Mold Cam Rod

CHAPTER XIII

THE MOLD DISK AND SLIDE

Movement of the Mold Disk

HARRY G. POTTLE in *Who's Who in the Composing Room:* An experienced machinist usually takes a quick look at the movement first. The mold disk comes up to the jaws. The pot also advances but does not move the disk. The pot recedes. The disk recedes — not much but visibly. (On an old machine it may be invisible). Then the disk advances to its previous position and the pot comes up and pushes it hard against the jaws.

To Adjust the Mold Disk Lockup

QUESTION: I hear operators speak of lockup tests, and it seems to me this is confused. Some are speaking of mouthpiece lockup, others of mold disk lockup. Are they the same, or are they different? — T.M.O., Sioux Falls, S. D.

LOOMIS: They are different, though they work in almost identical areas. The *mouthpiece lockup test* is described in *Test the Pot Lockup,* page 177.

This is the *mold disk lockup* test:

First, secure from your garage a piece of round steel 5″ to 6″ long and .6875″ in diameter (11/16″), plus or minus .001″. 11/16″ is the thickness of the front jaw, which normally acts as a backing piece for the vise jaw. You can afford to go to some trouble to obtain this piece of the proper diameter, for it will be used again in a moment. Its use simplifies the test, and since it will be needed every year or so, tag it and put it away where it won't be grabbed up when somebody can't find the mallet. With this rod, you can make an accurate test without removing the back jaw. But first, check for play in the mold slide, as follows:

Drop the first elevator to the vise cap and stop the machine with the mold disk forward. Lay a matrix on the first elevator jaws with its bottom against the disk. (This is Sterling Hoff's test, and a good one.) Pull the mold disk as far forward as it will come; then push it back. (Leave the mold cam lever handle up, of course. This is to check the play in the slide.) Now the gap between the mat and the disk should not be over .010″, preferably much less. Sometimes it will be 1/32″ or 1/16″, and you had better take steps before making the lockup adjustment. See *Too Much Forward and Back Play in the Mold Slide,* immediately following.

Take a piece of furniture about 8″ long and put it on the vise cap and under the first elevator, thus holding up the first elevator. Pull the plunger pin; close the left-hand vise jaw; put the test rod in place behind the jaw. With your finger on the vise automatic stop rod, have somebody turn the machine forward by hand until the mold cam roll is at the highest point on the second shoe in the mold cam track.

Now if your disk is one of those that has excessive play, you are in a dilemma, for the thing has to be adjusted whether it's worn out or not. My own method is to adjust it with the disk in its farthest back position all the time. Therefore I always push the disk firmly backward before making the check.

Now, with the first elevator up out of the way, the test rod behind the left-hand vise jaw, which is closed, the disk pushed back as far as it will go, and the mold cam roll at the highest point on the second shoe just before the pot goes forward (I repeat myself here, because all these conditions must be rigidly observed), there should be .005″ between the mold and the jaw. This is about two thicknesses of newsprint, but a steel feeler gauge is better. With the disk pushed back (I'm getting to be annoying about this, but you must watch it), a .005″ feeler or two pieces of newsprint should drag when pulled between the mold and the vise, but they should move.

This is adjusted by the eccentric in the lower end of the mold slide lever at the back of the machine. Pull back on the little handle to move the mold disk forward; push forward to bring the mold disk back (and always, when bringing the disk backward, push it back before testing). This can be a tricky adjustment, but, once made, hang onto the little lever and tighten the lock nut securely, and it will stay for quite a while. On some machines the stud has been turned upside down and the movement of the adjusting handle is reversed.

Wait a minute! Don't wash up yet. How about the face-to-face parallelism of the vise jaw and the mold? Hadn't thought of that, had you? If you've already used shims under the vise locking studs to bring the vise up evenly, you shouldn't have to bother with this — but sometimes you do. It is no good to have .002″ clearance on one end and .010″ on the other. Try your feeler all the way across. If there is a difference, find out how much it is, and use shims under the vise locking studs to even it up.

The Mergenthaler Company emphasizes that this adjustment must be made on the high point of the second or smaller shoe. This is correct. They recommend from .003″ to .005″ between mold and vise jaw. This is correct for newer machines. On old-timers, of course, you will have trouble getting that close. I generally am satisfied with .005″ to .010″.

HARDING: In tightening the lock nut, slip a 6″ piece of ¼″ pipe over the adjusting lever to hold it without movement. Otherwise sometimes it is very difficult to keep the pin from turning.

Too Much Forward-and-Back Play in the Mold Slide

LOOMIS: We'd better take this up while we are near it. This sloppy movement is caused primarily by three parts: the mold cam roll (the one that runs in the track, which wears both in the bore and on the periphery); the mold cam roll eccentric pin, which wears out of round; and the mold cam lever roll (with the larger hole, which wears; this roll itself doesn't usually wear much on the outside). On occasion, on very old machines, the two small mold cam shoes in the track will wear, but not often. In replacing these, I have generally found that I have had to grind them down to the thickness of the old ones to allow a new cam roll free passage. The cam roll *must* go through freely all the way around, especially over the shoes. You may use a feeler gauge between the roll and a shoe, and think you have .005″ play, but unless it is more than this, you'd probably better leave the shoes alone.

I prefer the eccentric pin not to measure less than .498″ at any spot, and both cam rolls should not be below 1.497″ at any spot.

Removing the Mold Cam Shoes

In case you do have to remove a shoe, it is worth approximately one million dollars Chinese to know how to do it without removing the main cams from the machine. First, by poking with a long screwdriver, and using a small hammer on a screwdriver to butcher the screws, and various subterfuges from there on to remove the screws, you are in a position to operate. Now use an old liner and drill a hole in it big enough to pass a 10x32 screw (a No. 20 drill or larger). Lay this liner across the track in the mold cam. Now put a 10x32 screw, ½″ long or more, through the hole, and turn it into the threads in the shoe to a depth of three or four threads. Get a couple of pieces of wood furniture, and a handful of 6-point slugs, and put them under each end of the liner, building it out far enough so the shoe can come off the pins. Turn the screw into the shoe. The shoe will come off.

The first mold cam shoe on a Linotype, the one with a rise in it, measures about .395″ new. These often have to be ground down for a new cam roll. I cannot give you the thickness of the second shoe, although as I remember it is the same. I have replaced a number on principle, but do not do so any more. I would say it is practically never necessary. Just check it to see that the rise is there; that's all unless your machine is very old.

Note that on rare occasions the large diameter stud at the bottom of the mold cam lever wears considerably out of round. This is a part of the casting, and the entire lever must be replaced. Be sure the washer and screw are present to hold it on.

Final Setting

Now, having replaced both rolls and the eccentric pin, and shoes if necessary, set the forward thrust of the mold slide as given above in *To Adjust the Mold Disk Lockup.*

To Remove the Mold Cam Lever

LOOMIS: This can be done by taking out the ejector link, pulling down the mold cam handle and pushing out the shaft with a screwdriver through the hole on the far side, after which the lever can be removed from the bottom.

Can a Warped Mold Disk Be Used?

LOOMIS: Yes — and probably seventy thousand of them are, for very few cast iron disks that have been in use for any length of time, escape warping. The *amount* of warp is what counts. On two-mold disks it usually can be handled by shimming the molds. (See *Shimming the Molds,* page 214.)

On a four-mold disk it is difficult to use a disk that is warped more than .005″ out of true. Check this by setting the mold disk guide just to kiss the disk at its highest spot, then turn to the lowest spot and use a feeler. A dial indicator is a wonderful instrument but not available to most m-o's.

How About a Rebuilt Disk?

QUESTION: My disk is badly warped, and I have been advised to have it rebuilt. They say it is considerably cheaper. — D.I.U., Bucyrus, Ohio.

LOOMIS: To give proper credit, I think disk rebuilding was perfected by Montgomery & Bacon about twenty years ago. They cut off the outer rim and installed a steel rim, pinning it in place, then shaving the disk on both sides to secure perfect straightness. Others do it now, and when properly done it is a good job. It does not save as much money now as it did, but to my notion it is a better disk because it is steel, and steel apparently does not warp. I have installed many of these and had excellent luck with them. Some ten or twelve years ago Intertype began using steel for their six-mold disk, and I have been told that Mergenthaler is using steel disks.

To keep the record straight, Ottmar Mergenthaler invented the Linotype, and there must go the major credit. The Intertype Corporation has provided competition and refinements — and competition is necessary. They too deserve much credit. Smaller places — Montgomery & Bacon, Rich & McLean, Star Parts, Lino Parts, and others, also have contributed, and deserve credit in a smaller degree. Not all of their parts are good, but some are excellent — such as the rebuilt disk. It is worth noticing that some smaller companies that started precariously have grown large and substantial; some have been absorbed into the two big companies; others make products that now are sold directly by the big companies. Witness the Mohr saw and the Monomelt and the Margach feeder.

Adjusting the Mold Slide Gib

LOOMIS: On very old machines there are two adjusting screws below a plate that forms the left side of the mold slide groove or slide. There should be about .006″ play (1/4 turn of the screws). Turn them in, then back off. Just enough to provide free movement is necessary.

Loose Mold Screws Cause Trouble and Squirts

QUESTION: There seems absolutely no reason for this, but about every fourth line I get a loose-line squirt. I have tried these lines over, and they are not loose. The foreman accuses me of sending in loose lines, but I have repeatedly tried these lines over and they are not loose. Sometimes I have noticed that some spacebands do not come up as far as others, but I don't know why. — M.I.M., Odessa, Del.

LOOMIS: Provided the forward thrust of your mold slide is properly set, some other obstacle is impeding spread of the lines at justification. It sounds to me as if a mold screw has worked out. On an Intertype this can be caused by leaving the border block recasting pin in the justification rod.

Setting the Mold Disk Guide Support Screw

LOOMIS: Some machinists adjust this after the disk comes forward onto the locking studs, by turning up the screw with the fingers, and locking. This is correct for old machines, but if you are installing new locking stud blocks you will want to go further.

On Linotypes the prime setting is made as follows: with the disk in normal position, loosen the screw. Back the machine. You will need a light. Insert a .002″ feeler strip between the top sliding surface of the slide and the corresponding surface on the column of the machine (vertical surfaces just behind the knife block). Now, working the strip slowly back and forth, turn up the screw until the feeler binds. Tighten the lock nut carefully and check again with the feeler.

On an Intertype this .002″ is prescribed at the bottom instead of the top.

What Makes the Mold Disk Pound?

QUESTION: My mold disk pounds very hard sometimes, until it seems as if the machine would break. How can this be fixed? -- P.B.T., Kingsport, Tenn.

HARDING and LOOMIS: Some disks pound as they come forward at casting point, some at ejection point, and some at both.

If both, or if at casting only, look for:

Dry locking studs (these should be oiled); anything that binds the disk, such as metal under the back knife, back knife set too tight, dry mold disk stud, mold

disk guide too tight, metal on back of mold, metal gathered around the Ejector Blade Guide, Assembled (old style ejector).

One way of getting at the answer to this trouble is to watch the disk as it advances onto the studs. Does it advance straight, or does it jerk a little forward or back?

If back, adjusting the brake tension may correct it, particularly if the disk has to *snap* back. This also can be: headless screw in rear end of bevel gear shaft loose; gear segment or shoe on the mold turning cam loose; oil on the brake leathers.

If it snaps ahead, look for metal behind the disk or other retarding agents previously mentioned.

This sort of pound can be caused also by misadjustment of the mold disk guide support screw or the long gib under the mold disk slide on old machines.

If it pounds only at ejection, look for misadjustment of the mold-turning cam shoe at the back, or a loose gear segment.

Be sure the disk is tight on its stud.

An odd sound, more like a dull click, coming while the disk is turning, indicates metal in the teeth.

A mold cap liner screw, worked out, also can cause this.

For pounding of slugs as they are ejected, see *Why Do Slugs Pound at Ejection?* page 209.

What Makes the Mold Disk Turn Hard?

HARDING: Nine times out of ten, metal lodged somewhere behind the disk, under the back knife, around the ejector guide. Back knife set up tight.

How to Adjust the Intertype Mold Cam Safety Lever

HARDING: This is located under the rear end of the mold disk slide. When the forward thrust of the mold disk slide is interrupted, the clutch is thrown out.

To adjust it, shut off the power, back the cams a little, pull out the clutch lever. Turn the adjusting screw seen above the drive shaft until there is approximately .010″ clearance between the screw and the lever. Tighten the lock nut.

To Remove the Mold Slide

HARDING: Lower the vise to second position as instructed in *How to Lower the Vise to Second Position,* page 119.

Remove the wing pin from the ejector lever link at back and remove the link.

Lower the mold slide lever handle.

Pull the slide out a little.

(But if a universal ejector, set the ejector at 12 picas before you pull out the slide. With a long screwdriver unscrew the long rod whose head is toward the front. The ejector blade controller slides along this rod. Now the controller, if worked at, will drop out. Disconnect water tubes, if any, from the stud.)

Grasp the mold slide under the mold disk guide support at the left. Use a rag, for it may be hot and oily. Grasp it about 6 inches back from the disk on the right, with your hand protected by a rag, under the slide.

Lift it out and take it away.

To Remove the Mold Disk

Old Style Linotype: Lower the vise to second position but do not remove the slide.

Remove the guide with a ¾" socket wrench.

Mark disk and stud to insure returning them in same relative position.

The nut at the front may be right-hand or left-hand. Left-hand usually are marked "L H" on the end of the stud, but not always. If you do not have a big enough socket, use a punch and try it both ways.

Water-cooled disk:

HARDING: Lower the vise to second position but do not remove the slide. With a ¾" socket wrench take off the guides. With a big screwdriver take out the screws that hold the plate on front, and pull off disk. In replacing, put the oil hole of the plate at the top.

Snug up the bolts that hold the guides, with the guides touching the front side of the disk, and gently tap the guides back until they barely miss the disk, turning the disk all the time.

Milton Anderson brings the top guide up to the front of the disk, the lower one up to the back side.

Intertype disk: Lower vise to second position.

Remove the one or two guides.

A thin flat wrench is provided to fit the rear nut. Pull the disk out part way and fit the wrench over the rear nut. *Do not ever loosen or remove the front nut.* The rear nut has left-hand threads, so turn the disk until the handle of the wrench bounces against the mold slide on top. Bounce it until the nut loosens. Tighten it the opposite way.

To Time the Mold Disk

QUESTION: I would very much appreciate it if you would explain to me how to time the mold disk when it has been pulled out after the cast. — E.S.Y., Shelby, Mont.

HARDING: Pull out the pinion and turn the timing mark mark to 3 o'clock. Slide the disk back so one of its timing marks will coincide. Now, do you remember which mold was where when you pulled out the disk? If it's after the cast, it may be confusing.

LOOMIS: Take off the mold disk turning pinion. Back the machine to ejecting position with a mold on the locking studs, ready to eject. Replace the mold disk turning pinion so it is seated on its own positioning pin. Turn the machine forward and you should have it.

Failure of the Mold Disk to Turn

See *Mold Turning Mechanism* in Chapter XV.

LINECASTING OPERATOR-MACHINIST

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