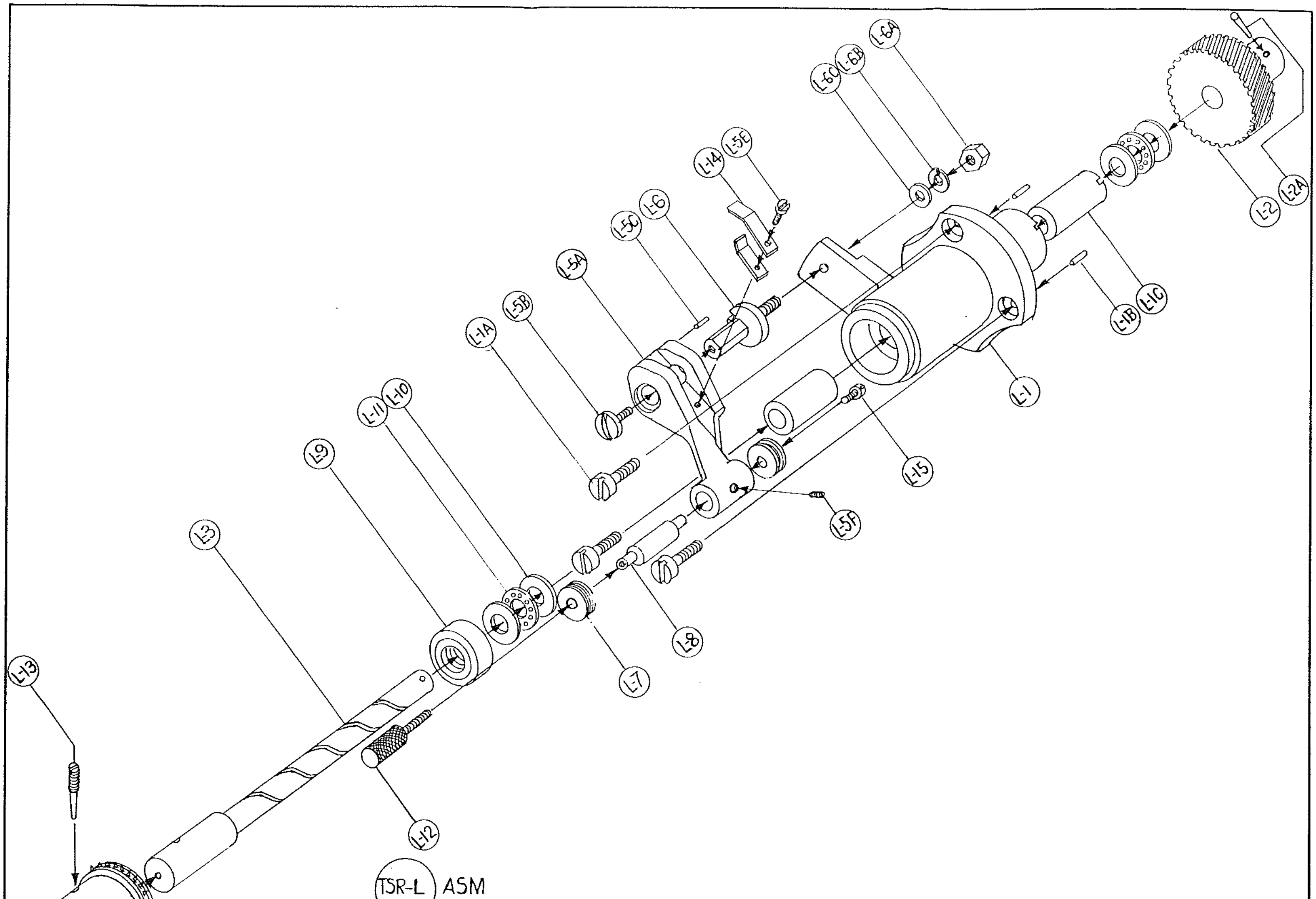
TSR-H ASM

TOLERANCES (EXCEPT AS NOTED)	REVISIONS NO.	DATE	BY	MAIN DRIVE GEAR AND OIL PUMP ASSEMBLY
DECIMAL ±	1	3/26/82	[illegible]	AMERICAN THEATER PRODUCTS INC.
FRACTIONAL ±	2			
ANGULAR ±	3			DRAWN BY [illegible] SCALE MATERIAL
	4			CHK'D DATE 3-2-82
	5			TRACED APP'D DRAWING NO. TSR-H

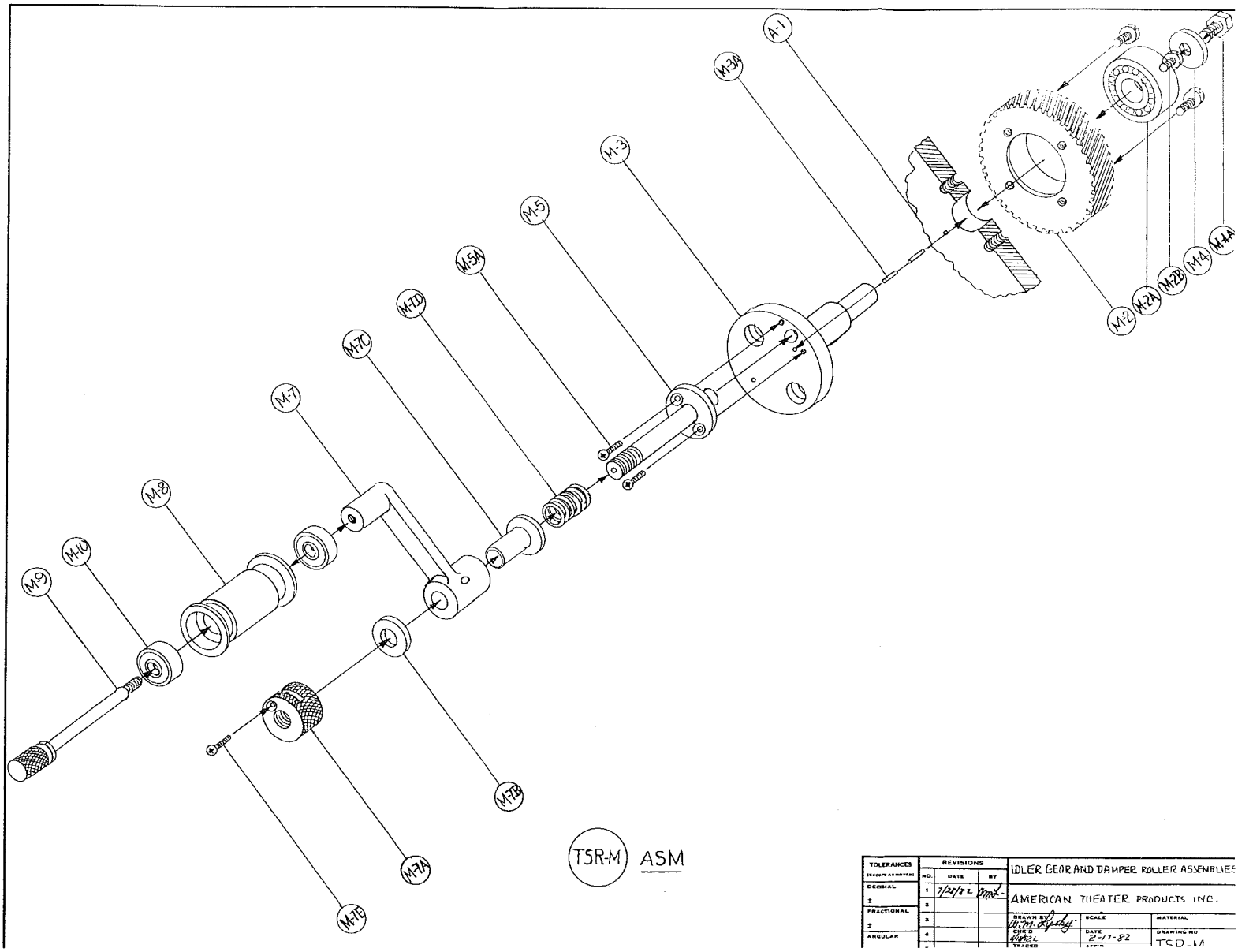


TSR-I ASM

TOLERANCES (EXCEPT AS NOTED)	REVISIONS			VERTICAL SHAFT ASSEMBLY		
	NO.	DATE	BY	AMERICAN THEATER PRODUCTS INC.		
DECIMAL ±	1	7/20/82	Wm L.			
	2					
FRACTIONAL ±	3			DRAWN BY Wm Lipsky	SCALE	MATERIAL

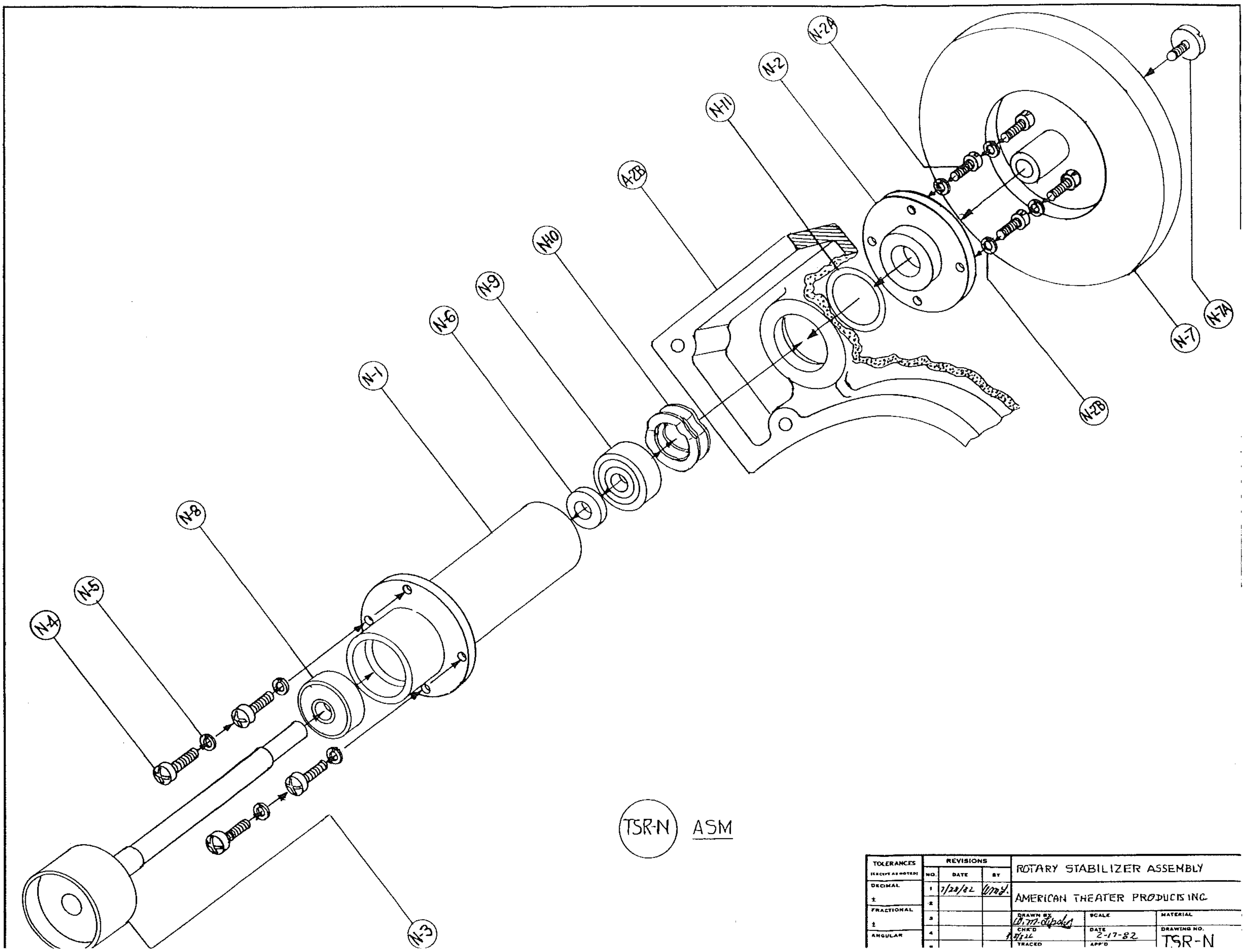


TOLERANCES (EXCEPT AS NOTED)	REVISIONS			SOUNDHEAD HOLD-BACK SPROCKET ASSEMBLY		
	NO.	DATE	BY	AMERICAN THEATER PRODUCTS INC.		
DECIMAL ±	1	7/28/82	wml	DRAWN BY	SCALE	MATERIAL
	2					
FRACTIONAL ±	3			CHK'D	DATE 2-16-82	DRAWING NO. TSR-L
ANGULAR ±	4			TRACED	APP'D	
	5					



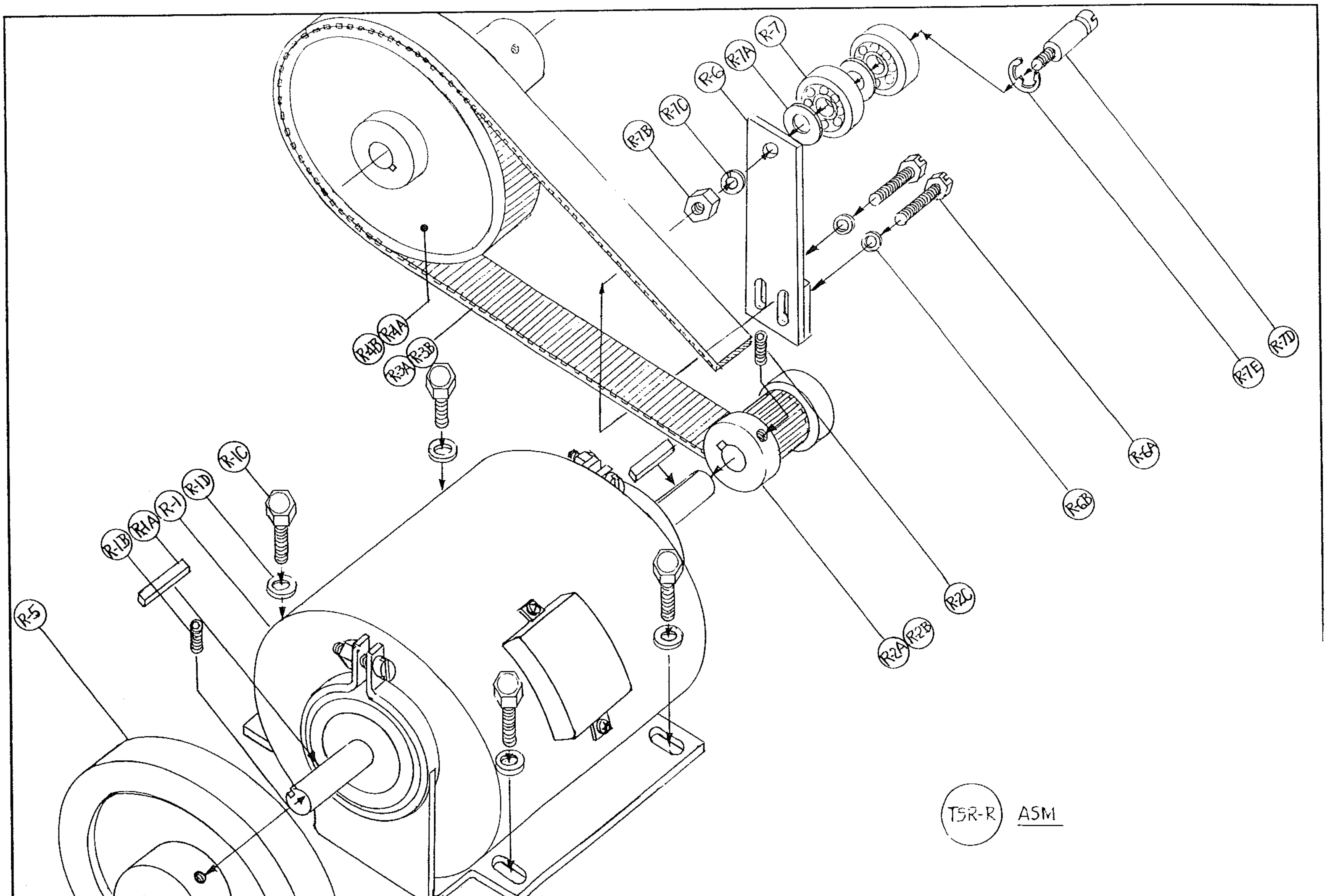
TSR-M ASM

TOLERANCES (EXCEPT AS NOTED)	REVISIONS NO.	DATE	BY	IDLER GEAR AND DAMPER ROLLER ASSEMBLIES
DECIMAL ±	1	7/27/82	DMK	AMERICAN THEATER PRODUCTS INC.
FRACTIONAL ±	2			
ANGULAR	3			DRAWN BY W.M. Appleby — SCALE — MATERIAL
	4			CHKD — DATE 2-17-82 — DRAWING NO TSD-M
				TRACED

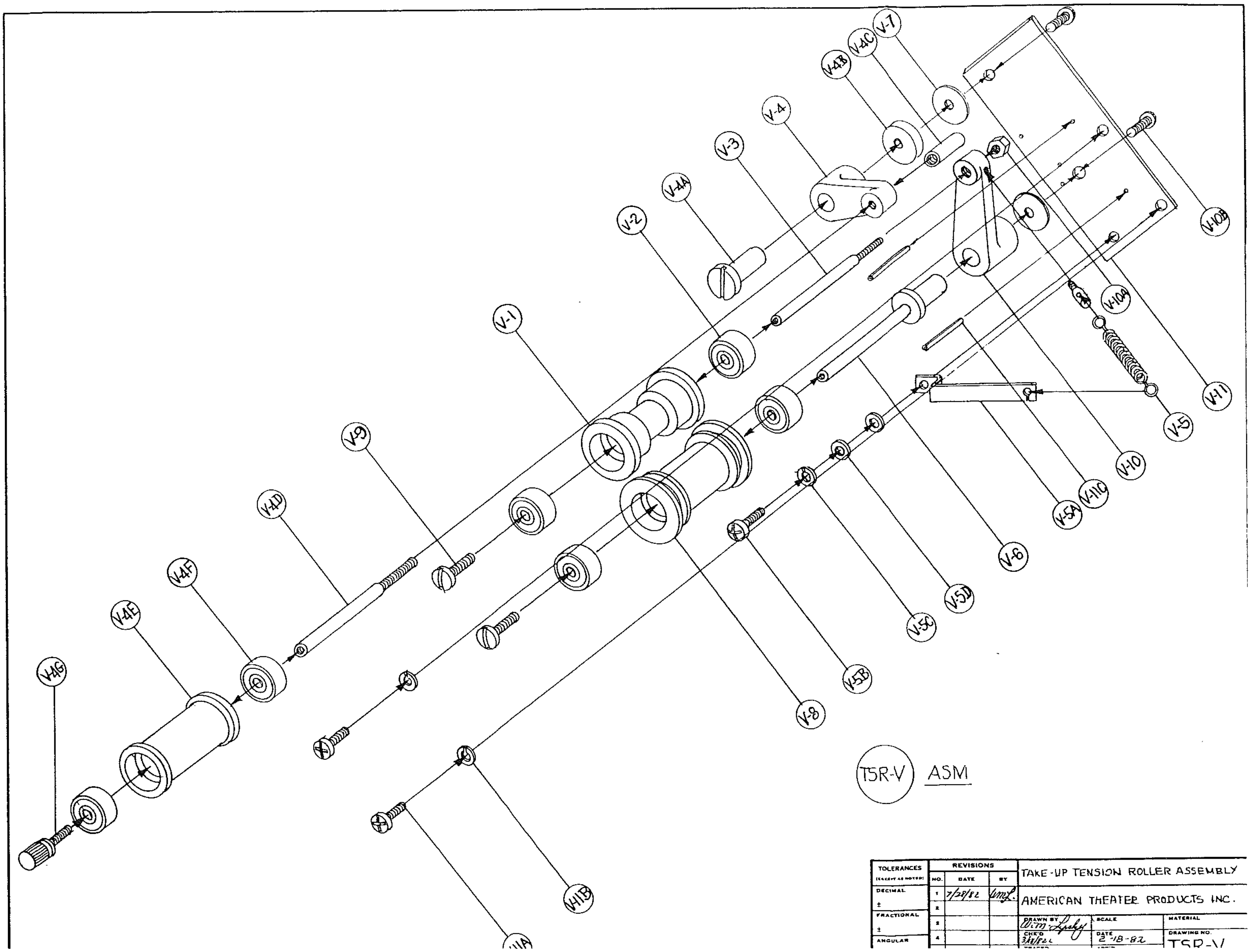


TSR-N ASM

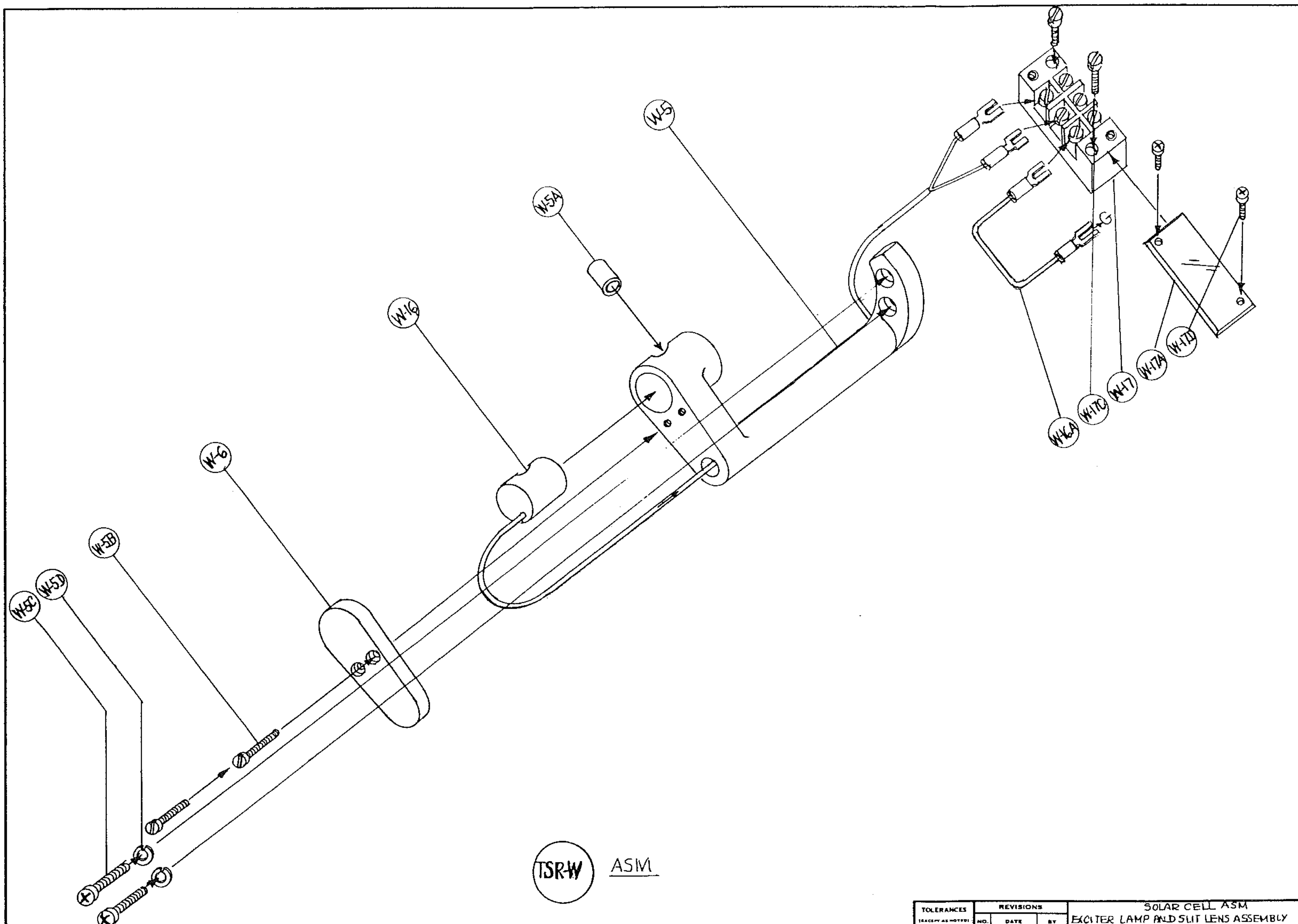
TOLERANCES (EXCEPT AS NOTED)	REVISIONS			ROTARY STABILIZER ASSEMBLY		
	NO.	DATE	BY			
DECIMAL ±	1	7/28/82	W.M.L.	AMERICAN THEATER PRODUCTS INC.		
	2					
FRACTIONAL ±	3			DRAWN BY W.M. Lipsky	SCALE	MATERIAL
ANGULAR	4			CHK'D 7/8/82	DATE 2-17-82	DRAWING NO. TSR-N
	5			TRACED	APP'D	



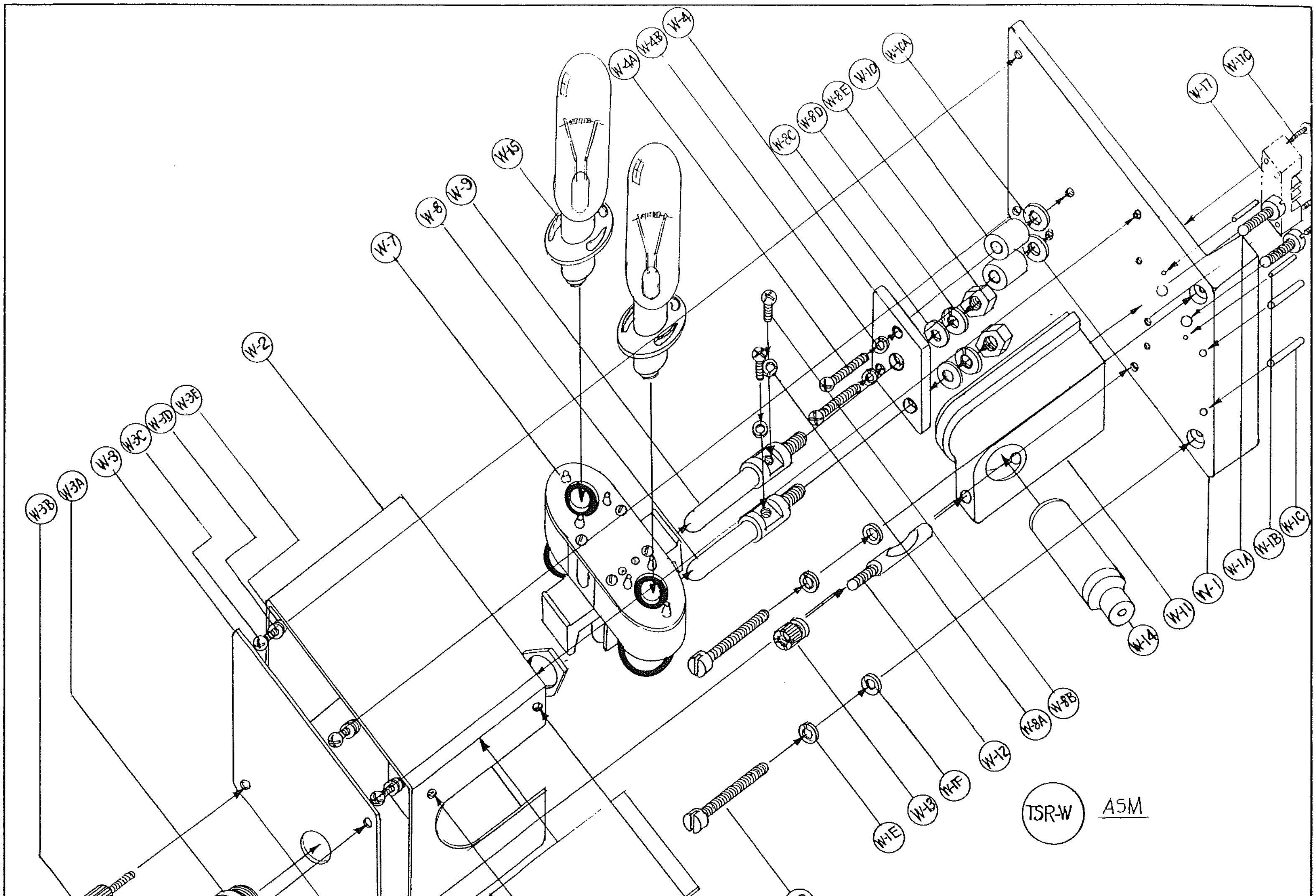
TOLERANCES (EXCEPT AS NOTED)	REVISIONS NO.	DATE	BY			
				MOTOR DRIVE PULLEY ASSEMBLY		
DECIMAL ±	1	7/28/82	AmK	AMERICAN THEATER PRODUCTS INC.		
	2					
FRACTIONAL ±	3			DRAWN BY L.M. Lipsky	SCALE	MATERIAL
	4			CHK'D 7/7/82	DATE 3-4-82	DRAWING NO TSR-R
ANGULAR	5			TRACED	APP'D	



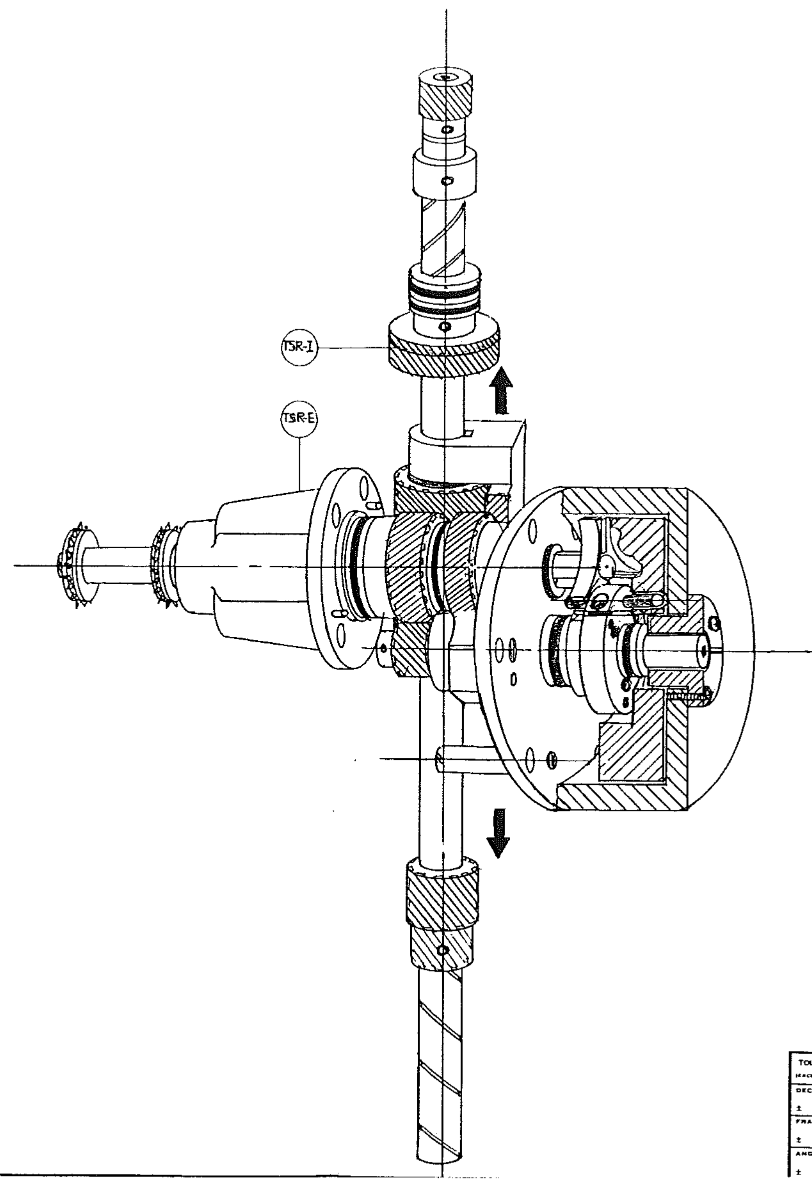
TOLERANCES (EXCEPT AS NOTED)	REVISIONS NO.	DATE	BY	
DECIMAL ±	1	7/28/82	Wmf.	TAKE-UP TENSION ROLLER ASSEMBLY
	2			AMERICAN THEATER PRODUCTS INC.
FRACTIONAL ±	3			DRAWN BY Wm. Lysky · SCALE · MATERIAL
ANGULAR	4			CHK'D 3/11/82 · DATE 2-18-82 · DRAWING NO. T5R-V



TOLERANCES (EXCEPT AS NOTED)	REVISIONS NO.	DATE	BY	SOLAR CELL ASM EXCITER LAMP AND SLIT LENS ASSEMBLY		
DECIMAL ±	1	7/28/82	amf.	AMERICAN THEATER PRODUCTS INC.		
	2					
FRACTIONAL ±	3			DRAWN BY W.m. Lydy	SCALE	MATERIAL
ANGULAR	4			CHK'D	DATE 2-17-82	DRAWING NO. TSR-W/A



TOLERANCES (EXCEPT AS NOTED)	REVISIONS			EXCITER LAMP AND SLIT LENS ASSEMBLY		
	NO.	DATE	BY			
DECIMAL ±	1	7/27/82	Wml.	AMERICAN THEATER PRODUCTS INC.		
	2					
FRACTIONAL ±	3			DRAWN BY W.M. Lypicky	SCALE	MATERIAL
ANGULAR	4			CHK'D	DATE 2-24-82	DRAWING NO. TSR-WB



TSR-E+I ASM

TOLERANCES (EXCEPT AS NOTED)	REVISIONS NO.	DATE	BY	VERTICAL SHAFT+INTERMITTENT MOVEMENT ASSEMBLY		
DECIMAL ±	1			AMERICAN THEATER PRODUCTS INC.		
	2					
FRACTIONAL ±	3			DRAWN BY W.M. Lyshy	SCALE	MATERIAL
ANGULAR	4			CHK'D 3/17/82	DATE 3-10-82	DRAWING NO.
±	5			TRACED	APP'D	TSR-E/I