

INSTALLATION PROCEDURE

**CONCEPT 90
BALL RETURN
NEW OR MODERNIZATION
INSTALLATION**

INSTALLATION PROCEDURE

CONCEPT 90 BALL RETURN

Installation Drawing # 250-001-000

1.0. GENERAL INSTRUCTIONS

- 1.1. Items from the Bill of Material must have been selected by way of a pre-installation survey or as determined by the local salesman. Not all items shown in the Bill of Material are needed for each installation.
- 1.2. If this is a modernization job, the old ball returns must be removed per sections 2.0. through 3.5. If this is a new job, installation of the underlane ball tracks must be done per section 6.0. before lanes surfaces are installed.

WARNING

Be sure the electrical power circuit for all Ball Returns is shut off before attempting equipment removal. This can usually be accomplished by locating the appropriate circuit breakers in the building's main control panel. As a precaution, those breakers' handles should be taped in the "OFF" position and marked to indicate: "DO NOT REMOVE." Serious injury and/or fire may be avoided with this simple safety procedure.

NOTICE

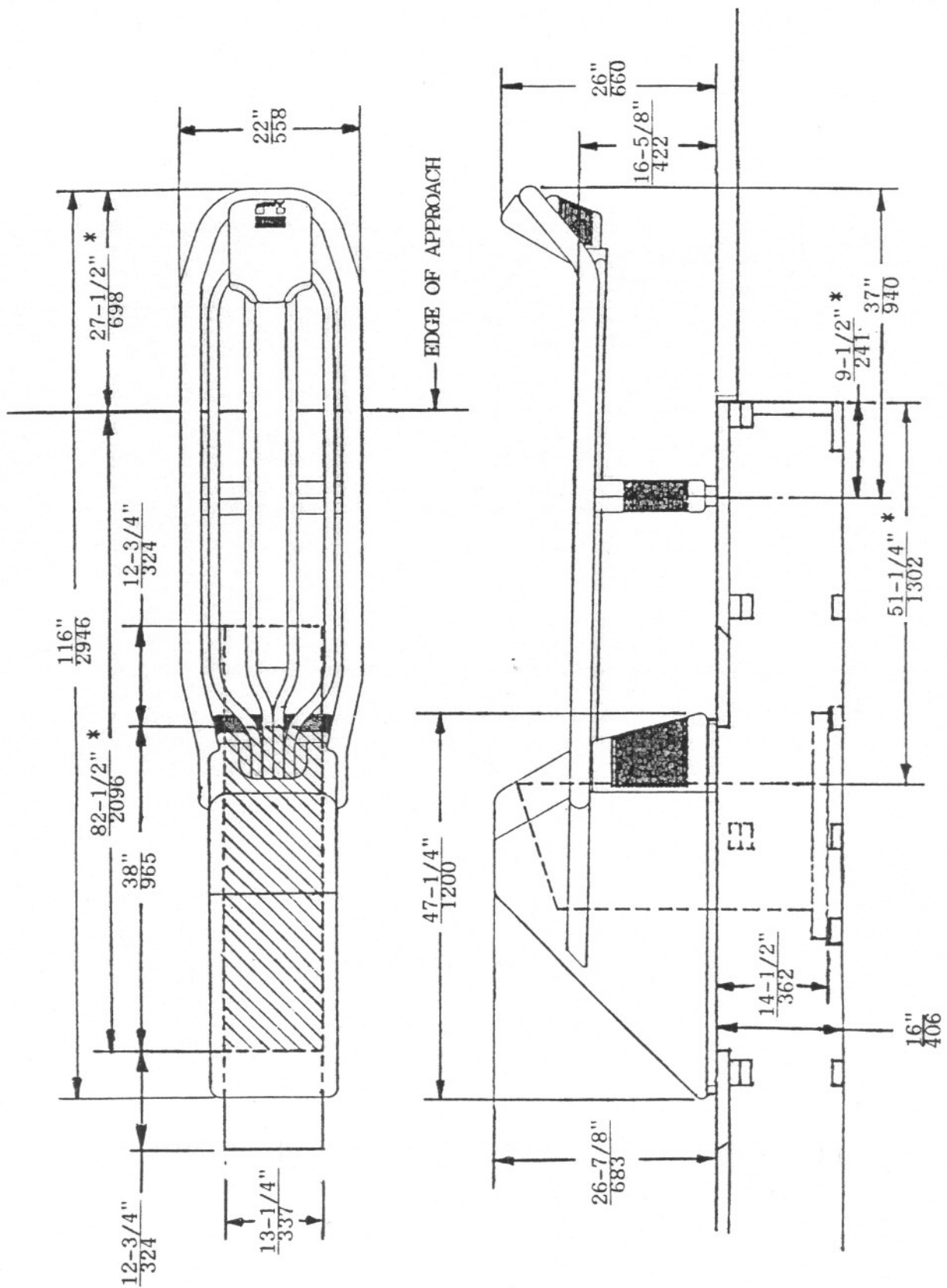
Approaches must be protected from damage with lane paper or other suitable material before removing old equipment or laying new material out on them. New Ball Return cartons may be used for this purpose by flattening & removing staples.

- 1.3. Lay out all new items received. Compare items received with items required per this procedure and items listed on the packing list.

Note: Most items are normally packed to serve a pair of lanes.

Report any damage or discrepancies to AMF at once at 1-800-843-0682 from 8:00 A.M. to 5:00 P.M. Virginia Local Time.

- 1.4. If removing old Ball Returns, measure the distance of your existing units overhang into the bowlers' seating area. If the clearance between the Ball Return, the scoring facility and the walking clearance between the Score benches or seats and the bowlers seated behind them is adequate, you may wish to maintain the present overhang. If those clearances are not adequate, you may wish to consider moving the new ball return toward the Foul Line to provide more clearance. A "normal" overhang is 27-1/2" (698mm) and all Ball Return installation dimensions marked * are based on a 27-1/2" overhang (See Figure I). If for any reason the 27-1/2" overhang is not suitable for your use, you must increase or decrease dimensions marked * in Figures I and II to accommodate the change. This is an important decision that must be made now for modernization or new installations of Ball Returns. (Note that the overhang is limited to 35" (889mm) maximum for the Ball Rack Leg to rest on the approach.)



"CONCEPT 90" BALL RETURN

FIGURE I

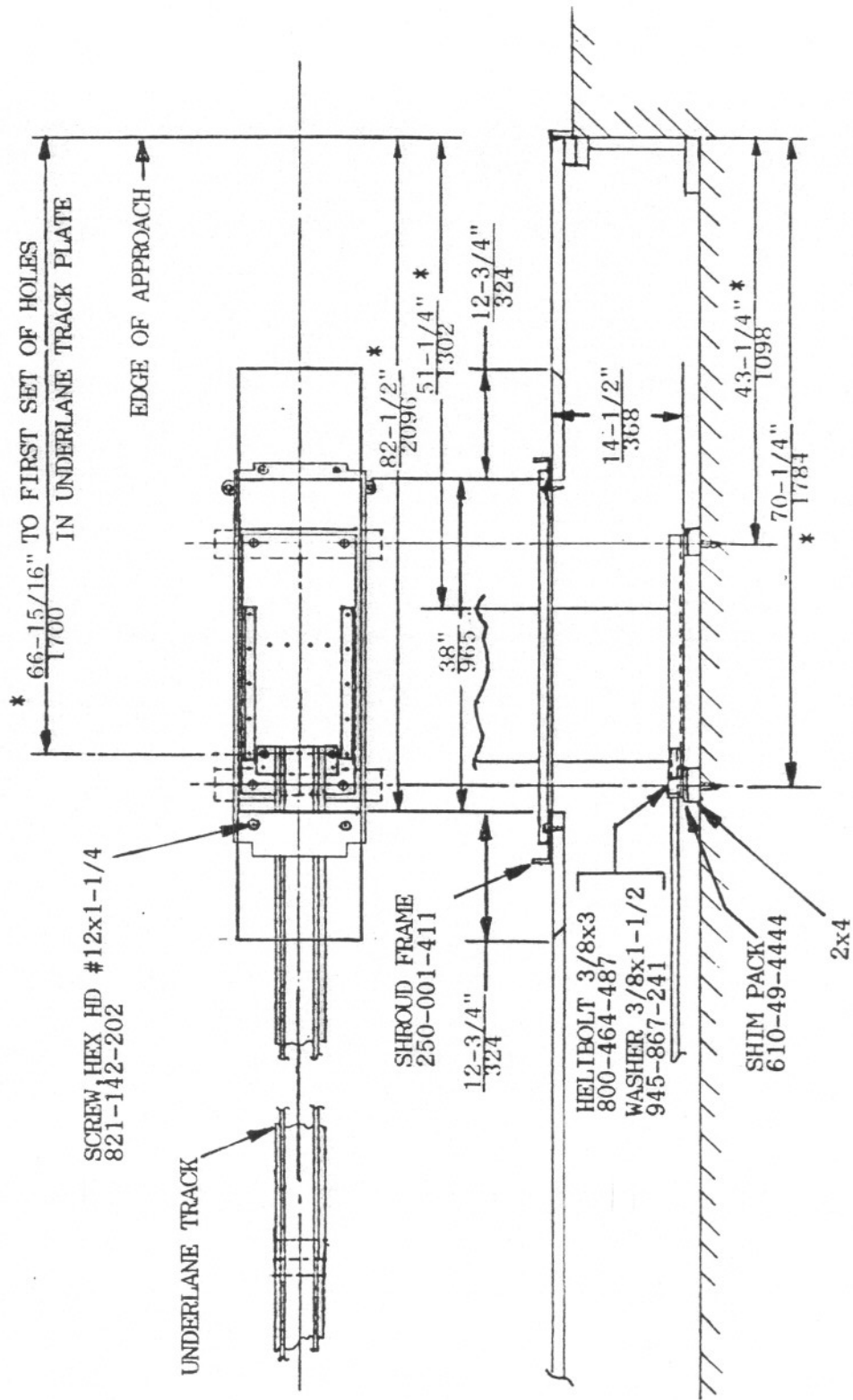


FIGURE II

* ALL DIMENSIONS BASED ON 27-1/2" OVERHANG

- 1.5. Once the decision is finalized, carefully pencil in the new dimensions marked * on Figures I and II.

Note: If this is a new installation, skip sections 2.0. and 3.0. and proceed to section 4.0.

2.0. REMOVAL OF OLD RETURNS

- 2.1. Remove covers from old equipment to expose lag screws attaching returns to approach fill and remove those lag screws.
- 2.2. Find the two (2) conductor wires (usually "Zip" or lamp cord) running to the left-hand and right-hand Tenth Frame (cycle) switches and the Pit Signal (trouble) switch. Carefully mark these wires and then disconnect them from the switches or the terminal board and drop them into the underlane area making sure they are not routed through the Return Frame at any point.

Note: Some installations may not have a Pit signal switch or wire.

- 2.3. Find the two (2) conductor wires ("Zip" cord) that run from the underlane area to the Ball Return Control Box. (Sometimes two "Zip" cords may be used here). These are the control wires that start the Ball Return when either of the adjacent Pinspotters is started. Carefully mark them, then disconnect them from the Ball Return Control Box and drop them into the underlane area making sure they are not routed through the Return Frame at any point.

2.4. Double check to make sure the main electrical power to the Ball Return is disconnected. Find the flex conduit supplying power to the Ball Return Control Box and disconnect it from the Control Box. Tape the three (3) leads temporarily and drop the conduit into the underlane making sure it is not routed through the Return Frame at any point.

2.5. Remove the trapdoor, if one exists, in front of the return and try lifting the Ball Return slightly to determine whether all lag and attaching screws will allow the frame to lift slightly off the approach fill. You will note that the Upsweep is still attached to the Underlane Track in some fashion and must be disconnected before the return can be removed. In many cases the hardware attaching the Upsweep to the Underlane Track is accessible and removable through the trapdoor opening permitting the entire Ball Return to be removed.

2.5.1. In most cases it will be necessary to remove the "Key" to gain access to the Underlane Track and revise its length or remove hardware.

The "Key" is that length of approach fill 9" (229mm) to 12" (305 mm) wide extending from the Ball Return to the Foul Detector units. After removing attaching wood screws, the "Key" can usually be removed as a unit by prying it upward after removing the Foul Detectors. With the "Key" removed, all attaching Ball Return and track hardware can be removed permitting removal of old Returns and revising the underlane track length to fit Concept 90.

2.6. A thorough inspection of the plastic and metal underlane track may now be made to determine whether repairs should be made.

3.0. APPROACH FILL MODERNIZATION

3.1. Using the dimensions finalized in step 1.5. on Figure I, lay out the location of the new hole required for the "Concept 90" Ball Return Mechanism. You probably will find the new hole location to be wider and closer to the foul line than the old hole. It is recommended that a 12-3/4"(324mm) long trapdoor be provided behind the new hole location to permit access to rear Ball Check hardware and Ball Check Motor and Wiring. It also is recommended a 12-3/4" long trapdoor be provided in front of the Ball Return to facilitate removal of ball jams in the underlane.

You also may find a 3"(76mm) to 5"(127mm) wide opening in the fill extending from the old Mechanism hole to the face board at the rear edge of the approach. This opening must be filled.

3.2. If you have Synthetic Lanes and Approach Panels, special material and procedures will be required for a proper installation. Record the dimensions finalized in Step 1.5. on Figure I and record the same information for the existing openings in the approach.

Contact AMF Lowville Pins and Lanes Division at 1-800-333-0527 with this information and they will assist you in making synthetic panel changes.

3.3. It is now possible to determine accurately the amount of Maple fill required to patch your fill area. 70 linear feet (21.34 meter) of Maple fill has been supplied by AMF for each Ball Return.

If additional Maple fill is required, enter an order for part #049-000-704 immediately with:

AMF BOWLING, INC.

1-800-843-0682

Hours: 8:00 A.M. to 5:00 P.M. Virginia Local Time

All old openings in approach must be filled before C-90 units are installed. Otherwise, they will be exposed to view after the C-90 Ball Return is installed.

3.4. You may now cut the new opening and trap-doors in the fill laid out in Step 3.1. **DO NOT REPLACE THE "KEY" OR BEGIN TO PATCH FILL AT THIS TIME.**

3.5. It probably will be necessary to shorten the first section of steel Underlane Track(000--21-185) to match C90 Ball Check. Remove spring clips from plastic track and remove track clips and screws. Slip track out of the Splice Plate at the first joint. See Step 5.0. (See Figure II.)

4.0. BALL CHECK INSTALLATION

4.1. Construct a depth gauge from scrap 2 x 4's and plywood as shown in Figure III.

4.2. Using the depth gauge, place two (2) 2 x 4 x 18" (457mm) long on centers 42-3/4" (1086mm) and 69-3/4" (1772mm) from edge of Approach. (These dimensions based on a standard 28" Overhang.) (See Figure II.)

Using 1/8" (3.2mm) or 1/4" (6.4mm) shims from Shim Pack (610-49-4444), build up four (4) pads on the 2 x 4's per the depth gauge to provide a level base for the Ball Check.

4.3.

WARNING

This Ball Return has been factory connected for operation on 230 Volts. If operation on 115 Volts is required, follow instructions on the inside the Motor Terminal Board Cover to change motor connections for 115 Volts operation.

4.3.1. Lower the Ball Check Mechanism into the opening. Center the ball check crosswise in the opening. Position the check so the back edge of the sideplates are 50-3/4" (1289mm) from the edge of the approach (Based on a 28" Overhang). Make sure the 2 x 4's and shims are well centered under the 1" (25.4mm) holes in the Base Plate.

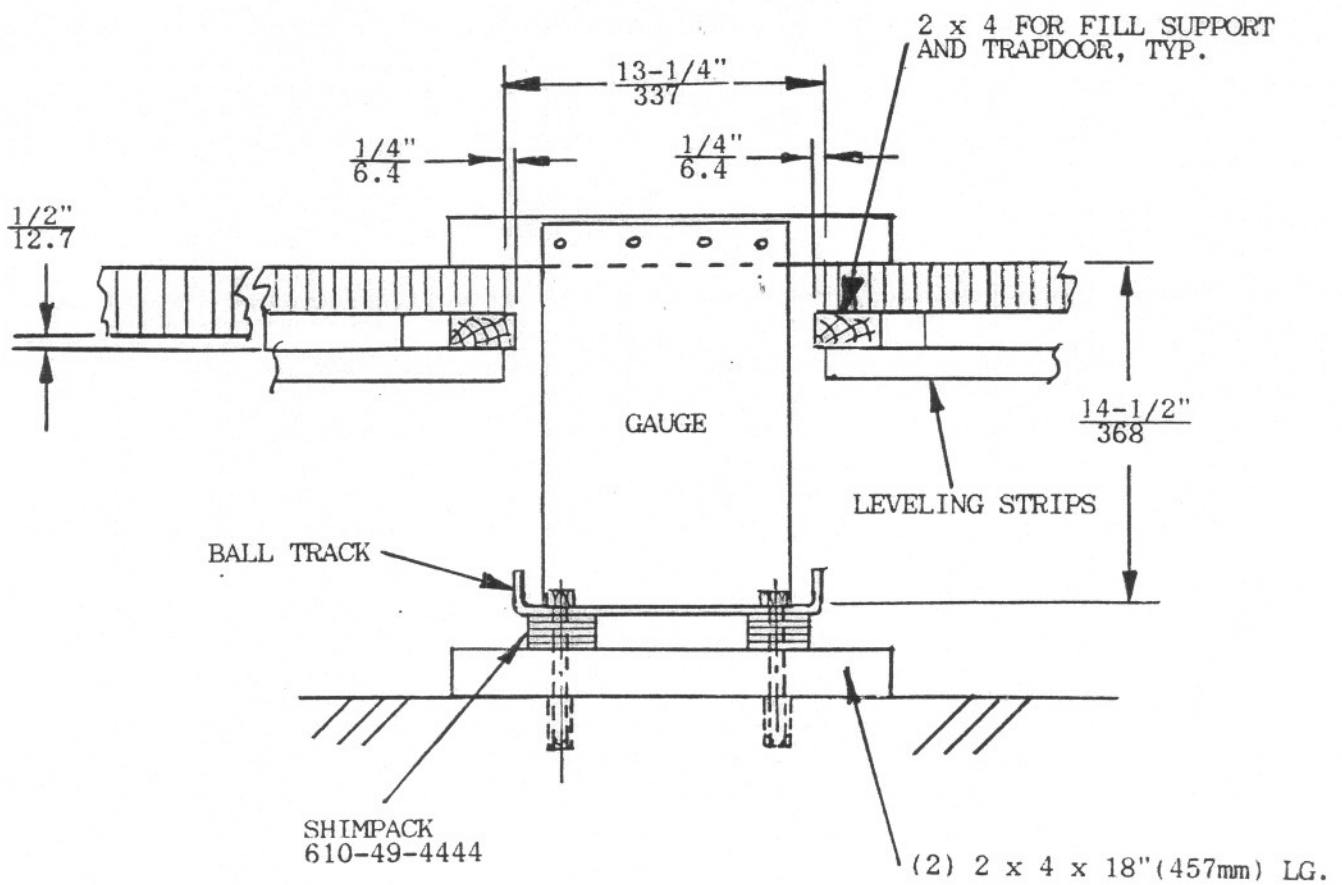


FIGURE III

4.4. Using a 3/8" (9.5mm) Masonary Bit and an Impact Hammer, drill four (4) holes through shims, etc. into concrete using 1" holes in Baseplate as a guide. Drill holes 1-1/2" (38mm) deep in concrete. Insert 3/8" X 3" (76mm) Lg. Hellilag (800-464-487) with 3/8" x 1-1/2" Plain Washer (000-021-787) and tighten securely.

5.0. UNDERLANE TRACK INSTALLATION

5.1. Temporarily install the metal track section removed in Step 3.5 over the four (4) studs in the Base Plate matching the four holes in the track plate. Now mark the track for cutoff at the nearest joint. A power reciprocating saw will facilitate this cut. (See Figure II.)

5.2. While track is still accessible, inspect the entire plastic track for cracks, breaks, missing clips, etc. Repair parts may be ordered as required from the following List:

#167-003-122	Plastic Track - 67 ft.(20.4 meter)
#167-002-014	Spring Clip
#167-001-114	Track Splice Dowel
#000-021-186	Track Clamp
#821-142-202	Screw, Hex Head #12 X 1-1/4" Type "A"
#000-021-179	Steel Track - 8 ft.(2.4 meter)
#000-021-185	Steel Track Plate Weld. - 8 ft.(2.4 meter)

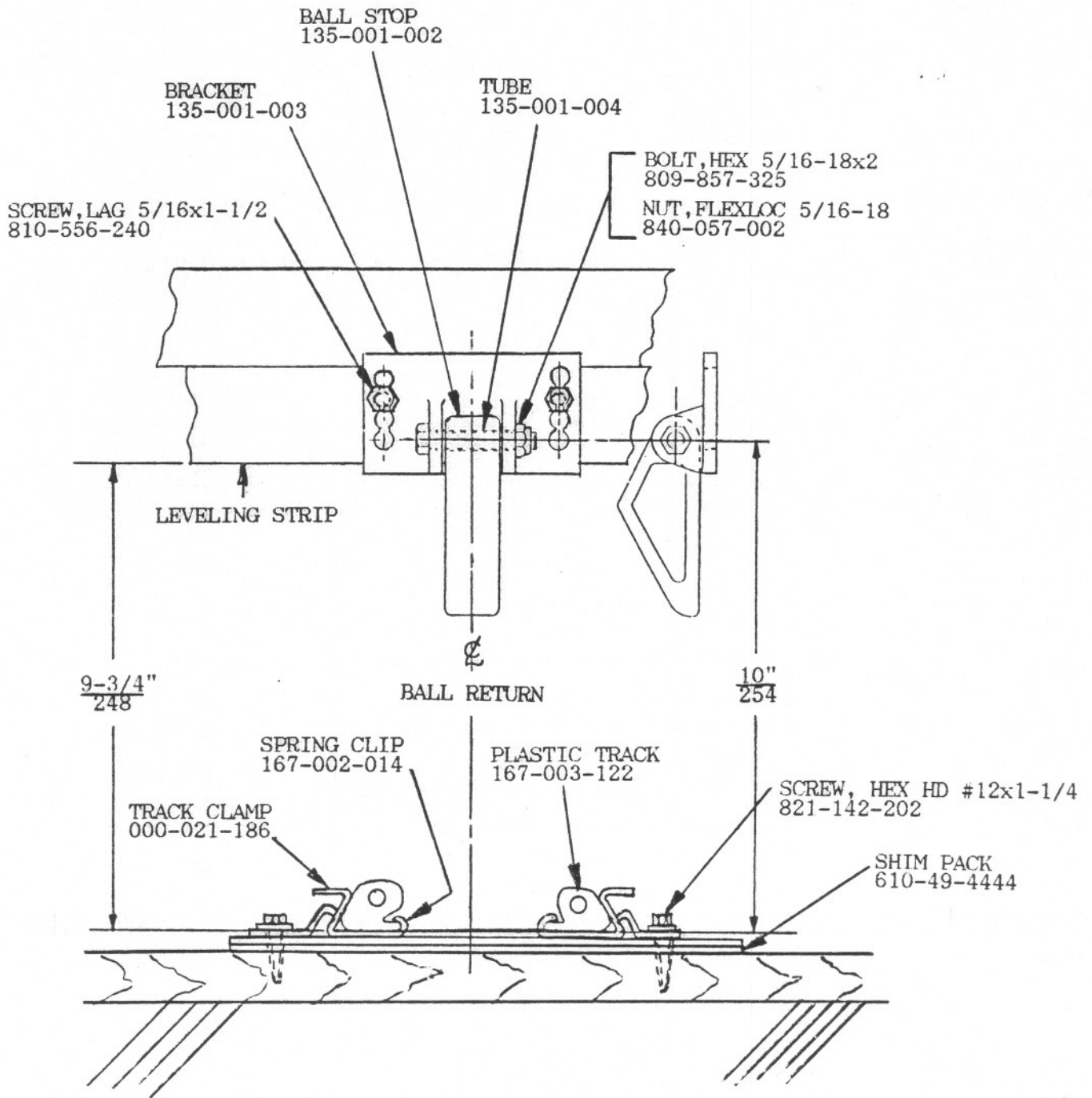
5.3. Reinstall metal track, plastic track, and track clamps on metal track after positioning the Splice Bracket (000-021-165) at each joint of metal tracks. Cut off excess plastic track. Secure metal track to base plate with four (4) 5/16"-18 Locknuts (844-057-002) and four (4) 5/16" Plain Washer(948-761-112). Use splice dowels between each piece of plastic track and use them to fill the last section of plastic track.

Insert Wedge(167-0020016) beside end of plastic track at the track plate weldment on the downsweep end. Secure with adhesive. (See Figure VI). Use Flat Washer(000-026-865) under the #12 x 1-1/4" Hex Hd. Type "A" Screws(821-142-202) at this same location. (See Figure VI). Use 1/8" or 1/4" shims from Shim Kit (610-49-4444) between 2 X 4 sleepers and metal track to obtain a smooth transition of track into the ball check.

Reinstall Track Clamps (000-021-186) with #12 x 1-1/4" Hex Hd. Type "A" Screws.

5.4. 135 Ball Stop (See Figure IV)

The Ball Stop described in Figure IV is positioned on the Bowlers' side of a leveling strip to prevent a ball from rolling back toward the Pinspotter in the event of a ball jam. If your underlane is not equipped with one, install it now as one is supplied per Ball Return. Mount it on the nearest available leveling strip in front of the front trapdoor.

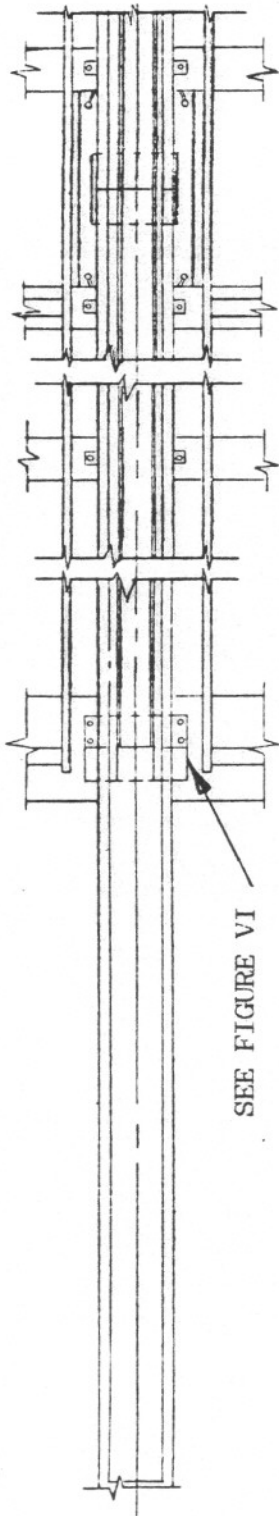


135 BALL STOP

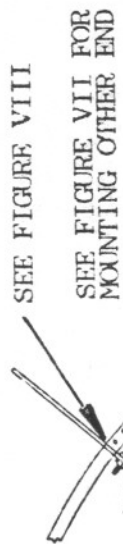
FIGURE IV

6.0. UNDERLANE BALL TRACK INSTALLATION

- 6.1. See Figures V, VI, and VII for installation of ring, support, dust trap, and dust cloth.
- 6.2. Remove shipping hardware from downsweep. Install 2" x 10" as base and secure downsweep to base using eight (8) #12 x 2-1/4" Flat Head Wood Screws(821-142-262). Shim downsweep 1/32"(0.8mm) higher than plastic track. Fasten downsweep securely to eliminate any possible motion or bounce. Add additional bracing against back side of downsweep at double division capping for more support.
- 6.3. Center 2 x 4 stops between sleepers. Anchor track securely to each sleeper and stop using Track Clamps and #12 x 1-1/4" Hex Head Type "A" Screw. It is extremely important that entire track is level and free from jogs or uneven joints. Shim as required. Remove portion of track at a joint to adjust for total track length installation.
- 6.4. Add additional supports (toe-nailed) to existing studs when a track joint falls between studs. Check curvature of downsweep with tool 82-30 ST 3580 if available.
- 6.5. Install ball stop assembly. Anchor bracket to first leveling strip forward of the trap door location; use two (2) 5/16" x 1-1/2" Lag Screws(810-556-240). (See Figure IV.)

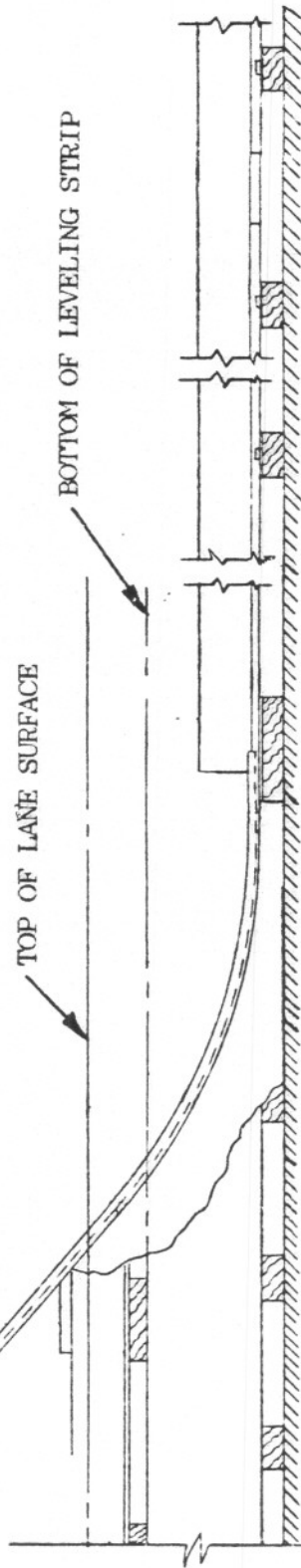


SEE FIGURE VI



SEE FIGURE VIII

SEE FIGURE VII FOR MOUNTING OTHER END

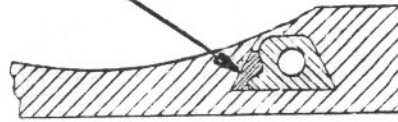


TOP OF LANE SURFACE

BOTTOM OF LEVELING STRIP

FIGURE V

WEDGE (SECURE WITH ADHESIVE)
167-002-016



SECTION A-A

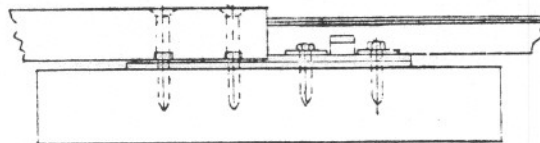
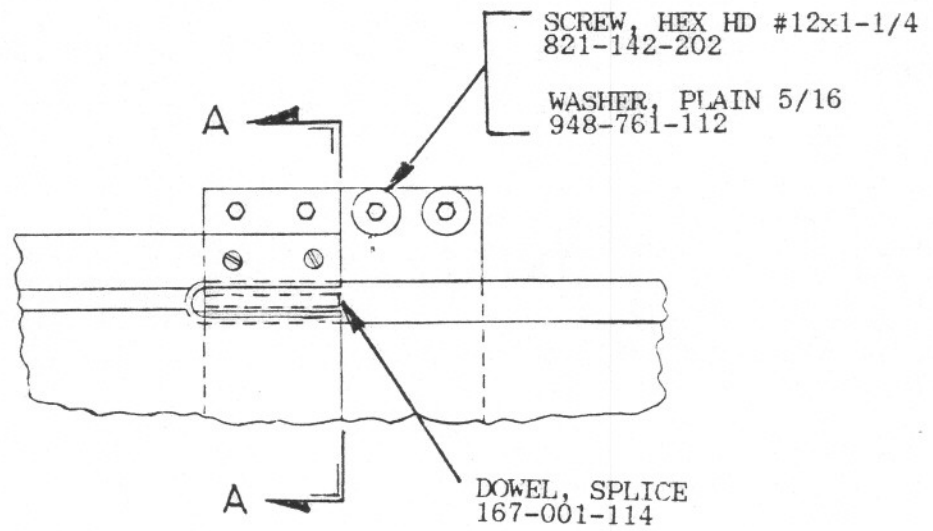


FIGURE VI

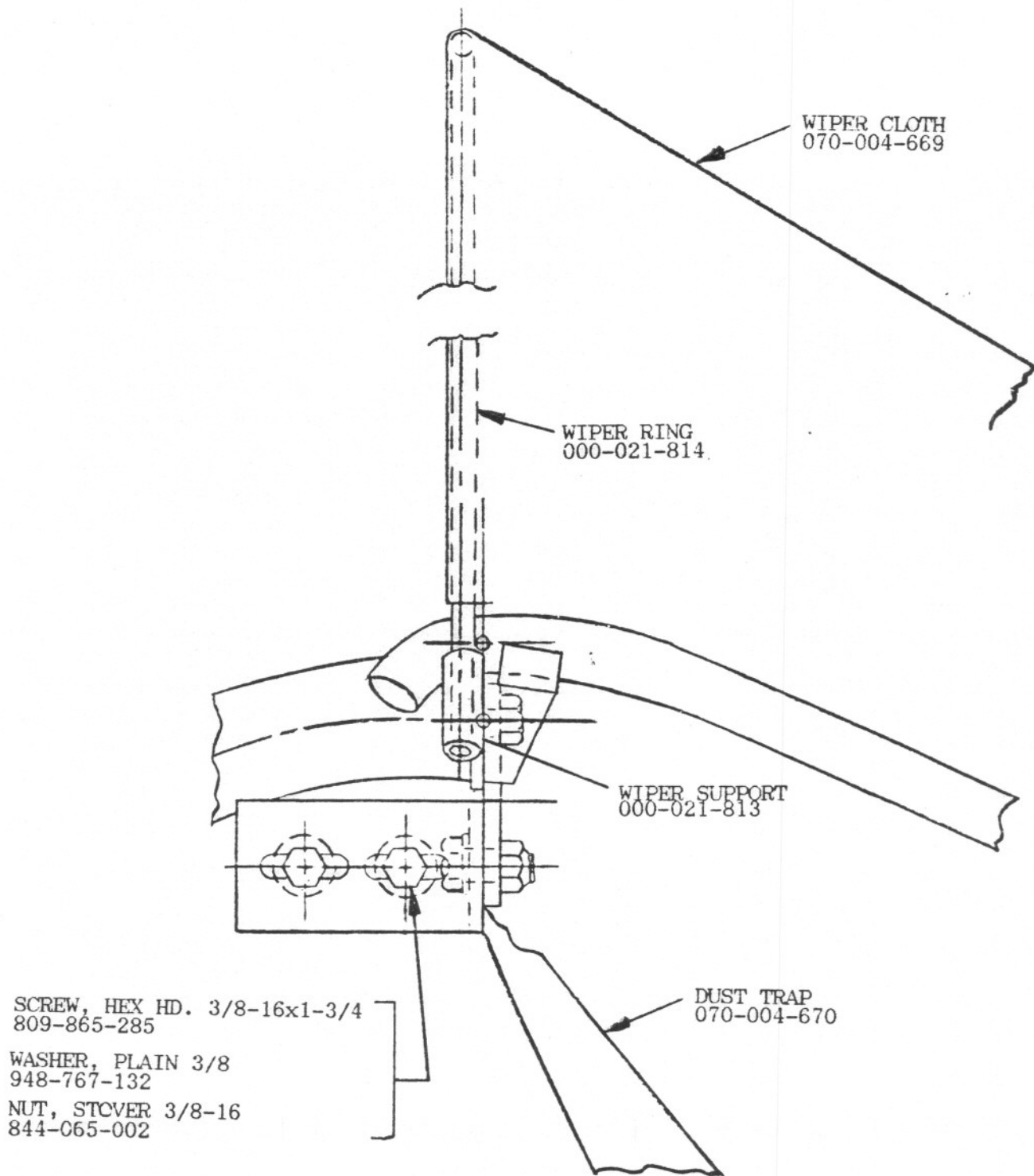


FIGURE VII

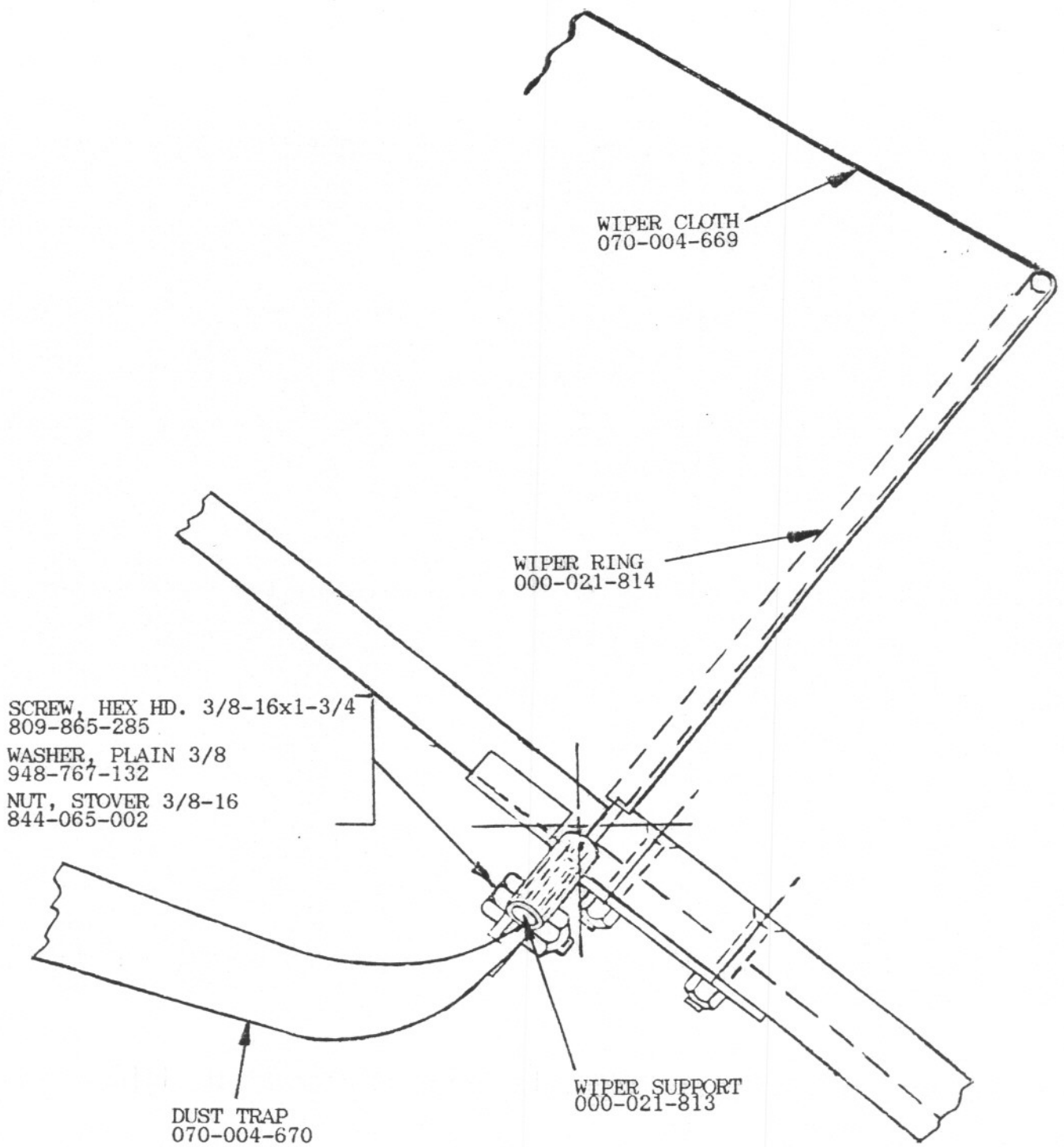
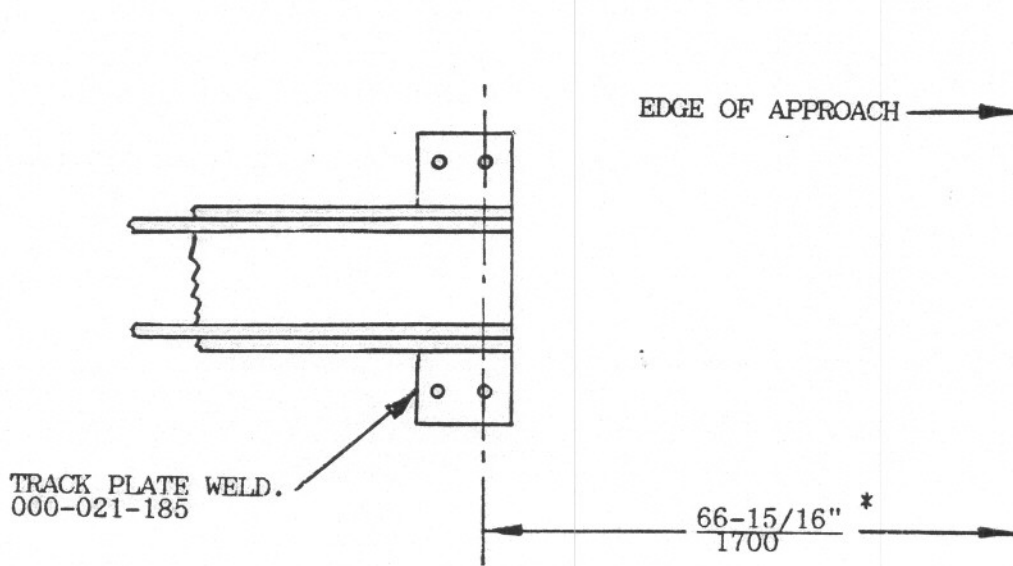


FIGURE VIII

5.6.

For "normal" installation of a Concept 90 Ball Return with a settee area overhang of 27-1/2", the last section of underlane track may be installed 66-15/16" (1700 mm) to the first set of holes in underlane track plate weldment. See illustration below.



* BASED ON 27-1/2" OVERHANG

7.0. POWER SUPPLY CONDUIT

- 7.1. Retrieve the 1/2" flexible Power Supply conduit from the underlane from Step 2.4. Bring the end of the conduit to the Control Box on the ball Check to see if it has sufficient length to reach the Control Box and make the connections on Terminal Block TB2 to terminals 1, 2, and Ground. If not, the flex conduit and wire must be replaced with like material of sufficient length starting at the 4" x 4" Box usually located near the edge of the approach. This material is not supplied by AMF. (See Figure IX.)

- 7.2. Retrieve the four (4) or five (5) "zip" cords dropped in the underlane in Step 2.2. and 2.3.
 - 7.2.1. Select the three (3) "zip" cords for tenth frame (cycle) switches and the pit signal (trouble) switch. Lay them under the rear trapdoor for easy access later.

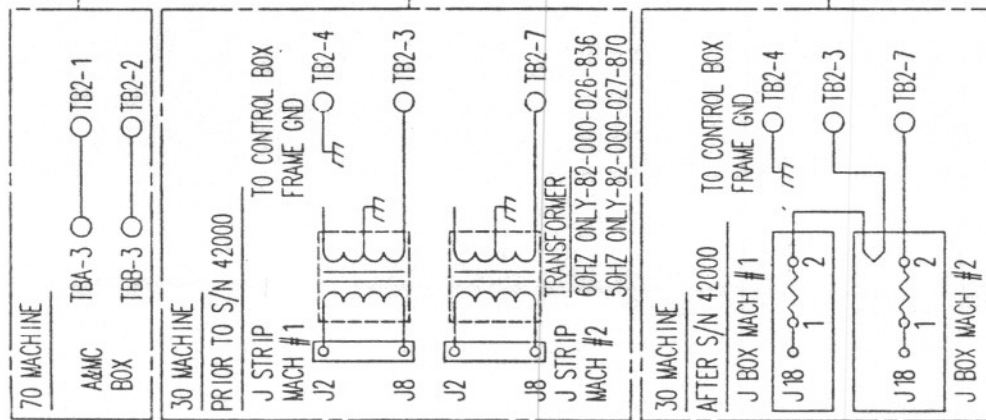
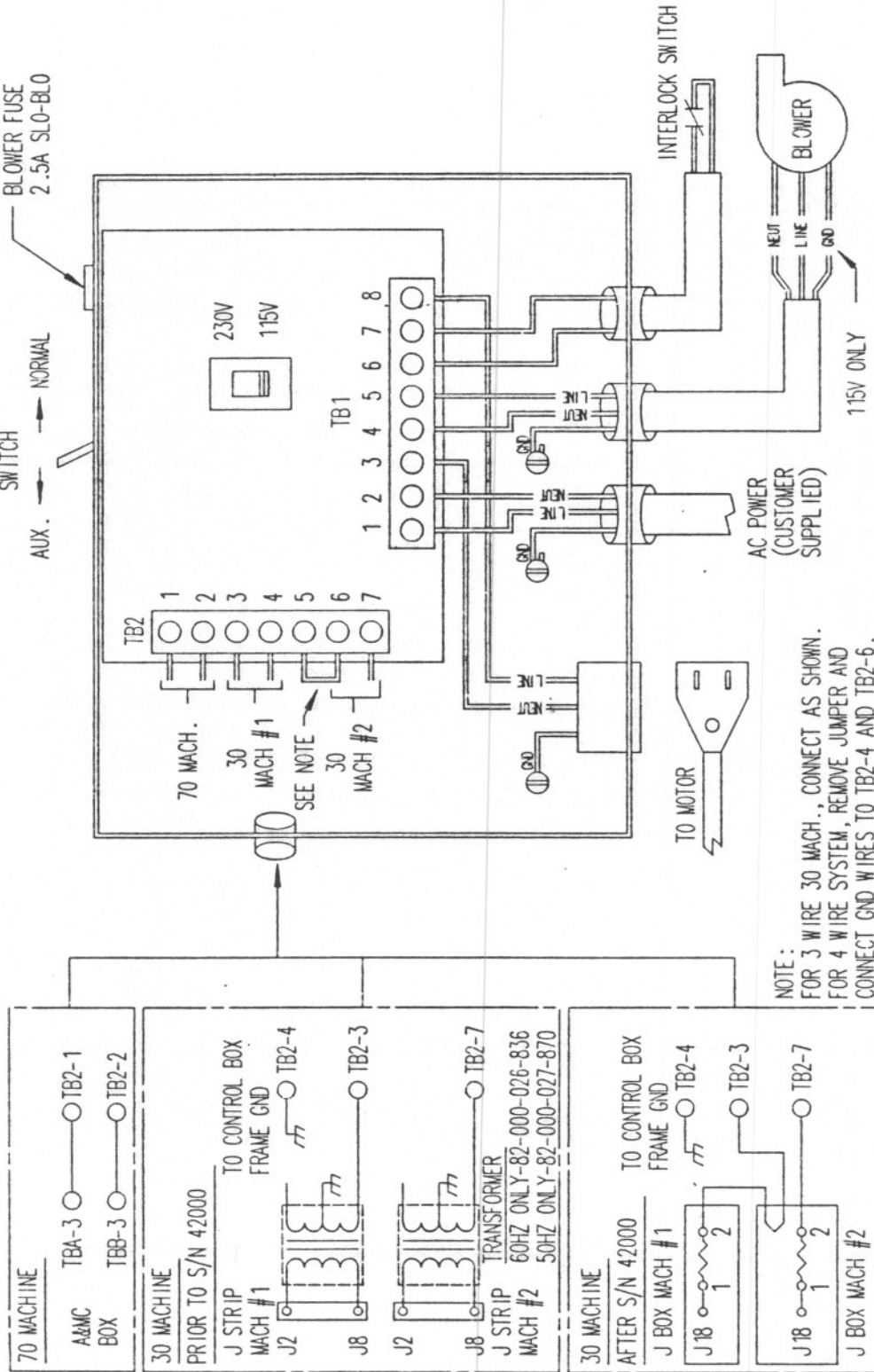


FIGURE IX

7.2.2. Select the one (1) or two (2) "zip" cords for the Ball Return control. Trim off terminals, etc. and strip insulation back 1/4" on the conductors. In the control chassis you will find terminal block TB2 with numbered terminals one (1) through seven (7). Feed the cord(s) through the left-hand knock out and connect machine wires to terminals according to your Pinspotter type. Refer to schematic on inside of Control Box lid. (See Figure IX:)

If two (2) "zip" cords (four conductors) are used, the extra zip cord (both leads) or one lead from each cord is used as a ground. Check with ohmmeter to identify ground wires and/or check the source of the wires: (See Figure IX.)

A & MC Box on 82-70 Pinspotter

"A" or "J" Box on 82-30 Pinspotter

Box on Brunswick Pinspotter

8.0. PATCHING APPROACH FILL

- 8.1. Saw the "Key" to a new length if necessary to match the front of the new opening. It may be necessary to add 2 x 4 bracing under fill & "Key" under front edge of the new opening.
- 8.1.1. Using the approach fill provided, patch in the old mechanism opening and the slot running to the edge of the approach. Refer to Figure I. Plan the patching to accommodate two (2) trapdoors 12-3/4" long and 13-1/4" wide at the rear and front of the new 38" opening. You may find it necessary to clear out 2 X 4 shoring and leveling strips if they are located in the trapdoor area. Leave 1/4" of 2 X 4 shoring protruding into the trapdoor area if possible on both sides of the opening. This will hold up the trapdoor. If this is not possible the 45° saw cut across the the trapdoor will be required to hold up the trapdoor.

If the "Key" was secured with flat head wood screws and cover dowels, do not use old screws and dowels again. Use new screws secured locally.

Maple Dowels - 11/16" diameter cross grain, #909-172-266 may be ordered from AMF Bowling, Inc.

Note that 1/32" clearance should be provided around trapdoors and a 1/2" diameter finger hole drilled to facilitate easy removal.

8.1.2. Using a belt sander, finish the fill surface level with the approaches. 80 or 100 grit sandpaper or screen will provide a suitable final surface finish. Apply at least three (3) coats, with a 1" brush, of the same approach finish currently used. The last coat, after allowed to dry thoroughly, may be lightly rubbed with fine steel wool to blend it into the old finish.

9.0. INSTALL BALL RACK AND SHROUD FRAME

9.1. Install Shroud Frame (250-001-141) per Figure II. Locate front cross member of Frame even with front edge of opening and even with sides of opening. Secure four places with #12 x 1-1/4" Type "A" Screws after back drilling four (4) places at 3/16" (4.8mm) dia. x 1-1/4" deep.

9.2. Locate Trapdoor Plate (250-001-452) on front edge of rear trapdoor and center it. Secure it to trapdoor two (2) places with #12 x 1-1/4" Type "A" Screws after back drilling two (2) places at 3/16" dia. x 1-1/4" deep. If properly installed the rear trapdoor will be supported at the front by the ends of the trapdoor plate that slides between the "J" strips of the shroud frame and the fill surface.

9.3. To attach the Ball Rack section to the Mechanism, note the attaching hardware shipped temporarily assembled to the Ball Rack. Remove the 1/2"-13 x 1-3/4" Bolt (809-873-280), 1/2"-13 Locknut (844-073-002) and 1-1/2" O.D. x 17/32" Heavy Washer (000-021-287). Leave the 1/2" Flanged Bushing (250-001-046) installed with flange on top of the rubber. Assemble the Ball Rack to the Mechanism with the flanged bushing against the bottom of the Mechanism Tongue Bracket.

Insert 1/2"-13 x 13" Bolt (809-873-280) through the Tongue Bracket and install 1-1/2" x 17/32" Heavy Washer and 1/2"-13 Locknut.

9.3.1. Locate Ball Rack Leg on centerline of fill. Remove six (6) 1/4"-20 Button Head Screws securing Leg Covers to Leg and remove Covers. Back drill two (2) holes 1/4" diameter x 1-1/2" deep in approach fill from Leg base holes. Install two (2) 5/16" diameter x 1-1/2" Hex Head Lag Screws (810-556-240). Using soap on Lag Screw threads will facilitate driving them into the hard maple. Replace Leg Covers and screws.

9.4. Retrieve the three (3) "zip" cords for the Tenth Frame (cycle) switches and the Pit Signal switch. Trim the six (6) conductors of terminals, etc. and strip insulation back 1/4". Near the control chassis on the Ball Rack you will note terminal block TBTF with terminals numbered one (1) through six (6). (See Figure X.)

Connect two (2) leads from EVEN machine to terminals one (1) and two (2).

Connect two (2) leads from Pit Signal to terminals three (3) and four (4).

Connect two (2) leads from ODD machine to terminals five (5) and six (6).

9.5. Retrieve three (3) wire cord from Ball Rack Tube running to Blower. Feed it through the center knockout in Control Chassis and connect leads to TB2 terminals 4,5, and Ground. (See Figure IX.)

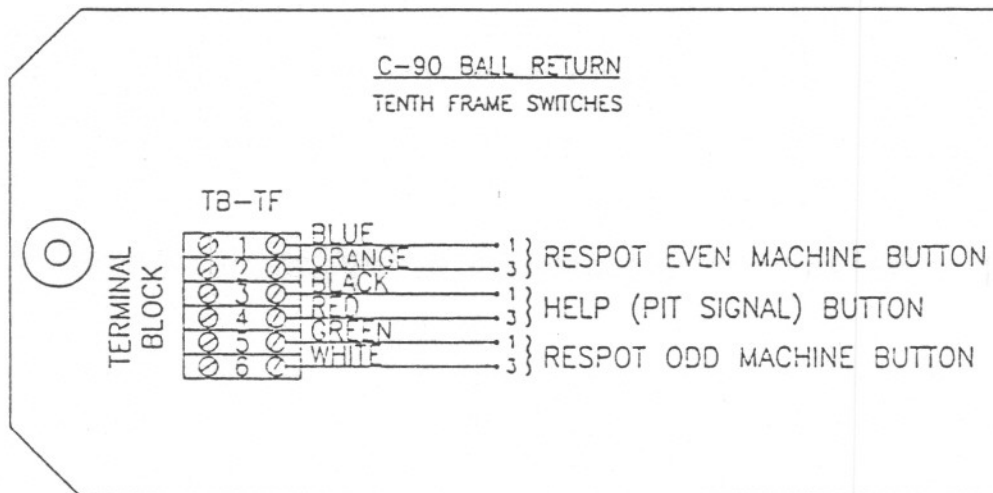
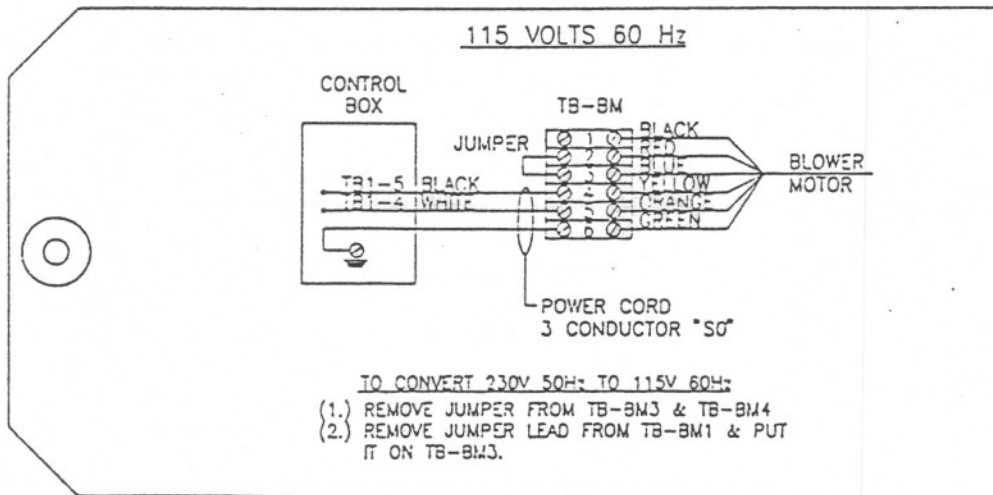
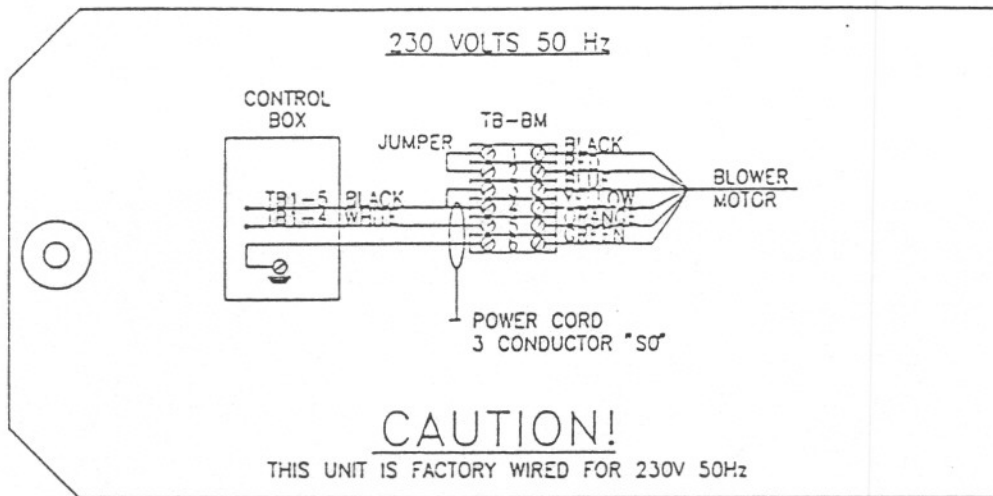


FIGURE X

9.6.

WARNING

This Ball Return has been factory connected for operation on 230 Volts. If operation on 115 Volts is required, the following changes must ALL be done:

- 9.6.1. In the Control Box on the PC Board you will note a Slide Switch. Slide the Switch button to the 115 Volt position.

- 9.6.2. Remove two (2) 1/4" Button Head Socket Screws holding Blower Housing in place on Ball Rack. This will expose Blower and Motor Terminal Block TB-BM. (See Figure X.)

Reconnect two (2) jumper wires as indicated at TB-BM for 115 Volts. Replace Blower Housing.

- 9.6.3. The Ball Check Mechanism Motor must be rewired at the Motor Terminal Block for 115 Volt operation. This should have already been done in Step 4.3. above. (See Step 4.3.)

10.0. FINAL TEST

10.1. This completes the normal installation. Turn main power on at establishment Main Breaker Panel.

10.1.1. Activate each Pincspotter of a pair to assure that the Ball Return starts with the switch on top of the Control Box in the "Normal" position.

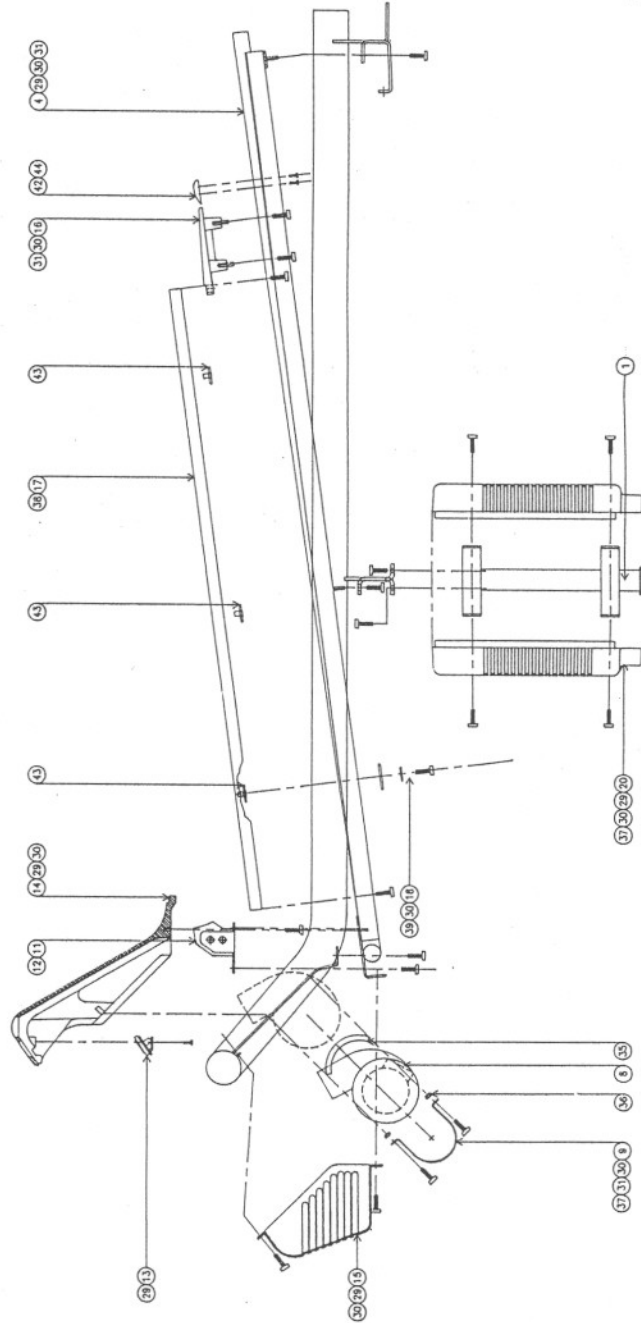
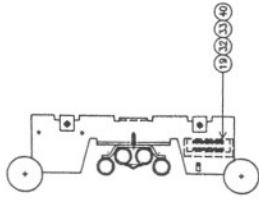
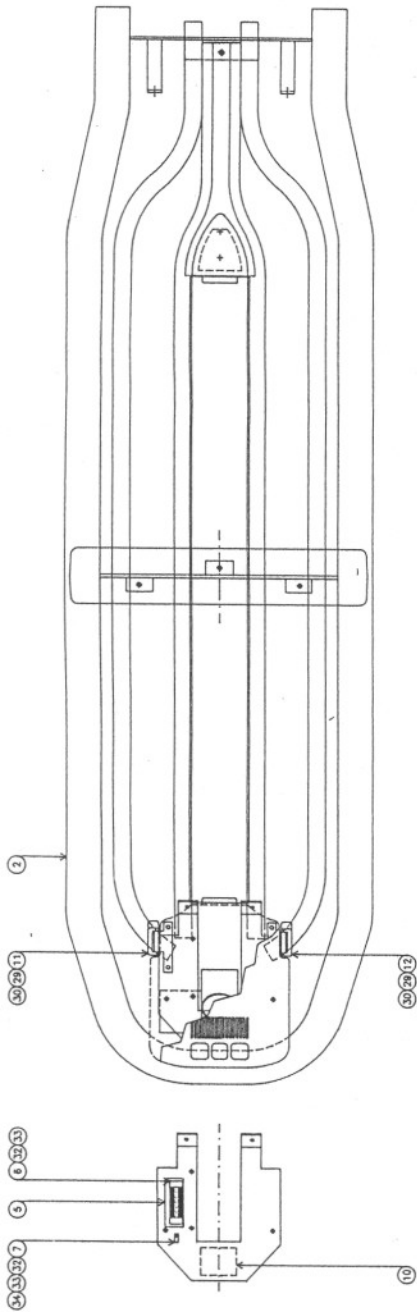
10.1.2. The Ball Return should continue to run 15 to 20 seconds after the Pincspotters are turned off (to allow time for balls in the Ball Exit and underlane to be processed through the Ball Check).

10.1.3. Check operation of Safety Switch as follows:

Note that the Safety Switch guard at the "V" Wheel rotates slightly in the "V" Wheel shaft. In its Forward position, a detent on the guard depresses the Safety Switch plunger that completes the electrical circuit to the Mechanism motor. In the event any foreign object is introduced between the guard and the "V" Wheel, the guard will rotate slightly and its detent will release the Limit Switch plunger shutting off the Mechanism motor. After the Main power is turned on, the guard should be actuated manually to assure proper operation.

10.1.4. With both Pinspotters in a pair "OFF", actuate the switch (located on top of the Control Box) by moving it to the "AUX" position. The Ball Return motor only should start and run as long as the switch is in the "AUX" position. Move the switch to "NORMAL" position and the Motor should stop without delay. This circuit bypass switch is used only in the event of control circuit or component failure as a temporary measure until repairs are made.

10.1.5. Process a few balls through the system to make sure proper functioning has been reached.



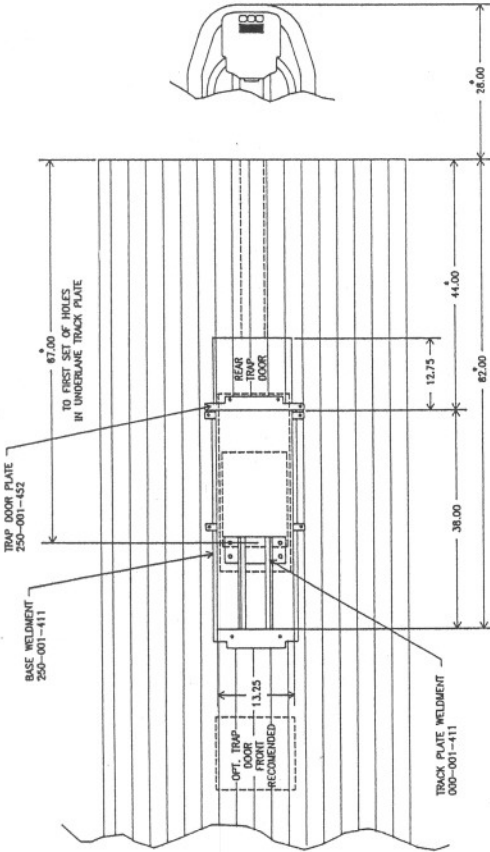
2	44	818-233-007	#8-32 X 3/8" Socket Screw
3	43	250-001-489	Blind Strap
1	42	250-001-488	Blind
1	41	250-001-487	Blind
1	40	250-001-486	C-Notch Ball Tray Fastening Bar
1	39	250-001-485	Blind
3	38	808-548-200	1/4" - 20 X 1-1/4" Cap Screw
6	36	250-001-483	Card Clips
4	37	808-548-220	1/4" - 20 X 3/4" Cap Screw
2	36	711-507-001	Ground
3	35	808-548-211	Self-Adhesive Spacers
3	34	808-548-210	Self-Adhesive Spacers
6	33	818-233-002	#8-32 X 3/8" Socket Screw
6	32	818-233-001	#8-32 X 3/8" Socket Screw
17	31	814-049-002	1/4" Steer Locknut
31	30	948-537-001	1/4" Flat Washer
18	29	808-548-100	3/8" - 16 X 5/8" Cap Screw
18	28	808-548-100	3/8" - 16 X 5/8" Cap Screw
4	27	814-052-002	5/16" - 18 UNC Steer Locknut
10	26	948-781-112	5/16" Plain Washer
5	25	808-453-185	5/16" - 18 X 1" Hex Head Screw
2	24	808-072-889	3/8" Plain Washer
2	23	810-558-240	3/8" X 1-1/2" Lug Screw
1	22	250-001-479	Top End Pin
1	21	250-001-478	Top End Pin
2	20	250-001-475	Leg Cover
2	19	744-107-015	Clamp-Drybar
3	18	250-001-477	Blind Strap
3	17	250-001-476	Blind Strap
3	16	250-001-475	Blind Strap
1	15	250-001-482	Lower Blower Housing
1	14	250-001-481	Upper Blower Housing
1	13	250-001-205	Switch Assembly
1	12	250-001-455	Lift Bumper
4	11	250-001-460	Rt Bumper
4	10	250-001-459	Lt Bumper
1	9	250-001-458	Blower Mounting Bracket
1	8	250-001-457	Blower Mounting Bracket
1	7	744-203-014	Clamp-Bumpy
1	6	744-107-015	Terminal Block
2	5	780-906-002	Terminal Strip Washer
2	4	250-001-456	Blower Mounting Bracket
1	3	250-001-455	Blower Mounting Bracket
1	2	250-001-407	Nylon Powder Coated Outer Tube
1	1	250-001-410	Front Leg Weldment

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NOTE:
 1. IF FOR ANY REASON THE 26" OVERHANG IS NOT SUITABLE FOR YOUR USE, YOU MUST INCREASE OR DECREASE "X" DIMENSIONS TO ACCOMMODATE THE CHANGES.
 2. DIMENSIONS SHOWN IN TRACK OVERHANG OF 26" IN SEATING AREA FROM END OF APPROACH.

