TURN BULL

MODEL - E VALUE

Earle

INSTALLATION AND ADJUSTING INSTRUCTIONS FOR HYDRAULIC ELEVATORS WITH MODEL E VALVE ASSEMBLY

INSTALLATION & ADJUSTMENT OF HYDRAULIC PUMPING UNIT - MODEL E VALVE

SETTING THE HYDRAULIC PUMPING UNIT: Refer to elevator layout and locate the unit, with outlet as shown, on floor that is even and level. It is important that at least the four corners of the base frame rest solidly on the floor. Care must be exercised when piping the unit to make sure that the motor supports rest solidly on the four rubber isolation pads.

SUCTION STRAINER: The suction line strainer incorporates a cut-off valve. Lifting the handle and rotating 90 degrees allows the valve to drop into the cut-off position. The handle must be in the UP position and latched, during operation of the pump. Strainer is secured with a safety wire to tank baffle.

CONTROL CIRCUIT STRAINER: The strainer provides protection for the control lines and the pilot relief valve. The strainer should be cleaned approximately every three months. To remove the strainer, remove the 1/2" pipe plug (7) in the up start control manifold that holds the strainer in place.

PRESSURE RELIEF PILOT VALVE (6) pressures above the relief pilot valve setting allows the Cushomatic to by-pass the pump discharge. Valve is factory set and sealed.

HYDRAULIC OIL THERMOSTAT: A manual reset thermostat is located in a knockout box welded to the up start by-pass line. It stops the motor if the hydraulic oil overheats. If the thermostat opens from an excessive oil temperature, it is reset by removing the box cover and pressing the reset button after the oil has cooled and the trouble has been corrected.

FILLING THE SYSTEM WITH OIL:

1. Remove the 1/4" bleeder screw and leather washer from the strainer dome.
2. Fill with Texaco Rando A (150 SSU @ 100°F.) hydraulic oil or equivalent (see

recommended oils) to oil level indicator attached to strainer dome (Z shaped piece of sheet metal).

3. Close up start "S" adjustment clockwise. Open manual lowering screw (23) (see manual lowering instructions).

4. Jog motor to check rotation of the pump with white arrow on sheave end of pump housing. If incorrect, switch T1 and T2 leads on motor starter.

5. Jog motor 5 or 10 seconds at a time until pump runs quietly, maintaining the oil level above the strainer dome.

6. Close the manual lowering screw (23). Replace and tighten the 1/4" bleeder screw and leather washer in the strainer dome.

7. Remove the air bleed plug from the plunger head casting assembly (see Sheet 13801563). Run the pump 5 to 10 seconds at a time until a solid stream of oil escapes from the air bleeder hole, maintaining oil in the reservoir above the strainer dome.

8. Bring the oil level to top of oil level indicator with car at lowest landing.

CAUTION!! DO NOT ADJUST VALVES DURING INSTALLATION SINCE VALVES WILL NOT FUNCTION PROPERLY UNTIL COMPLETE SLING AND CAR IS INSTALLED. THIS UNIT HAS BEEN FACTORY TESTED AND SET UNDER SIMULATED CONDITIONS AND SHOULD REQUIRE ONLY MINOR ADJUSTMENTS. IF ADJUSTMENTS ARE REQUIRED, DETERMINE SPECIFIC CAUSE BEFORE MOVING VALVE ADJUSTMENTS.

MODEL "E" VALVE ASSEMBLY: (Refer to drawing 1, Turnbull Model E Valve). The Model "E" Valve Assembly performs all the functions necessary for the hydraulic operation of the elevator. The assembly is made up of the following components: Upstart - Up leveling (8) with control manifold (1), Manifold housing and main line check (13), Lowering - Down Leveling (15) with control manifold (20).

The Upstart - Upleveling valve (8) when properly adjusted will by-pass sufficient oil to allow the pump to start under no load. As the valve closes the elevator accelerates to full speed, at the rate set by the upstart "S" adjustment (5). When

up-slow-down is initiated the valve opens, at a rate controlled by USD adjustment (4).

(4). The up leveling speed is controlled with up leveling speed adjustment (11). Drawing No. 2 is provided as a parts list.

The manifold housing and main line check (13) provides a mounting to the pump for the valve assembly, passage for the oil and a main line check to retain the elevator at a desired level. Drawing No. 3 is provided as a parts list.

The lowering and down-leveling valve (15) when properly adjusted, provides smooth down acceleration, lowering, deceleration and down leveling. The down speed is set with the lowering speed adjustment (17) to the speed desired, acceleration being controlled by lowering opening adjustment (25). When down slow-down is initiated, the valve closes at a rate controlled by the down leveling slow-down adjustment (DSD (26), to the leveling speed set by the down leveling speed adjustment (18). Drawing No. 4 is provided as a parts list.

Hydraulic elevator adjustments are similar to adjustments on a traction elevator. All valve adjustments (if needed) are to be made before final setting of switches, cams and vanes. As an example, increasing down speed after setting switches and limits would require resetting all down switches. Therefore, it is important to adjust valves first. ALL ADJUSTMENTS MUST BE MADE WITH PUMP STOPPED TO PREVENT DAMAGE TO SEALS.

ANTI-CREEP: On units without leveling only, keep in mind that the anti-creep feature has no function during the normal operation of the elevator and operates only after the elevator stops to maintain the car within 3" of the landing should a leak occur.

Refer to Drawing No. 1 in making the next eight (8) adjustments.

1. STARTING BY-PASS PRESSURE is set with "S" (5) adjustment screw closed, the unloader valve energized, and with no load on the car. The unloader valve solenoid (3) is energized by placing a jumper between terminals 30 and 63, 68 and 2, on the relay panel. Disconnect hoistway wire 32 on the relay panel (not required on constant pressure operation). Run the pump by pressing the UP button in the car,

pressure operation). Run the pump by pressing the UP button in the car, or by manually pushing in the motor starter contactor. Rotate the 5/8" adjusting screw (10) 1/2 turn before each start until the car creeps very slowly. (Clockwise will increase movement and counterclockwise will decrease movement of car). Then rotate screw approximately 1/4 turn counterclockwise to a stalled car position. After completion remove all previously installed jumpers.

UPSTART ACCELERATION is controlled by "S", the upstart adjustment screw (5). Adjustments are made with an empty car and in small increments to obtain a smooth and steepless acceleration (counterclockwise to increase and clockwise to decrease the rate of acceleration). The car must be at rest when making these adjustments. Acceleration to full speed will vary with the contract speed of the elevator; however, the car should be up to full speed within 3-4 feet regardless of contract speed. Be sure the valve closes before slowdown is initiated.

RATE OF SLOW-DOWN from high to leveling speed is controlled by "USD" (4) adjusting screw. (4) must be open more than "S" (5) or the car will not slow down. Set the slowdown on the selector or position a limit switch to actuate approximately 24" above the floor. Operate the car and check the slow down (counterclockwise for increasing, clockwise for decreasing rate of slow down). Final setting of the up slowdown or limit switch will be made later to obtain approximately 4" of leveling (with no load on the car). It should be noted that this 4" of leveling can increase slightly as load increases.

UP LEVELING SPEED (Not used on units without leveling) can be checked by decelerating the car to leveling speed between floors. This may be done in the following sequence:

(1) Place a jumper across terminals 5 and 7 located on the "3T" base, (to prevent "3T" timer from recycling the upstart valve due to long leveling time).

(2) Disconnect "3U" relay coil wire at the desired upleveling starting point. Bring

the car up to full speed and initiate the up leveling by disconnecting "SU" coil wire as previously described. The leveling speed can now be checked easily and adjusted by rotating the up leveling speed adjustment (7/16") slotted screw (11) in the up-start cap, with the motor stopped (clockwise to increase and counter-clockwise to decrease). A speed of approximately 10' per minute is normal. Be sure the jumper is removed and the coil wire reconnected after adjusting.

CONTROLLED UNLOADING: The upstart control by-pass solenoid valve (unloader is automatically energized for a timed interval, (after the motor is de-energized). The unloader controls the coasting effect of the pump and may be used to cushion the stop of the car. Two methods of energizing the unloader are available. (1) Using 68A terminal the unloader will be energized after the doors open. When this method is used, quick timing the elevator (that is not allowing the doors to make their normal cycle) can result in a fast up start. This method gives the softest stop. (2) Using 68B terminal the unloader will be energized immediately after the motor is de-energized. This method gives the most accurate stop.

LOWERING VALVE ADJUSTMENTS: All adjustments are made externally at two points. The rate of oil flow through the valve determines the down lowering speed, and is adjusted by the speed control (17) in the valve cap. Clockwise rotation decreases down speed and counterclockwise increases it. The speed can be determined with a tachometer or by running the car over a measured distance in a given length of time. Floor to floor times does not give the true speed because of the leveling time. Adjust speed control to obtain contract speed with 1/2 contract load, remembering that this speed will be greater with a fully loaded car.

The rate of down acceleration is controlled by the slotted adjustment screw (25) located on the top right of the lowering control manifold (20). Rotate clockwise for slow acceleration, rotate counterclockwise for fast acceleration. Adjustment is best determined by the individual feeling for smoothness on start down after temporarily positioning a down stop or limit switch some 24" ahead of a floor.

DOWN LEVELING: The down leveling speed is set with the speed control screw (18). Clockwise rotation decreases speed, counterclockwise rotation increases speed. The down leveling deceleration is adjusted with DSD adjustment screw (26). Clockwise rotation increases deceleration rate.

DOWN LEVELING ON RELEVELING: Check releveling by initiating a start and throwing the stop switch in the leveling zone. (About 2 to 3 inches above the floor.) Turn the stop switch back on and the elevator should level down to the floor. Should it be too slow or fail to level down, close off the adjustment screw (25) 1/4 turn. Open the down leveling deceleration screw DSD (26) 1/4 turn. Also be sure the down leveling speed is not too slow.

MANUAL LOWERING: The manual lowering screw is the top left hand screw (23) on the lowering control manifold. Open counterclockwise until the flow starts and then close off a few turns to maintain a slower than normal lowering.

CAUTION!! If persons are on the elevator during manual lowering, they must be warned to keep clear of entrances by remaining inside. To lower elevator, pull main line disconnect switch, loosen lock nut and rotate screw counterclockwise. Rotate screw clockwise to close valve when elevator reaches desired level.

LOW TEMPERATURE OPERATION: The hydraulic oil may be subjected to low operating temperatures due to machine room location. The oil temperature must be maintained above 50°F. using recommended oil for the suction line strainer to function properly and prevent cavitation. All valves should be re-adjusted for low temperature operation. Oil below 50°F. should be mildly heated with a heat cable, such as G.E. Cat. No. 4915978G1. Do not dilute the hydraulic oil with mineral spirits, etc.

PUMP NOISE: In cold weather should the pump continue to be noisy after several trips of the elevator read the Low Temperature Operation instructions. Should the

noise start when the oil drops below the top of the strainer dome, check the tightness of the bleeder screw and air leakage around strainer shut-off stem. If noise occurs at the top landing check the oil level to be sure that it is not too near the bottom edge of the strainer dome and, therefore, drawing air into the system as a result of the whirlpooling action of the oil. If the strainer has been removed, check to see that it has been properly replaced. Add more oil with the car at lowest landing.

ADJUSTMENT OF SWITCHES, CAMS AND VANES LOCATED IN THE HATCH: For a two-stop elevator, with car empty, the top limit is set down (12" to 36" depending on speed) so it breaks contact and the elevator decelerates to leveling speed 4" before reaching the top floor. The down direction limit is set in the same manner. For a three or more stop elevator, start adjustments at an intermediate landing and finish at the terminal landings. Actual floor stop is adjusted by correctly positioning the leveling cam or vane on the rail.

RECOMMENDED HYDRAULIC OILS: The following hydraulic oils may be satisfactorily substituted if the recommended Texaco Rando A is not available:

MANUFACTURER	BRAND NAME	AVERAGE VISCOSITY @ 100°F.
Texas Oil Company	Regal Oil "A"	152
Sinclair Refining Co.	Commodore	155
	Duro-Oil 150	155
Gulf Oil Company	Paramount 42	148
	Harmony 44	150
Standard Oil Company	DTE - 797	150
Shell Oil Company	Vitrea 27	160

Consult factory if fire-resistant oils are to be used.

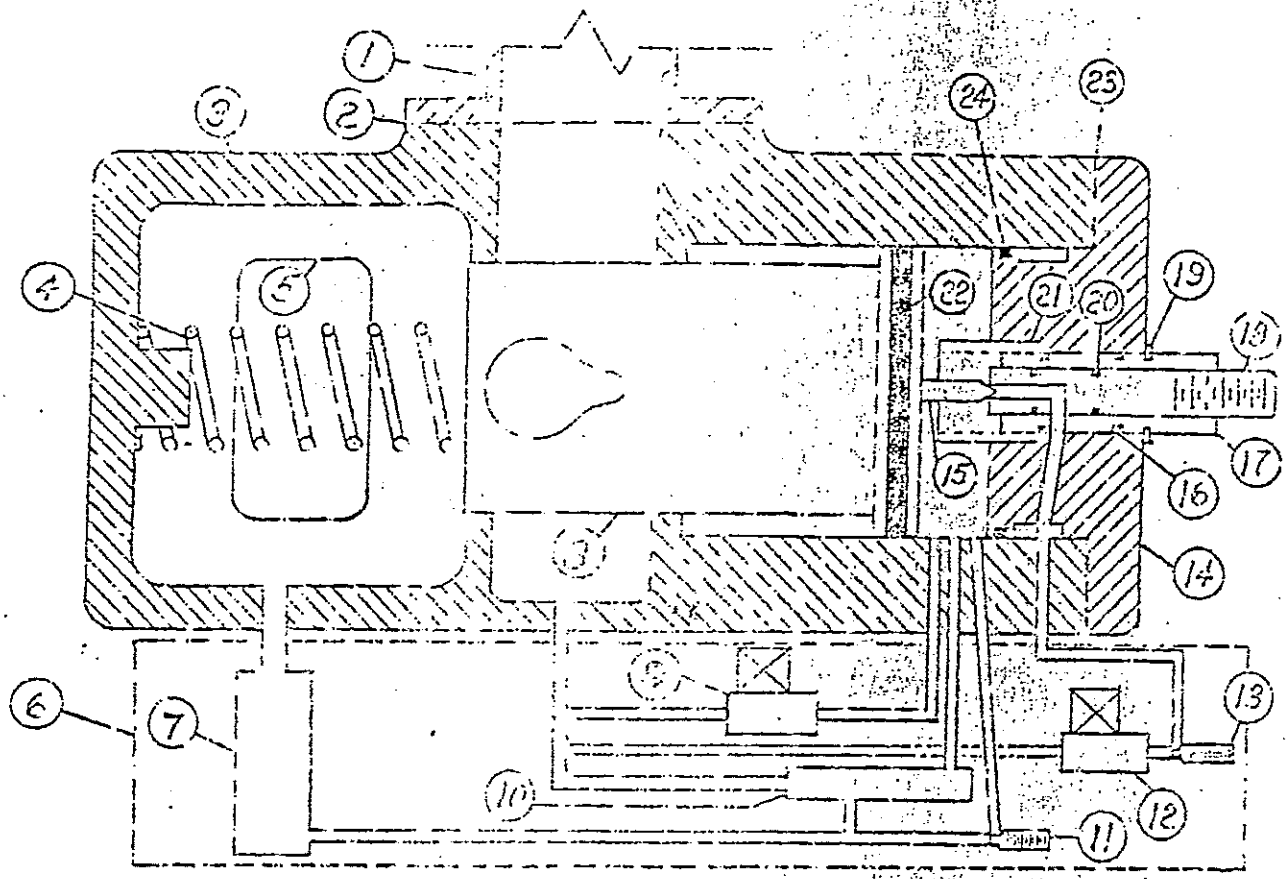
TURNBULL MODEL "E" VALVE

1. UP START CONTROL MANIFOLD
2. UP LEVELING PILOT VALVE
3. UNLOADER PILOT VALVE
4. UP SLOW DOWN (USD) ADJUSTMENT
5. UP START (S) ADJUSTMENT
6. PILOT RELIEF VALVE
7. CONTROL CIRCUIT STRAINER
8. UP START VALVE BODY
9. UP START VALVE CAP
10. BY PASS ADJUSTMENT
11. UP LEVELING SPEED ADJUSTMENT
12. BY PASS TO TANK
13. MANIFOLD HOUSING AND MAIN LINE CHECK
14. DISCHARGE CLOSURE
15. LOWERING AND DOWN LEVELING VALVE BODY
16. LOWERING VALVE CAP
17. LOWERING SPEED ADJUSTMENT
18. DOWN LEVELING SPEED ADJUSTMENT
19. TANK RETURN
20. LOWERING CONTROL MANIFOLD
21. DOWN LEVELING PILOT VALVE
22. LOWERING PILOT VALVE
23. MANUAL LOWERING SCREW
24. NOT USED
25. LOWERING OPENING ADJUSTMENT
26. DOWN LEVELING SLOW DOWN
27. HIGH PRESSURE PORT

FORM H-93

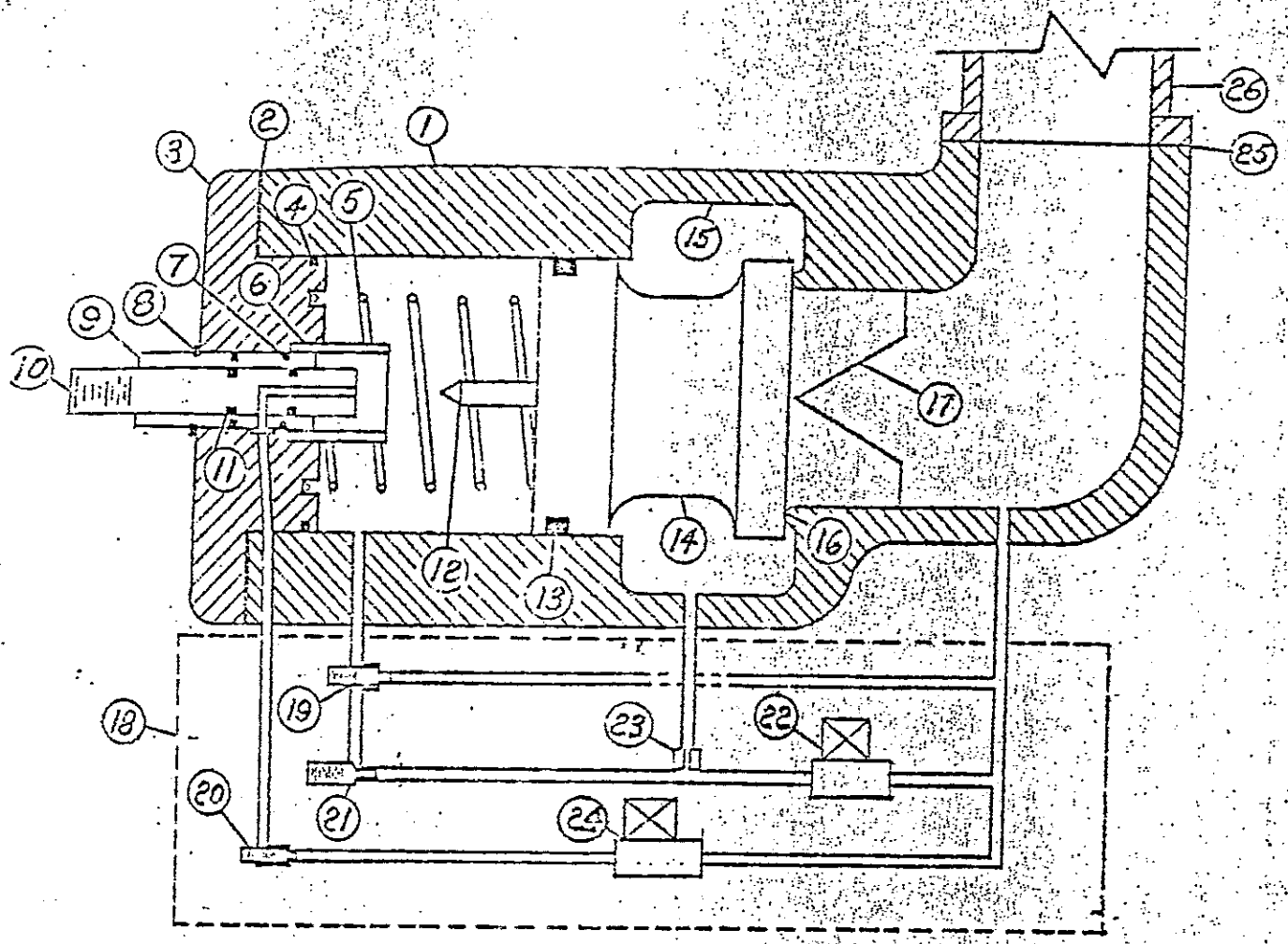
DRAWING #1

TURNBULL MODEL E VALVE



UP-START UP LEVELING VALVE
TURNBULL MODEL E VALVE

1. TANK RETURN (BY PASS)
2. TANK RETURN GASKET
3. UP START VALVE BODY
4. RETURN SPRING
5. VALVE BODY GASKET
6. CONTROL MANIFOLD
7. CONTROL LINE STRAINER
8. CONTROL SPOOL
9. UNLOADER PILOT
10. PILOT RELIEF VALVE
11. UP START ADJUSTMENT
12. UP SLOW DOWN PILOT VALVE
13. UP SLOW DOWN ADJUSTMENT
14. UP START VALVE CAP
15. UP LEVELING NEEDLE
16. "O" RING
17. BY PASS ADJUSTMENT
18. UP LEVELING SPEED ADJUSTMENT
19. RETAINER RING
20. "O" RING
21. BY PASS ADJUSTING NUT
22. CONTROL SPOOL "O" RING
23. VALVE CAP GASKET
24. "O" RING



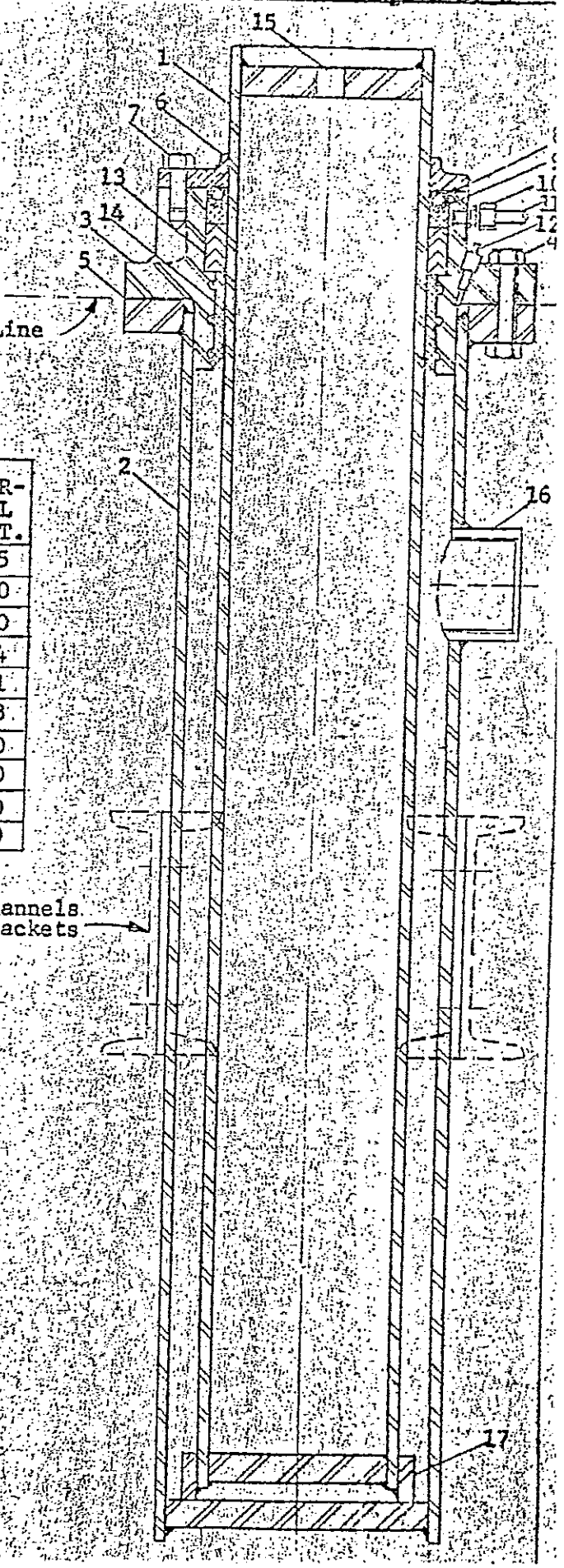
LOWERING - DOWN LEVELING VALVE
TURNBULL MODEL E VALVE

1. LOWERING AND DOWN LEVELING VALVE BODY
2. VALVE CAP GASKET
3. VALVE CAP
4. "O" RING
5. CLOSING SPRING
6. LOWERING SPEED ADJUSTING NUT
7. "O" RING
8. RETAINER RING
9. LOWERING SPEED ADJUSTMENT
10. DOWN LEVELING SPEED ADJUSTMENT
11. "O" RING
12. LEVELING NEEDLE
13. PISTON "O" RING
14. LOWERING PISTON
15. VALVE BODY GASKET
16. SEALING DISC
17. PISTON GUIDE
18. CONTROL MANIFOLD
19. MANUAL LOWERING
20. DOWN LEVELING SLOW DOWN
21. LOWERING OPENING ADJUSTMENT
22. LOWERING PILOT VALVE
23. HIGH PRESSURE PORT
24. DOWN LEVELING PILOT VALVE
25. TANK RETURN GASKET
26. TANK RETURN

FORM H-93

DRAWING #4

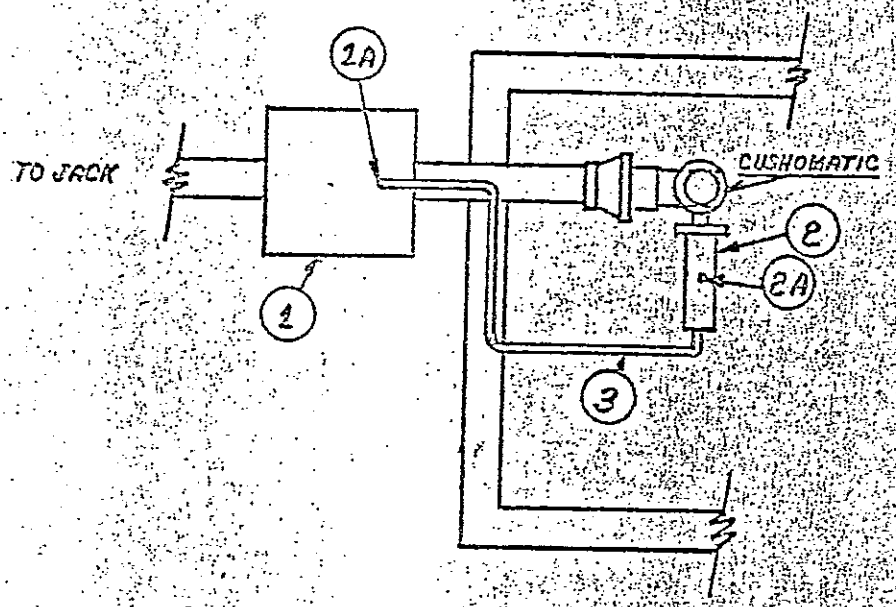
SIZE	CYLINDER O.D.-In.	PLUNGER O.D.-IN.	PLUNGER AREA-IN^2	DISPLACE-MENT GAL./FT.	DIFFER-ENTIAL GAL./FT.
SH-4	6 5/8	4 3/8	15.03	0.785	0.715
SH-5	8 5/8	5 1/2	23.76	1.230	1.370
SH-6	8 3/8	6 9/16	33.80	1.760	0.840
SE-7	10 3/4	7 1/2	44.18	2.295	1.784
SE-8	10 3/4	8 1/2	56.75	2.948	1.131
SE-9	12 3/4	9 1/2	70.88	3.681	2.193
SE-10	12 3/4	10 5/8	88.66	4.600	1.270
SE-12	16	12 5/8	125.20	6.503	3.000
SE-14	18	13 7/8	151.20	7.850	4.150
SE-16	20	15 7/8	197.93	10.300	4.870



PARTS LIST

Item No.	Description of Part
1	Plunger
2	Cylinder
3	Head casting - steel
4	Bolt w/nut - Cylinder head
5	Gasket - cylinder head
6	Gland ring - bronze
7	Capscrew - gland ring
8	Wiper ring - neoprene
9	Collector ring - aluminum
10	Adapter - 1/4 tube x 1/8 male NPT
11	Copper tube
12	Air bleed plug - 1/8" NPT
13	Chevron Packing assembly - 5 pieces
14	Guide bearing - babbitt
15	Bolster plate connection
16	Oil inlet
17	Stop ring

MUFFLER (FSMP-1) INSTALLATION AND OPERATING INSTRUCTIONS	INSTRUCTION DATA H-60



The muffler assembly consists of a muffler housing (1), air pump (2) and air line (3).

The pump (2) is mounted on the manifold below the Cushomatic in a horizontal position. The vent screen (2A) must be in the up position. Pumps are factory installed on units requiring mufflers.

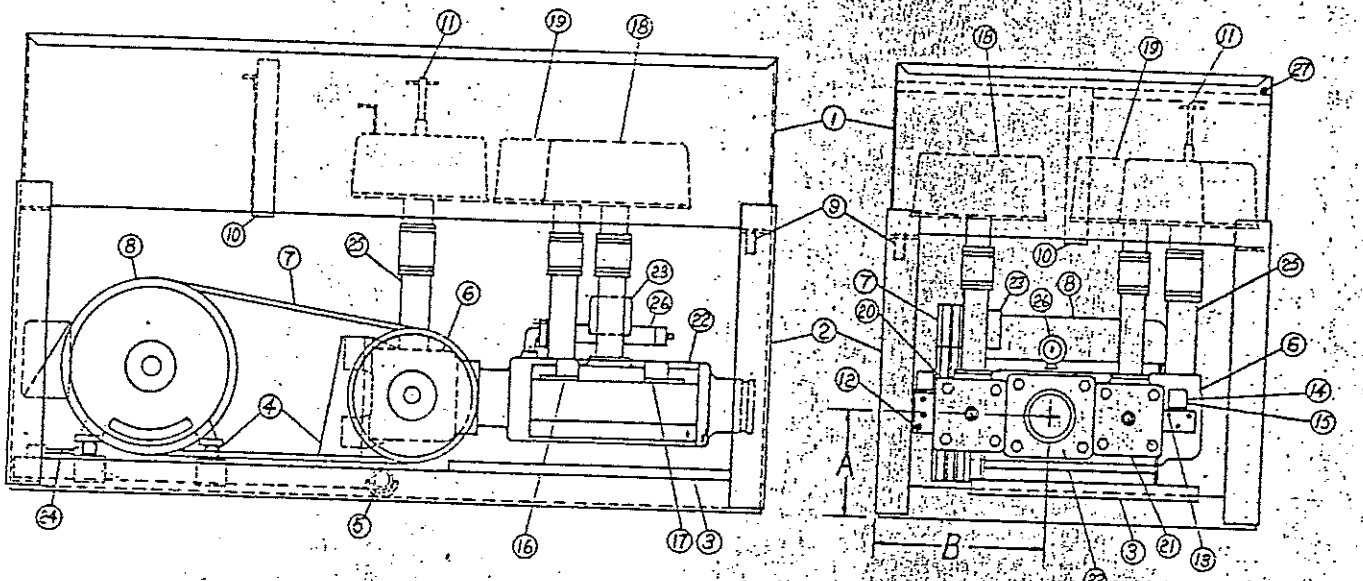
The muffler (1) is installed with the air inlet (1A) in a vertical position over the oil line. For the most effective application, the muffler (1) should be installed on the unit outlet. The effectiveness of the muffler decreases the further away from the unit it is installed and it should never be installed in the elevator pit.

Install the 1/4" line (3) from the air pump (2) to the muffler (1) air inlet (1A). Care must be taken to insure that air tight connections are made.

Should the elevator be too spongy (has excess air), after being placed in normal operation, the following should be checked or performed. Check the oil level in the tank when the elevator is approaching the highest landing. Excessive turbulence and low oil will allow air to be drawn into the system. With the elevator at the lowest landing add more oil if necessary. If the low oil condition does not exist rotate the muffler approximately 15° from the vertical. 15° is about 1-1/8" on the outside of the muffler. The air volume will be decreased and allow more air to be washed back to the tank.

PARTS LIST

PUMPING UNIT MODEL E



UNIT SIZES AND DIMENSIONS						
UNITS	LENGTH	WIDTH	HEIGHT MIN	A	B	DISCHARGE SIZE
D25E	54"	35"	43"	8 3/4	14	3"
D31E	61"	40"	43"	9 3/4	15 3/4	3"

PART NO.	DESCRIPTION
1	RESERVOIR
2	BASE FRAME ASSEMBLY
3	DRIP PAN
4	PUMP AND MOTOR MOUNT ASSEMBLY
5	ISOLATION PAD
6	PUMP
7	BELT AND SHEAVES
8	MOTOR
9	RESERVOIR DRAIN
10	TANK AIR INLET
11	STRAINER AND VALVE
12	PILOT RELIEF VALVE
13	MANUAL LOWERING

PART NO.	DESCRIPTION
14	LOWERING SOLENOID VALVE
15	DOWN LEVELING SOLENOID VALVE
16	UNLOADER VALVE
17	UP LEVELING SOLENOID VALVE
18	BY PASS RETURN CHECK
19	LOWERING RETURN CHECK
20	BYPASS AND UPSTART VALVE
21	LOWERING AND DOWN LEVELING VALVE
22	MAIN LINE CHECK VALVE AND VALVE DISCHARGE
23	JUNCTION BOX AND OIL THERMOSTAT
24	BELT TENSION ADJUSTING SCREW
25	SUCTION LINE
26	MUFFLER AIR PUMP
27	PLUNGER BLEEDER RETURN CONNECTION