Function and Operation of the 15-17 Casting Machine

Including Supplementary Equipment

A Supplement to "*Casting Machine Adjustments*"

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15-17 COMPOSITION CASTER

Functions and Adjustments

The 15-17 Composition Casting Machine was designed to meet the growing demand for additional matrix positions in the Matrix Case. The parts, symbols and nomenclature used in this text conform to the Monotype Typesetting Machine Plate Book, 1955 edition. Page numbers are included with parts symbols for identification and are not repeated until a given symbol carries a different page number.

The capacity of the Matrix Case is extended from 225 to 255 matrices. This is accomplished by modifying the rear Air Pin Block a3C12 (page 48) to include two additional Air Pins 1C that function to extend the travel of the Matrix Case, front to rear, to 17 positions, thus adding two Matrix positions to each of the 15 unit rows of the Matrix Case for a total of 30 additional positions.

The two new Air Pins are located to the front of the Air Pin symbolled "A" and are symbolled from front to rear: NI, NL, A to O inclusive, and each require one or two signal perforations in the controller ribbon.

The Control Valve Box 40C2 and the Air Pin Block a3C12 are machined to provide air passages leading from the bottom of Air Pins, N, I and L into the Control Valve Box. The two annular rings of Control Valve 40C1 provide open air passages from the I Air Pin to the NI Air Pin and from the L Air Pin to the NL Air Pin when the Valve is raised by air pressure from the N air source.

When the controller ribbon presents perforations NI, air is admitted to raise the Air Pins N and I. The N air enters the Valve Control Box and raises the Valve to open the air passage to the bottom of the Air Pin NI and the air from the Air Pin I raises the Air Pin NI. When the air is cut off by the Air Tower, the Control Valve 40C1 is restored to inactive position by the pressure of the Valve Spring 40C14. The Control Valve Box requires no adjustment and because of the absence of piping, it is a relatively trouble-free unit.

The flexibility of the 15-17 machine provides for the use of both the 15-17 matrix case and the 15-15 matrix case. To change from 15-17 to 15-15 Matrix Case operation, the Valve Locking Plunger Head 40C9 must be pulled forward and moved one-quarter turn, engaging the Locking Plunger 40C8 to lock the Control Valve 40C1 into inactive position. The rear Draw Rod b5C1

must be turned out of the Cross Slide d5C approximately seven and one-half turns and checked for positive adjustment in accordance with a normal Draw Rod adjustment.

The purpose of the Control Valve locking mechanism is to prevent all possibility that either the NI or NL Air Pins will raise when operating with the 15-15 Matrix Case. Keyboard operators use the Paper Feed Lock 24 KU to stop the Paper Feed mechanism, when setting partial or complete trial lines. The perforations resulting from this trial setting appear in a straight line across the ribbon and must include a lower justification perforation to lock out the Pump mechanism. This line of perforations may include the NI or NL perforations. Obviously the NI or NL Air Pins cannot be raised when the Valve Locking Plunger is in locked position. Failure to set the Locking Plunger in locked position will result in the raising of the NI, NL or both Air Pins and the 15-15 Matrix Case will be brought to position where the matrices would be beyond range of contact with the Bridge Centering Pin and the Mold matrix seat. The volume of air, not the air pressure that passes through the controller ribbon perforations on the Casting Machine Air Tower, is distributed through the perforations, and this volume is decreased in proportion to the number of perforations in the trial line. Double check the position of the Valve Locking Plunger 40C8 to assure locking of the Control Valve 40C1 when changing to 15-15 operation.

Order all replacement parts for the 15-17 machines from the Monotype Typesetting Machine Plate Book, 1953 edition.

The Quadding and Centering Mechanism

This mechanism comprises two separate air activated units, the Quadder and Duplicator. The parts, nomenclature and symbols used in this text are taken from the Monotype Typesetting Machine Plate Book, 1955 edition. Page numbers are included with parts symbols for identification, and are not repeated until a given symbol carries a different page number.

The holes in the Air Tower are used to supply air to raise the Air Pins in the front, rear and justification Air Pin Blocks. The Valve Box Bodies 282E1-3 (page 14) mounted on the rear of the Top Stand provide two additional air supplies to operate these units through the use of multiple controller ribbon perforations, BC for the Quadder and AC for the Duplicator. The Valve Box (group) includes: two Valve Boxes, two cut-off Valves, one Control Valve and two Springs to restore the Valves. When the BC signal perforations appear in the controller ribbon, both air supplies enter the Valve Box (group) to position the Valves and channel the air. The B air supply is routed through the pipe to the Quadder unit and the C air is blocked from passage to the C Air Pin and vented to the atmosphere. The Duplicator perforations AC and the single A, B and C perforations channel the air through the Valve Box to

position the Valve or Valves to carry the air to the Duplicator mechanism or the signalled Air Pins.

The Valve Box (group) is a self-contained unit, free from adjustment, that functions properly when air pressure of 15 to 18 lbs. is maintained and the Valves are lubricated with a few drops of oil about once a week. Do not alter the tension of the Springs, or substitute other springs. Sluggish action is caused by insufficient lubrication or lowered air pressure, sometimes caused by leakage.

The Quadder Mechanism, Functional Operation and Adjustments

The Quadder mechanism locks the paper feed on the Air Tower for selective operation of five or ten machine revolutions for combined BC perforations as they appear in the controller ribbon. This is possible because of two slotted disks, mounted on the Quadder drive shaft, one of which can be pulled forward and moved to a position that will lock the Paper Feed Pawl (upper) 13G1 (page 64) for one-fourth or one-half of the twenty machine revolutions necessary to revolve the disks one complete turn. One position of the disks closes two of the four slots and locks the Feed Pawl for ten revolutions and the other position opens all four slots to produce five revolutions for each combined BC perforation. The periphery of these disks stops the movement of the Paper Feed Pawl Arm (part No. 2) 13G13, and holds the Feed Pawl in locked position until the next slot in the disk is presented, permitting the Feed Pawl Arm to move into the slot and release the Feed Pawl. The setting for four open slots or five casts for combined BC perforations is generally used and will be in use for the instructions which follow. To check the adjustments and study the functional action of the Quadder Mechanism both air pipe covers must be removed, because some of the adjustments referred to are inside the front housing of the Air Tower. Proceed to check all adjustments in the following sequence:

1. The perforations in the controller ribbon, as made by the Keyboard Punches, must line up with the marginal perforations of the controller ribbon to assure full volume of air for machine operation. Check the Keyboard Tower adjustment (for procedure to position the Paper Feed Pawl Ring, see Keyboard Adjustment Book).

2. Check the alignment of the spurs in the Pin Wheel Xd20G (page 62) with the air holes in the Paper Tower Cross Girt. The object is to permit the full volume of air to pass through the controller ribbon perforations into the Paper Tower. The alignment is determined by the position of the Paper Feed Pawl (locking, upper) 13G1 (page 64) when the Pawl engages a tooth in the Pin Wheel Ratchet 20G4 (page 62). Machines equipped with Quadding and Centering include an eccentric Paper Feed Pawl Stud a16G (page 64) that provides adjustment to position the Paper Feed Pawl and establish this alignment.

Procedure to check alignment:

Raise the Air Bar Clamping Lever to uncover the Cross Girt.

Raise Paper Feed Locking Lever 12G to release Paper Feed Pawl and turn the machine to 10 degrees as indicated by Vernier 20E (page 18).

Lower the Locking Lever to engage Paper Feed Pawl with the Ratchet Wheel 20G4.

Check the alignment with a strip of perforated controller ribbon, as covered in previous paragraph. To establish alignment, loosen the Paper Feed Pawl Stud Nut 16G1, and turn the Pawl Stud a16G to a position where perfect alignment is made.

Tighten the Nut.

Any adjustment for positioning the Paper Feed Pawl requires a compensating adjustment of the Paper Feed Pawl Ring 14G. (See Paper Tower adjustments, Casting Machine Adjustments Book).

3. Check all the standard adjustments of the Paper Tower, as covered in the Casting Machine Adjustment Book to assure proper functioning of the Tower when the Quadder and Duplicator are idle. The adjustment of the Paper Feed Pawl Stud a16G is not covered in the book. Refer to the previous paragraph.

4. Adjust the eccentric Pin a19G6 (page 64) in the right end of the Paper Tower Lever a19G5 to a position that will provide sufficient travel of the Ratchet Wheel Pawl 29G4 (page 62) to advance the Ratchet Wheel 29G1 one tooth for a complete revolution of the machine. CAUTION: Remove the Paper Feed Pawl Arm 13G13 (page 64) to make this adjustment. Any interference with the free revolution of the Ratchet Wheel Shaft caused by maladjustment of this Arm will damage the Ratchet or the Ratchet Shaft.

5. Set a controller ribbon on the Keyboard for twenty Quadder-BC and ten Duplicator-AC perforations for use in making and testing the following adjustments. Place the ribbon on the Tower with the BC perforations over the Cross Girt holes and engage the feed and Connecting Hook 4G1. Turn the machine slowly until the Paper Tower Lever a19G5 is at the bottom of its stroke and the Spring Box Xa17G is under full compression. At this point air enters the Quadder Piston Block a29G10 (page 62) and raises the Piston a29G9. The Piston raises the Ratchet Wheel Pawl Lever a29G5 to engage the Pawl with a tooth in the Ratchet Wheel. The Pawl is now in dwell position, at which point the adjustment for positioning the Ratchet Wheel Detent Spring a29G2 is made.

6. Loosen the Detent Spring Screw and adjust the position of the Detent so that there is a gap of .015" or .020" between the engaged Pawl and a tooth in the Ratchet Wheel and tighten the Screw. Turn the machine slowly to advance the Ratchet Wheel until the Detent Spring drops into the next tooth. If the Detent Spring hangs on the top of the Ratchet Wheel Tooth, it is evident that the Pawl requires more stroke. Readjust the eccentric Pin and position the Detent Spring to increase the stroke and establish the clearance gap. (Refer to paragraph 4.)

7. To adjust the Paper Feed Pawl Arm 13G13 (page 64) release the paper feed and hook, and turn the machine to 20 degrees, indicated by the Gear Vernier 20E (page 18). In this position the Tower Lever has started its up stroke, compression is released in the Spring Box and the lug of the Paper Feed Pawl Ring is against its right hand Stop Screw 1G20. Revolve the Control Plate (slotted disks) to line up an open slot with the end of the Pawl Arm. Back off the Nuts and Screws that provide horizontal adjustment of the Pawl Arm and position the arm in place with its screws. Leave the top screw loose and tighten the bottom one enough to suspend the arm in place. When the Pawl Arm is moved into the slot by finger pressure, the Arm must be positioned vertically to provide one point clearance between the bottom of the Arm and the lower edge of the disk slot. Horizontally the Arm should just clear the periphery (outer rim) to permit the disks to revolve. Adjust the positioning Screws and Nuts to establish this clearance and tighten the clamping Screws. Engage the Tower Connecting Hook and turn the machine by hand to check the adjustments.

The Duplicator Mechanism, Functional Operation and Adjustments

The Duplicator mechanism is a separate device that also locks the paper feed of the Air Tower to accomplish its function. The Duplicator requires combined AC perforations that appear once only in a ribbon to produce any number of casts from one to the number of casts required to complete the line, whereas the Quadder perforations BC must appear in the ribbon once for every multiple of five casts required to complete the line. The Valve Box (group) X282E (page 14) mounted on the rear end of the Top Stand channels the air supply to both the Quadder and Duplicator.

The Duplicator functions through two separate Control Boxes, one mounted on the front Air Tower housing, the other mounted on the front end of the Galley Main Stand. Both controls are operated by a common signalled AC air supply from the Valve Box (group). The Duplicator Control Box X28G (page 6) mounted on the Tower, functions through two signalled AC air supplies that enter through pipes on the left side of the Control Box Cover (bottom) 28G4. To avoid confusion we omit the purpose of the third pipe that enters the front of the Control Box Cover and explain its purpose later.

Place the AC perforated controller ribbon in place on the Tower, release the paper feed Locking Lever 12G (page 64) and engage the Connecting Hook 4G1. Turn the machine until the Tower Operating Lever a19G5 is at the bottom of its stroke and the Air Bar Valve a2G8 (page 66) is opened to carry the AC air supply into the Tower Control Box through the rear air pipe. The Paper Feed Pawl Ring Arm 14G6 (page 64) is at its extreme right position. The air supply raises the lock Piston 28G14 (page 68) to activate the Control Box Lever 28G9, stopping the movement of the Feed Pawl Ring and locking the paper feed. The Lever is held in raised position by a friction plunger and spring for every machine revolution until the Lever is restored by air supplied from the Valve Box (Duplicator release) 220F2 (page 30) mounted on the Galley Stand.

The Valve Box is supplied by the same AC air source as the Tower Control Box. When the machine is in the same cycle position, the air supply in the Valve Box is trapped by the closed Valve, until the Trip Gage Bar 219F1 (page 32) is raised by the foreward movement of the Line Support and the Bar Gage tappet depresses the Valve to release the air. The air is piped to the Tower Control Box, raising the two feed pistons to restore the Control Box Lever and release the paper feed.

Reference to the omission of purpose for the third air pipe: some earlier model Duplicator Control Boxes did not include the third air pipe. Ribbons that include trial lines with AC perforations set with the paper feed locked, activated the Duplicator mechanism to stop the paper feed. Obviously, it was necessary to depress the Control Box Lever by hand to release the paper feed. To handle this problem mechanically, the single large diameter feed Piston was replaced by two feed release Pistons and BC signal air supply is carried by the third pipe to raise the upper Piston to restore the Control Box Lever and release the paper feed. When setting a trial line with the paper feed locked, the operator must include a Quadder Key before restoring the Keyboard.

Check the following Duplicator adjustments to assure proper function in response to AC signal perforations:

1. With an AC perforated controller ribbon in place on the Tower, release the paper feed and engage the connecting hook, turn the machine until the Tower Operating Lever is at the bottom of its stroke and the Air Bar Valve is opened. The air is carried to the locking Piston in the Control Box, raising the Piston and lifting the Lever in the path of the Feed Pawl Arm. Check the amount of clearance between the adjusting Screw in the Lever and the Pawl Ring Arm, loosen the clamping Screw and move the adjusting Screw to position so that two thicknesses of controller ribbon will pass freely between the Screw and Arm, and three thicknesses will drag, tighten the clamping Screw.

2. With the machine in the same position as stated in previous paragraph, the AC air is carried to the small diameter Locking Piston 28G1H (page 68) in the Control Box and to the Valve Body 220F2 (page 30) where it is stopped by the closed Valve (repeater release) 220F1. To determine the function of this Valve raise the Trip Bar Gage 219F1 (page 32) and note how the tappet depresses the Valve to release the trapped air. This released air is carried back to the Control Box, raising both large diameter feed Pistons 28G13 and 20 (page 68) restoring the Lever 28G9 and Locking Piston to rest position, permitting the Tower feeding mechanism to resume operation. The height of the Valve 220F1 (page 30) must be established by loosening the Bracket Screws 220F5 and positioning the assembly so that there is a maximum of .020" clearance between the top of the Valve and the bottom of the Tappet. Check this clearance after the Screws are tightened.

3. The Type Pusher Xb29B (page 40) must be adjusted in its forward position so that a 20 pica Pica Gage 7L1 (in position on the nick side of the fixed channel Block a51F (page 30) and against the forward end of the Type Pusher) will position the forward end of the Pica Gage flush with the front face of the fixed Channel Block. This covers the fixed adjustments of the Duplicator. The selection of the proper Line Support and setting of the Trip Carriage is based on the size of the Mold and the column width of the job.

4. Reference to the listings on page 33 shows: the point range and pica width limitations for each of the four Line Supports. The slotted Trip Bar Gage has two graduated scales; the right hand scale is used for setting the Carriage Gage 218F8 when the long Line Supports are used. The left hand scale is used with the short Line Supports. Set the Carriage Gage to the line measure in picas, then place two quads set-wise against the rear edge of the Carriage Gage and move the Trip Carriage 218F up to them and secure. After the Trip Carriage is locked in position the Carriage Gage is moved forward out of the way and locked. If difficulty is experienced in delivery of lines to fit the measure, the trouble may be caused by maladjustment of the Type Pusher or the gap between the tappet and the top of the Valve requiring slight modification.

General instructions for the separate or combined use of the Quadder and Duplicator and exercises covering their practical application are included in the 1951 edition of the Straight Matter Composition Book.

PATTON SPACING ATTACHMENT

New Low Quad Device

The standard Low Quad mechanism and the Patton Low Quad device function to release the Mold Blade Carrier Latch and uncouple the lower Mold Blade from the upper Mold Blade Carrier, thus permitting the lower Mold Blade to open while the upper Mold Blade remains closed. The standard Low Quad is fully mechanical in operation, functioning by means of the difference in depth of cone holes of the steel and bronze matrices. The utility of this mechanical control is limited to the number of steel matrices carried in the Matrix Case.

The Patton Spacing Attachment was designed to effect greater flexibility in Keyboard operation. This flexibility is accomplished by means of a simple air controlled Piston Block and Bell Crank assembly, mounted on the Bridge, that functions at the will of the keyboard operator to produce low quads, fixed low spaces for each unit row value and justified low spaces, although each Matrix Case position carries a "live" character matrix.

Composition Casting Machines No. 13571 forward and Keyboards beginning with Serial Number 11186 forward are fully machined for simple application of Patton Spacing Attachment 32CU for Casting Machines and 11KU for Keyboard. All new machines factory-equipped with Patton Spacing Attachment and orders for Attachments will include full instructions for installation, and detailed assembly drawings for both Keyboard and Caster. No special machinist's tools are required. Older machines require the above mentioned machining. While we recommend a Monotype serviceman to make the installation, it can be accomplished by an experienced in-plant machinist. We will furnish the tools and drill jigs for the work.

The Patton Spacing Attachment requires combination JH signal perforations in the controller ribbon to activate the new Low Quad mechanism. This is necessary because the 31 air holes in the Air Tower Cross Girt are used to control the air pins of the front, rear and justification Air Pin Blocks.

The plate on page 70 of the Monotype Typesetting Machine Plate Book, 1955 edition, is a photo-reproduction and assemblies such as the Valve Block assembly do not furnish the detail required to follow a logical explanation of function. Parts such as: Latch and Valve Pistons, Signal Pistons and Springs and air pipe connections to Valve Body Plate are not shown, and the

symbols for these parts are likewise missing from the parts list on page 71. Parts not shown on this plate, including the necessary Keyboard parts are readily identified by symbol numbers on the detail assembly drawings. Refer to these drawings when ordering replacement parts. These drawings should be returned to their jacket when not in use, and filed for reference use by the operator or plant machinist.

The Functional Cycle

The detail assembly drawing No. 29665 was developed to furnish a clear picture of parts and air passages, showing their relative positions when the device is idle. The following explanation of the complete functional cycle of this device in operation will be clarified by reference to this drawing, to identify the symbolled parts and study their purpose and action. Because the drawing is used exclusively to follow the explanation of the functional cycle all reference to the movement of parts will be: right, left, up and down.

As stated previously the new Low Quad Device is activated by combined JH signal perforations in the controller ribbon. When combined JH perforations in the controller ribbon are carried to active position on the Paper Tower, the JH air is carried through the Air Pipes 285E5 and 285E6 into the Valve Block 285E15 to raise both Signal Pistons 285E23.

The Valve Block assembly including the Valve Block Back Plate 285E18 is drilled and channel milled to provide passages for the constant air, present in the Valve Block when the Air Valve 285E40 is open. The annular groove in each of the Signal Pistons, now raised by pressure of JH air, line up with a constant air passage (hole) to permit free passage of the constant air through a channel in the Back Plate 285E18 to the right end of the bored hole for the Latch Piston 285E25, moving the Piston to the left. At this point in the machine cycle the hook-shaped extension of the new Jaw Tongs Bell Crank (lower) b21E has moved to the extreme right position to receive the Latch Link Pin 285E32, as the Latch Link 285E31 moves by pressure of the Latch Piston. Note: The Valve Piston 285E26 remains in idle position as the Latch Link fulcrums on the Valve Piston Clevis Pin 285E29 to accomplish the Coupling of the Latch Link Pin with the hook-shaped extension of the Jaw Tongs Bell Crank. The machine cycle continues with the Latch Link Pin coupled to the hook-shaped extension, by pressure of the Latch Piston.

As the Jaw Tongs Bell Crank moves to the left, the Air Tower Air Bar is lifted, closing the Air Valve to cut off the combined JH air supply, permitting the Signal Pistons to restore through pressure of the Signal Piston Springs 285E24. With the Signal Pistons in restored position the constant air passage to the Latch Piston is closed.

The Jaw Tongs Bell Crank moves to extreme left and remains in this position for 100 of the 360 degree machine cycle; the Valve Piston 285E26 is carried to position where the annular groove of the Piston lines up with the constant air passages (grooves in the base of Piston Block) to carry constant air through Air Pipes 285E3, 285E13 and 70A6 into the Bridge Piston Block 70A1. This constant air supply is present in the Piston Block for 100 degrees of the machine cycle and serves to move the Piston 70A3 to the left, activating the Bridge Bracket Bell Crank 70A7 and the Mold Blade Carrier Latch Bell Crank 87E1 (not shown on drawing) to move the Mold Blade Carrier and top Mold Blade to closed position, under pressure until the cast is made.

When the Jaw Tongs Bell Crank moves to the right, the Latch Link remains coupled to the Bell Crank extension by the tension of the Piston Springs. The travel of the Valve Piston is stopped by the Stop Screw 285E20 and the Latch Piston travels further to stop against the Back Plate 285E18. The added travel of the Latch Piston causes the Latch Link assembly to fulcrum on the Clevis Pin and unlatch from the Bell Crank hooked extension to complete the functional cycle.

Adjustments

Perfect functioning of the Patton Spacing Attachment is accomplished by means of four simple adjustments. The adjustments are furnished on pages 4 and 6 of the Installation Instruction sheets. The instructions are based on the position of the operator as he faces the front of the machine. The following text of adjustments will be based on reference to the same Detail Assembly Drawing No. 29665 used previously. These adjustments are made without the use of perforated controller ribbon.

1. Establish the distance the Valve Piston 285E26 travels to the left when the Latch Link 285E31 coupled to the hook-shaped extension of the Bell Crank moves to the extreme left position. To obtain this position, turn the machine to 130 degrees as registered on the Gear Vernier 20E located on the Gear Cover 19E. The purpose of this adjustment is to line up the annular groove in the Valve Piston with the constant air supply passage and the air passage that carries the constant air into the Bridge Valve Block 70A1. Procedure: The drawing furnishes the checking points for the 21/32" distance the Piston must extend beyond the left side of the Piston Block. Hold the Piston by the milled hexagon head and loosen the Nut 285E27, turn the Piston in or out of the Clevis 285E28 until the edge of its grooved surface extends 21/32" beyond the left face of the Piston Block 285E18. Lock the Nut and re-check the dimension.

2. Adjusting the Valve Piston Stop Screw 285E20, turn the machine to the position of 330 degrees. This will position the hook-shaped extension of the Bell Crank at rest in extreme right position, and the Latch Link is

uncoupled from the hook-shaped extension. The Latch Link Pin 285E32 should clear the lip of the hook in the extension by approximately 1/32". Procedure: Loosen the Valve Piston Stop Screw Nut 285E21 and back off the Stop Screw 285E20 so that the Latch Link Pin 285E32 will remain coupled to the hook-shaped extension. Advance the Stop Screw slowly until the Latch Link Pin is uncoupled by the pull of the Latch Piston Spring 285E36. Check the position of the Stop Screw several times, then advance the Screw one complete turn and lock the Nut. The Stop Screw has 32 threads to the inch. When the screw is advanced one complete turn, the Latch Link Pin will clear the lip of the hook-shaped extension by approximately 1/32".

3. Adjust the Latch Piston 285E25 so that the Latch Link Pin 285E32 will clear the periphery (rim) of the hook-shaped extension by 1/32" to 3/64". Procedure: Turn the machine to position of 130 degrees. This places the hook-shaped extension at its extreme left position. Loosen the Latch Piston Lock Nut 285E27 and turn the Piston by means of its milled hexagon head, in or out of the Clevis 285E28 to establish the required clearance. A short piece of three point lead or the combined 1 pt. and 2 pt. leaves of the squeeze standard Gage 7L12L may be used as a gage to determine this clearance. Recheck the clearance after the Lock Nut is tightened and the machine has been turned over several times.

4. Adjust the Bridge Bracket Bell Crank 70A7 by means of the Adjusting Screw 70A10 so that the top Mold Blade cannot open up beyond 18 units of 12 1/2 set when letter spacing characters. This will assure ample coverage of the Mold opening by the Matrix. Procedure: Remove the Bridge and place a 12 pt. Mold and a 12 1/2 Set Normal Wedge in position on the machine. Use the next smaller Mold and Normal Wedge if the suggested ones are not available. Turn the machine to casting position (220 degrees) and adjust the Mold Blade Adjusting Screw 14C1 so that a type measuring 12 1/2 set (.1729") fits set-wise into the Mold opening. Replace the Bridge and back off the Bridge Bracket Lever Nut 70A11 and Adjusting Screw 70A10. Turn the machine a complete cycle, then to casting position (220 degrees) to be sure the Mold Blade Carrier Latch is coupled. The purpose of this adjustment is to limit the opening of the top Mold Blade, and this is accomplished by taking up the play between the Bridge Bracket Bell Crank 70A7 and the Mold Blade Carrier Latch Bell Crank 87E1 when the end of the Latch Bell Crank is in contact with the Mold Blade Carrier Latch Lever 2MC3E12. To simplify this adjustment remove the Carrier Latch Bell Crank Spring 87E7 to eliminate its pressure and press lightly on the lower end of the Bridge Bracket Bell Crank to take up the play, hold the Bell Crank in this position and advance the Adjusting Screw until it just touches the Piston 70A3, then back off the Screw 1/4 turn, lock the Nut and replace the Spring.

For close adjustment of the opening for the top Mold Blade, advancing the Adjusting Screw reduces the opening of the top Blade and backing off the Screw increases the opening.

To simplify the explanation of the functional cycle we purposely avoid mention of the fact that combined JH perforations in the controller ribbon raise both J and H Air Pins in the rear Air Pin Block together with the raising of both Signal Pistons in the Valve Block assembly. The JH air source was selected to limit the travel of the Matrix Case, so that all spaces will be cast centrally in the H row.

When J or H signals appear singly in the controller ribbon, the relative Air Pin in the rear Air Pin Block and one of the Signal Pistons in the Valve Block are activated, the companion Signal Piston remains inactive and blocks the passage of constant air, so that the Spacing Attachment does not function.

INSTALLATION INSTRUCTION

Factory Applied Varidrive

The Varidrive unit and the Clutch and Gear assembly is factory applied to new Composition Casters, Display Type Casters and Type and Rule machines. Because of variation in electric current specifications and restrictions in local Underwriters' codes, the wiring of the Varidrive must be handled by a local electrician.

Operating Instructions

Complete instructions for lubrication, motor wiring and maintenance of the Varidrive unit are included in the Operating Instructions Plate and the Motor Wiring Diagram Plate, both attached to the motor housing. Supplemental information in pamphlet and binder insert sheets provides detailed instructions for maintenance and adjustments of the unit. This instruction material is enclosed in a protective envelope wired to the unit. Read thoroughly, then file for future reference by the operator or plant machinist.

Lubrication

The Varidrive unit MUST BE LUBRICATED before use (see Instruction Plate on unit). The Rockford Clutch assembly is equipped with three "Oilite" (self-lubricating) Bearings and an "Oilite" Thrust Bearing on the end of the Clutch Axle. These bearings provide sufficient lubrication and serve to prevent flooding of the Bonderized Raybestos Plate Facings with grease and accumulating dust and grit. These Plates must be kept clean, dry and free from oil or grease. The presence of grease or oil reduces the traction required to transmit power and slippage occurs. At the first sign of Clutch slippage, examine the Clutch Driving Plates for the presence of oil or grease. If the Clutch Plates are clean and free of grease a simple adjustment of the Spider will furnish the additional pressure required. The Machine Starting Lever must be released and the Varidrive shut down. Standing in a position facing the rear of the Machine, loosen the Allen Set Screw in the Spider and move the Spider counter-clockwise about one-quarter of a turn and tighten the Set Screw. The Clutch Spider must apply sufficient pressure to operate the Machine, yet be free to revolve when the Machine Starting Lever is released. DO NOT apply oil or grease to the gears. When Clutch Plates slip because of the presence of grease or oil, the Clutch and Gear assemblies

must be disassembled and the grease removed from the Clutch Plates and Gears by use of a commercial cleaning agent. The rest of the parts must be wiped dry with a clean rag, because the "Oilite" Bearings would lose their lubricant on contact with any cleaning agent.

Motor Wiring

The Varidrive Motor Terminal Box is accessible for wiring hook-up through the opening in the side of the machine base. A small Plate fastened to the Unit gives wiring instructions for two and three phase Motors, single phase wiring instruction Plate is inside the lid of the Capacitor-Relay Box. The Unit Belt Sheave must revolve clockwise, the same as the Machine Hand Wheel, as observed from the front of the Machine. Motor reversal is covered in the Operating Instruction Folder.

Sheave Alignment and Belt Tension

Misalignment of the Sheaves causes excessive wear of the V Belts as they track from one Sheave to the other. When Belts are excessively tight the fabric is weakened and the Belts lose their elasticity. DO NOT use a screw driver or other tools to apply Belts. To apply Belts and align Sheaves proceed as follows: Loosen all four Unit mounting bolts one-half turn and raise the Unit by means of the jack screw under the Unit; loosen the set screw in the Unit Sheave and remove the Sheave. If necessary use a piece of wood as a drift against the Sheave hub. Holding the Sheave in the hand, lace both Belts over the Sheaves and replace the Sheave on the Unit Shaft. Start the key in position. To adjust the tension for this length Belt, grasp the bottom of the Belt midway between the Sheaves, with the thumb and index finger and determine if the belt can be twisted about one-quarter turn by a light twist of the wrist. This tension is established by lowering the Unit Jack Screw. Alignment of the Sheaves is established through use of the Galley Bar as a Straight Edge and tapping the Unit Sheave to position where the full faces of both Sheaves are in line. Tighten the Unit mounting Bolts and the Sheave Set Screw, and recheck Belt tension and Sheave Alignment.

Rockford Clutch Assembly

Function and Adjustments

The Rockford Clutch selected for use with the Varidrive embodies full adjustment to provide positive constant pressure within itself when the Clutch is engaged. When properly adjusted the complete Clutch assembly will float freely without back pressure on the Actuating Ring Bearing or the retaining washer on the end of the Axle.

The Clutch Spider Assembly is mounted on the threaded diameter of the Clutch Body (sleeve). This style mounting provides sensitive adjustment for the position of the Spider in relation to the Clutch Plates, by loosening the Allen Set Screw in the Spider and turning the Spider to establish the required Clutch pressure.

The Roller Yokes are attached to the Spider by means of pressure sustaining fulcrum Pins. Obviously these Pins maintain a fixed relation with the axis of the Clutch Body (sleeve). The Roller Yokes are connected to the Actuating Ring by clevis pins. Pressure applied to the Actuating Ring to engage the Clutch causes the Roller Yokes to fulcrum and spread the Rollers beyond a line parallel with the Clutch Body axis and the center of the pressure sustaining Yoke Fulcrum Pin. Care must be exercised in making adjustments to establish this position of the Rollers to assure self locking of the Clutch, thus preventing back pressure on the Actuating Ring Bearing and the Retaining Washer. When adjustments are properly made, the only outside pressure exerted on the Actuating Ring Bearing is the slight pressure exerted by the Spring in the Operating Lever Spring Box.

Rockford Clutch Assembly

Adjustments

1. The Machine Starting Lever must be released and the Varidrive Motor Switch in "off" position.

2. Loosen the Allen Set Screw in the Spider web that locks the Spider in adjusted position on the threaded diameter of the Clutch Body (sleeve).

3. From a position at the back of the Machine, facing the Clutch assembly, note that the Spider turned counter clockwise advances the Spider closer to the Clutch Body shoulder. Position the Spider so that a gap of 1/8" inch exists between the shoulder and the Spider. Do not tighten the set screw at this time.

4. The Belt Shifter Rod, 6E, is replaced by a special Rod 287E27 and the Machine Operating Lever adjustments furnished on pages 104 to 107 inclusive of the Casting Machine Adjustment Book must be omitted. These adjustments will not bring the Clutch Actuating Ring to position to effect proper function of the Clutch assembly.

5. Move the Machine Operating Lever a32F to engaged position and check the gap between the Spider and the adjacent face of the Clutch Actuating Ring. This gap should not be greater than 1/4" and is established by loosening the Screw in the Shifter Rod Arm 2E and moving the Arm to position the Actuating Ring and establish the gap as stated.

6. Adjust the Spider to provide sufficient pressure for smooth machine operation, yet not so tight that the Clutch cannot slip in an emergency. Turn the Spider so that the contact point of the Rollers will spread to self-locking position, beyond a line parallel with the Clutch Body axis and the center of the pressure sustaining Yoke Fulcrum Pin.

7. The Plunger in the Operating Lever Spring Box must be under compression when the Lever is in engaged or disengaged position. If the Plunger is compressed solid when in either position it will be necessary to make a slight change in the position of the Rod Arm and reset the Spider. Check to see that the Spider Set Screw and the Rod Arm Screw are tightened.

8. The Cam Shaft Bushing 287E7 carries one or two Driven Gears depending on the style of machine. The regular Composition Machine has one high speed Driven Gear, the Display and Type and Rule Machines require two Driven Gears to provide lower speeds for casting Display Type. The Gear in use is keyed to the Bushing by means of a tapered-end Set Screw and the free Gear hole is closed with a fillister head Screw to retain the grease. When changing from one gear drive to another, switch the screws and take advantage of the backlash in the gears by jogging the Hand Wheel back and forth to permit proper seating and tightening of the Key Screw.