

CHAPTER 31

Adjustments, and How to Take Down a Linotype

LINOTYPE ADJUSTMENTS

THE MOST IMPORTANT adjustments of the Linotype are briefly reviewed in the following comments for ready reference:

1. *Main Clutch*—Allow $\frac{1}{2}$ " between the collar and the machine bearing. See Fig. 1-21 for further details of this adjustment.

This is where the power is applied and it is connected to the cam shaft by gears that are 11 to 1, and give one revolution of the cams to 11 of the clutch.

2. *Automatic Pawls*—(Stopping and Safety)—Set $\frac{1}{8}$ " from the edge of the cam. Use adjusting screw in automatic pawls—the screws that go through the pawls and strike on the lugs of the cam. The stopping pawl is to stop the machine after it has made one revolution. The safety pawl is to stop the machine if for any reason the line has not transferred.

3. *Automatic Stopping Pawl*—Set $\frac{1}{4}$ " on upper stopping lever. Use set screw in top of vertical lever. This pawl is for stopping the machine in normal position. The action is to push down on the upper stopping lever, forcing the lower stopping lever against the forked lever, which in turn pushes against the collar fastened to the clutch rod, the other end being connected to the clutch. In doing this, the clutch is thrown out of action and the machine is stopped.

4. *Lower Stopping Lever*—Allow $\frac{1}{2}$ " between the lower stopping lever and forked lever. Use adjusting screw in upper stopping lever. This lever is the connection between the upper stopping lever and the forked lever to get a horizontal motion from a vertical action.

5. *Vertical Lever*—Should force automatic pawls $\frac{1}{8}$ " clear of the upper lever. Use adjusting screw in outside of vertical lever bearing to tighten spring. This lever is only in action when starting lever is pulled by hand. The eccentric screw in the starting rod, pulling against the lower lug of the vertical lever, forces it around, causing the upper lug to push off the automatic pawls, which release the clutch letting the machine go into action.

6. *Vertical Lever*—Allow $\frac{1}{4}$ " between the upper lug and automatic stopping pawl. Use adjusting screw inside of column. This lever is returned by a spring and stops against the adjusting screw and should move freely.

7. *Starting Lever*—Allow $\frac{1}{2}$ " between eccentric screw and vertical lever lower lug. This lever controls the machine. When part way out and standing free, machine is in operative position; pulled all the way out it will start machine.

8. *Tie Rod*—The tie rod consists of a long bolt which passes through a projection on the top of the main cam shaft bracket cap and extends into the column of the machine. The head of this bolt should bear snugly against the cam shaft bracket cap when the machine is in normal position. The tie rod takes up the strain when the pot locks up.

9. *Mold Turning Cam*—The steel shoes to take up lost motion in pinion. Adjust by screw bushings in cam. This is to position the mold disk in casting and ejecting position so locking studs will enter bushings.

10. *Mold Turning Bevel Pinion*—Set screw to be on top when cams are in normal position. The pinion turns the mold disk and gets its power from the segments in the cam. The short segment gives one-quarter turn, bringing the mold to casting position; the long segment gives three-quarters turn, carrying the slug past the back knife, which trims the slug to type-high; then it goes to ejecting position.

11. *Mold Disk Locking Stud Blocks*—Disconnect the mold slide and pull the disk forward on the locking studs to see that they do not bind, and also see that the ejector blade is in line with the base of the mold when the blade comes forward. If the blade does strike, or the locking studs bind in the stud block, it may be necessary to remove the dowel pins from the blocks and fasten them loosely to the vise frame; then see that the ejector blade is in correct relation to the mold. Tighten the stud blocks evenly so that the locking studs will be free in the blocks.

12. *Gibs on Vise Frame*—Adjust first elevator so elevator will stand square with mold. Test by placing a thin matrix in each end of first elevator jaw, pull mold forward over toes of matrices, raise elevator by hand. If matrices are tight, alignment is correct; if not, adjust gibs. The jaw will be partially self-aligning if there is some play between the slide and the lower gibs.

13. *First Elevator*—To just clear the transfer and delivery channels. Adjust by gibs on vise frame. The elevator carries the line to the mold, and after the cast, carries it up to the transfer channel. (See Fig. 4-10.)

14. *First Elevator Connecting Link*—Allow $\frac{3}{4}$ " at the top and $\frac{1}{8}$ " at the bottom from holes to shoulders. Adjust by link screws. The link has a spring inside of it that compresses when the alignment is made. Then adjust first elevator jaws a hair line lower than grooves in line delivery channel by screw in auxiliary lever.

15. *First Elevator*—Allow .010" between adjusting screw and vise cap when first elevator is lifted for alignment. When display matrices in the 45-point alignment and the auxiliary position of duplex display matrices are used, this setting should be about .005". Adjust by center screw at top of elevator when matrix toes are in the mold. This is the alignment of matrices and is important.

16. *First Elevator*—Adjust jaws a hair line higher than transfer channel so that the matrices will pass freely to the second elevator. Adjust by screw on bottom of first elevator slide, right side. Also adjust from front to back.

17. *Mold Slide*—To bring mold slide .003 to .005" from vise jaw or line. Adjust eccentric pin in mold slide lever (pin with lever attached). This is to bring the mold over the toes of the matrices so that the alignment can take place. The mold must not strike the line of matrices or it will prevent proper justification. The position to make this adjustment is shown in Fig. 7-12, and the method of making the adjustment is described in Chapter 12, under the heading "Adjusting the Movement of the Mold Slide."

18. *Second Elevator*—When the elevator is at transfer point, roller should be free of cam. Adjust by connecting bolt in second elevator lever. This is to assure the elevator going to its proper position for the line to transfer. When elevator is at upper position the connecting bolt should be loose. When elevator is at transfer point the second elevator starting spring should be flush with collar. On older

models adjusting nut should touch spring. This spring is to start the elevator down and prevent sticking at the distributor box.

19. *Distributor Screw Matrix Guard*—The matrix guard to be adjusted to clear the distributor screws. There must be clearance between matrix guard and matrices as they pass along the distributor bar.

20. *Elevator Transfer Lever*—Allow $5\frac{5}{8}$ " from the intermediate or transfer channel to slide finger ($7\frac{5}{8}$ " on 42-em machines). Adjust by moving split lever on shaft. This is the lever that transfers the line from the first elevator to the second elevator.

21. *Spaceband Lever*—The spaceband lever pawl should pass point of spaceband box rails. Adjust by turnbuckle that connects with the transfer lever. This lever returns the spacebands to their box.

22. *Transfer Slide*—Allow $\frac{1}{8}$ " between slide finger and the end of slot in spaceband lever pawl. Adjust screw in transfer slide. The slide and finger push the spacebands under the pawl so that the pawl can return them to their box.

23. *Transfer Slide*—Cut in slide finger to be flush with right-hand end of first elevator back jaw. Adjust by screw in automatic safety pawl. This is when the line is transferred to the second elevator bar. The cam roller works the automatic safety pawl buffer, which forces the pawl clear of the upper stopping lever.

24. *Delivery Slide*—The slide should go far enough back to just catch in the second notch of the delivery pawl. Adjust by split lever on shaft. This is to bring the delivery slide back so that when a line is raised by the assembling elevator, the line will not strike the delivery slide short finger.

25. *Delivery Slide*—To stop $\frac{1}{2}$ " inside of first elevator. Adjust by stop screw on face plate. This adjustment is to carry the matrices inside the first elevator retaining pawls, which keep them from falling out.

26. *Delivery Slide*—To start the machine when the slide stops against the stop screw on face plate. Adjust plate on automatic pawl. The starting of the machine is done by the delivery roller forcing the automatic stop pawl off the upper stopping lever.

27. *Mold Driving Pinion Shaft Friction Clamp*—To take up lost motion in the mold disk. Adjust screw in clamp. This is to keep the disk from running past the locking stud blocks.

28. *Vise Automatic Disk Dog or Plunger*—To just clear the automatic stop rod. Adjust by screw at right on top of elevator slide. Machine to be stopped by thin space placed under center screw of first elevator. This is to stop the machine in case the first elevator does not come down to proper position. The disk dog pushes against the automatic stop rod, forcing it out; the bottom end, coming in contact with stop lever, acts on the connecting rod, which, in turn, pushes the forked lever against the collar that is connected to one end of the clutch rod, the other end of the rod being connected to the clutch. This causes the clutch to be thrown out of action and stops the machine.

29. *Metal Pot*—Mouthpiece holes to align with smooth side of slug. Adjust with top and bottom screws in pot legs. Square pot with front and back screws when using gauge.

30. *Pot Lever Eye Bolt*—There should be $\frac{1}{8}$ " between the nut and pot lever when spring is compressed. All late model machines have pipe riveted to the screw, and nut should be against pipe. This gives the lockup to the pot and takes up all excess friction.

31. *Back-Knife*—To set square and press lightly against the mold. Adjusted by two square-headed screws back of the knife. The slug passes in front of the knife, which trims it to type high.

32. *First Elevator Slide Guide*—Releasing lever to clear transfer slide $\frac{1}{32}$ ". Adjusted by screw in second elevator. This lever is to keep the matrices from transferring if the second elevator does not come down in position.

33. *First Elevator Intermediate Bar*—When pawl is raised it should be flush with second elevator bar. Adjust by two screws in top cap. This pawl is to push down the spacebands when transferring.

34. *Ejector Blade*—When the blade advances it should come slightly beyond the front end of the lower liners in the knife block. Adjust by screw in ejector lever pawl. This is where the slug is pushed out of the mold between the trimming knives and into the galley.

35. *Assembling Elevator*—Starting pin to release the delivery slide just as the latch catches. Adjust by screw under starting pin. This small pin starts the machine by releasing the delivery slide, which is carried to the first elevator by line delivery spring, bringing roll on split lever in contact with the automatic stopping pawl, forcing the pawl off the upper stopping lever and allowing the clutch to go into action.

36. *Assembling Elevator*—To be returned by its own weight. Adjust by counterbalance spring screw hook in keyboard frame. This is to make the elevator fall easy by balancing it so that it will just fall into position.

37. *Assembler*—The chute spring to throw the bottom of the matrices toward the star wheel, allowing the cap "W" to go between it and the rails. Adjust by finger adjustor stud. (No adjustment on Blue Streak machines.) The star wheel shaft to have a spring with the proper tension, to slip on tight lines. The catch spring to prevent matrices from falling backward. Adjust by bending the spring so that it will be flush with casting when pushed by matrices.

38. *Matrix Delivery Belt*—To be kept tight. Adjust by pulling idler pulley back. This carries the matrices from the assembler entrance to the assembling elevator.

39. *Spaceband Box*—The pawls to go $\frac{1}{32}$ " below the box rails on the down stroke. Adjust by screw in pawl lever. The pawl lifts the spacebands over the rails, allowing them to fall into the assembler.

40. *Spaceband Box Center Bar*—One spaceband should be released at a time. Adjust by screw in center bar. This allows but one spaceband to pass between it and the points of the spaceband box rails.

41. *Assembler Slide Brake*—To release just before the line delivery starts. Adjust by screw in operating lever. This brake holds the slide when the line is being assembled and releases to bring slide back into position. The outer end of the operating lever is forced up by the assembling elevator when it is raised and releases the brake. When the elevator descends, the lever is forced down, setting the brake for another line.

42. *Distributor Box Lift*—To lift matrices $\frac{1}{32}$ " above rails in the distributor box. Adjust by screw in cam lever. This lifts the matrices into the distributor screws, one at a time.

43. *Distributor Box*—Matrices to pass freely from rails to bar. Adjust by screws in top of distributor bar. The matrices travel along this bar until they come to their proper places, when they fall through the channel entrance into magazine.

44. *Distributor Beam*—Adjust distributor beam vertically so that the bottom of a matrix will clear the top of the channel entrance partitions by about .043".

45. *Keyboard Upper Guide*—When placing keyrods in guides be sure to notice whether machine is equipped with double "e" attachment; if not, leave first section of upper guide blank.

46. *Thermostat Gas Governor*—To lower temperature turn the dial to the left; to raise temperature, turn dial to the right. The tubular casing part of the thermostat which is immersed in the metal is machine steel and has a pocket in the bottom of the tube in which is set an Invar steel rod. Invar is a high nickel content steel which has about one-tenth the coefficient expansion of machine steel. The contraction or expansion of the thermostat casing lowers or raises the Invar rod which in turn operates the levers that control the plunger type of gas valve.

47. *Trimming Knives*—To trim the slugs to size and parallel. Adjust left-hand knife to trim overhang from smooth side of slug. The knife is held to the vise frame with two square-headed screws, and there are two side adjusting screws in the knife block against which the knife rests. The right-hand knife is held with two hexagon-headed bolts and two micrometer-set adjusting screws.

48. *Vise Jaw*—To bring face of type flush with each end of the slug. Adjust screw bushing in bracket for left-hand long jaw and screw on knife block for right-hand jaw. This is to position the type on slug so there will be no indentation or overhang.

49. *Pump Stop*—To have $\frac{1}{32}$ " between stop lever and stop. Adjust by screw in pump stop operating lever. This is to prevent a line from casting if it is not properly justified.

50. *Matrix Guard Safety*—On "Two-in-One" single distributor machines, adjust the lower end of distributor screw matrix guard lever so that if there are matrices on the distributor bar, the channel entrances or distributor bars cannot be changed until all matrices are distributed.

HOW TO TAKE DOWN A LINOTYPE (MODEL 8)

The following is a list of operations necessary in taking down a Model 8 Linotype and will also serve as a guide to taking down other Linotype models.

1. Insert matrix locking strips into the magazines or lock magazines. This is done to prevent matrices from sliding out when removing magazine from the machine.
2. Remove all magazines. Raise each magazine to proper position, pull magazine frame elevating handle forward, attach magazine supporting arms and allow magazine to slide down frame to magazine supporting arms.
3. Remove stationary front guide holder and assembler entrance by removing the four screws in stationary front guide and three screws in assembler entrance.
4. Remove pi stacker, tube and bracket by removing two screws which hold the pi tube bracket to escapement support brace.
5. Disconnect line delivery lever from the slide by disconnecting the link. The line delivery lever is found in front of the column back of the face plate, between the transfer and spaceband levers, and is connected to a shaft on which is a split lever and cam roller. It carries the assembled line from assembling elevator to first elevator, and while doing so the roller on line delivery

split lever forces the automatic stop pawl on cam No. 10 free of upper stopping lever, releasing clutch and setting machine in motion.

6. Disconnect transfer lever by releasing pin held in place by a set screw at top of lever. The transfer lever is found back of transfer channel and operates the transfer slide which carries the line from the first elevator to second elevator, pushing the spacebands under spaceband pawl which returns them to spaceband box.
7. Disconnect assembling elevator by disconnecting the link at bottom of the elevator from the assembling elevator lever. The assembling elevator is the part in which the line is assembled before it is raised to the delivery slide.
8. Disconnect the spaceband key rod by removing wire pin connecting it with spaceband key lever, behind the face plate. The spaceband key rod is found on the extreme right of the keyboard, it is the last one in the keyboard lower rod guide, and works in conjunction with the spaceband key on left side of keyboard.
9. Secure spaceband pawl with a string. Securing spaceband pawl is done to prevent losing spaceband pawl spring. This pawl carries the spacebands from the intermediate channel to the spaceband box.
10. Remove ejector scale bar by removing shoulder screw at lower end of bar.
11. Remove assembler driving belt and take off face plate by removing three screws which hold it in place. These are found at each end of face plate and one near the center line under line delivery channel.
12. Remove automatic matrix guard.
13. Remove magazine escapements by removing the screws, one at each end, or turning escapement hook screw nuts.
14. Remove escapement lever guide, upper.
15. Remove escapement lever bar support, assembled. Remove screws, one on each end of support.
16. Remove the keyboard rod upper guide.
17. Remove keyboard rods. The rods are lifted out and tied with cord in sections of eighteen.
18. Remove the keyboard by removing screw that passes through intermediate bracket, the two that pass through the base and screw in bottom of keyboard.
19. Remove the distributor shifter lever, after disconnecting the spring. The distributor shifter lever and spring are found on top of mold gear arm and are used to operate the distributor shifter, which pushes matrices from second elevator into distributor box.
20. Remove matrix tray.
21. Remove matrix tray brackets.
22. Remove font distinguisher indicator bracket.
23. Remove font distinguisher lever bracket.
24. Remove channel entrance.
25. Remove distributor screw guard lever.
26. Remove distributor box by turning the handle to right as far as it will go, and lift off.
27. Remove distributor by loosening two screws that hold it to bracket. When replacing care should be taken that dowel pin has entered hole on older ma-

chines, and on later machines see that banking screw at right end of distributor beam banks against distributor bracket.

28. Remove magazine frame elevating links.
29. Remove magazine frame gibs.
30. Remove upper and middle magazine frames.
31. Remove magazine frame elevating shaft.
32. Remove magazine frame, lower, after removing four screws attaching frame to magazine elevating screw bracket.
33. Remove magazine elevating screw crank and universal shaft.
34. Remove magazine elevating screw bracket.
35. Remove magazine frame locating block supports.
36. Remove magazine frame locating block lever shaft collar.
37. Remove stationary front guide holder bracket, right-hand.
38. Remove stationary front guide holder bracket, left-hand, and magazine frame locating block lever shaft and levers, as one assembled unit.
39. Remove intermediate bracket.
40. Remove galley, galley bracket, right-hand, and galley bracket, left-hand.
41. Remove slug lever and slug lever connecting rod.
42. Release first elevator link at foot of first elevator slide, and remove slide. The first elevator link connects first elevator slide with first elevator lever and is sometimes used to align first elevator with line delivery channel. The slide, in front of vise, is held in position by four gibs.
43. Remove first elevator cam and auxiliary lever. The first elevator cam is found on left side of cam shaft outside the mold gear arm and operates first elevator lever and slide.
44. Remove distributor bracket support.
45. Remove distributor bracket by removing four screws which hold it to column. When replacing, care should be taken that dowel pins have entered the holes of the intermediate bracket and column.
The machine has now been taken down to what is known as the "Factory Strip." On skids the narrow base machine will go through doors or passages 39 inches wide. The wide base machine requires 47 inches.
46. Disconnect left-hand vise jaw wedge from vise closing lever. The wedge is used to lock jaw against line when casting.
47. Open vise in second position and remove mold slide after first removing ejector controller link rod and controller. The vise is found on the front of the machine on the left side and is locked by two handles. The mold slide, inside of which is the ejector blade, is back of the vise and is connected to the mold disk. To open vise to second position, bring first elevator down on vise cap (disk locking pins must not be in the studs); pull out rest pin at bottom of vise, and lower.
48. Remove pump stop operating lever and pump stop lever bracket. The pump stop operating lever is found to the right of the pot, on top of long vise stud, and operates pump through short vise jaw. When line is not fully justified, short vise jaw remains locked. When line is fully justified, short vise jaw is pushed against pump stop operating lever, which in turn frees pump lever

and allows plunger to descend. Adjustment is made by adjusting screw on operating lever touching short vise jaw.

49. Remove gas burners. One burner is under metal pot and is used for heating metal; the other is under mouthpiece.
50. Insert nails in second hole in lower ends of rods in justification spring and vise closing lever spring. The justification spring is found under justification lever in center of base; it is used to force the justification block up against bottom of spacebands to justify the line for casting. The vise closing lever spring is found under vise closing lever on left side of base. This lever is U-shaped, one arm closing long vise jaw against the line; the other, by extra pressure, assisting the justification lever in justifying the line. Be careful in replacing these springs, the justification lever being the heavier of the two. On Blue Streak models both springs have the same strength.
51. Remove pump lever spring. The pump lever spring is found on older machines on top of pump lever over the pot, and on other machines inside the column. It is used to push plunger down and force metal through the mold against the line of matrices.
52. Remove mold gear arm. The mold gear arm is on left-hand side of machine, and has attached the square pinion, mold turning shaft, pinions and the short vise stud by which vise is locked.
53. Remove pump lever and mold cam lever. The pump lever is found above metal pot and is connected with plunger to force metal from pot into mold. The mold cam lever is found above pump lever, and is used to give mold slide its proper movement forward and back.
54. Remove metal pot. First remove pot leg caps and turn out the front pot adjusting screws at end of pot legs. Do not disturb setting of any other adjusting screws.
55. Remove tie rod, and in replacing be sure that it does not bind. The tie rod is found on outside of Cam No. 10, running through a hole in cam shaft bracket cap, and is screwed into the column. Its purpose is to relieve strain on machine when cast takes place.
56. Remove second elevator and cam levers, first removing starting springs on the side. The second elevator and cam lever are found in rear of machine, and are connected by bolt, spring and two nuts. The starting spring is found connected to second elevator cam lever on the side near auxiliary lever, and is used to start second elevator from distributor and to keep roller on the cam.
57. Remove first elevator lever and ejector lever. The first elevator and ejector lever are found in rear of machine, under justification and vise closing levers. The first elevator lever is used to operate first elevator slide; the ejector lever and link to push slugs from the mold through trimming knives to the galley.
58. Remove pump lever bracket. This is the bracket which carries pump lever. It is attached to the column by two large screws.
59. Remove cam shaft bracket cap. The cam shaft bracket cap, through which the tie rod passes, is found over the cam shaft.
60. Remove strip from cam shaft and loosen set screw and push Cam No. 10 toward other cams. Cam No. 10 (delivery and transfer cam) is found on right-hand side of shaft next to bracket cap. It operates the line delivery, transfer and ejector levers, and in conjunction with the automatic and safety pawls, stops the machine.

61. Remove cams. Removing cams means lifting all the cams together off the machine in one operation.
62. Remove the starting and stopping lever, first taking out hinge pin. This lever is found in front of machine under mold slide, and is used in conjunction with vertical lever to start machine and with forked lever and flange to release clutch from the pulley to stop machine.
63. Remove clutch and pulley. The clutch is found on the outer end of the driving shaft inside of the pulley, and is used to drive the machine.
64. Remove justification lever, vise closing lever and springs. The justification and vise closing levers are found in rear of machine under second elevator lever.
65. Remove forked lever. The forked lever is found under the cams and straddles driving shaft, and is used to operate flange. Remove cam shaft bracket, right-hand.
66. Remove driving shaft and flange. The driving shaft is found under the cams and is used in conjunction with clutch to drive machine. The flange is used in conjunction with clutch rod to release clutch shoes from driving pulley.
67. Remove ejector controller lift link guide. Watch carefully for lift link roll. It is on the screw in link and will fall off when guide is removed. Tie roll onto screw and link with cord.
68. Remove ejector controller lever. Hold latch and lever together when removing to avoid losing spring. Tie latch down against lever with cord.
69. Remove starting and stopping lever bracket from front lower side of column.
70. Remove cam shaft bracket, left-hand.
71. Remove vise. Be sure that vise is locked up with right-hand vise locking screw. Loosen set screw on vise shaft. Drive shaft from left to right. When shaft has been driven through left-hand pot leg bushing, remove bushing and place same where it will not be disturbed. Drive vise shaft only through right end of the shaft hole in vise frame. Do not remove right-hand pot leg bushing. Remove vise, push shaft to left and reapply left-hand pot leg bushing to vise shaft. Then push shaft all the way back and lock with set screw.

When the machine is reassembled, the bushings must go back the way they were originally. They vary slightly in width and reversing them would throw vise out of alignment with the column and mold disk. This would make it impossible to operate the machine and might also result in serious breakage of parts involved. When a new machine is shipped from the factory the bushings are marked R. and L. The markings are on the front side of the bushings. When new bushings are applied outside, it is seldom that punches are available so they are not marked. This makes it necessary that bushings be reapplied exactly as removed when dismantling. If you have occasion to replace bushings, file new bushings exactly to width of the old bushing. The widths must correspond to the thousandth of an inch.
72. Remove column.