

CRAYON MARKERS REPAIRS

If you've read my essay on *Other Grease Pencils and Markers*, I provided a picture of a set of 4 Kohinoor mechanical crayon markers at Figure 40. They all had white barrels, but each turning knob at the top of the barrel was a different color, denoting the color of crayon lead or marker lead which was loaded in the marker, for easy identification. Figure 43 showed a Scripto marker's mechanism that had been pulled out of the barrel for examination.

In that essay I noted that "The Redipoint marker and the Kohinoor markers and the Scripto markers are all "cousins". Each uses spiral grooves inside the barrel to guide the lead holder up and down, to advance and retract the lead. All have removable mechanisms, making it easy to refill them with lead. But markers of this type have two annoying weak points – the lead holder often binds up when the grooves inside the barrel get dirty, or when lead debris or contaminants like rust clog the long metal tube in which the lead holder moves back and forth.

It turns out that none of the 4 Kohinoor markers were usable. Not one of them would properly advance and retract the lead. Like many old mechanical lead pencils that I collect, they needed some repair and maintenance. I took a few pictures and then chronicled what I had to do to make the Kohinoor markers work smoothly again, in the hope that it will save some time and trouble for anyone who has to undertake this type project.

▼ Figure 1. This is the internal mechanism from a Scripto marker. It's virtually identical to the Kohinoor markers that don't work. The entire working mechanism simply unscrews from, and then pulls out of, the top of the marker. The piece of crayon lead on the left side of this image goes up into a metal tube that runs inside the barrel of the marker, and virtually its entire length, terminated by the blue plastic cap/turning knob at the top, on the far right. The green and white object in the center of the image is the lead holder. The left side of the lead holder is slightly enlarged, to go over the end of the crayon lead and hold it in place. The green end of the lead holder has slanted ridges, which fit into spiral grooves inside the barrel of the marker. The lead holder moves up and down the grooves in the barrel as the top blue knob is turned, to advance, retract and refill the lead. No matter how hard I tried to turn the top knob on the Kohinoor markers, it just wouldn't turn. Had I turned too hard, the slanted ridges on the lead holder simply would've given way, and the marker would likely be unusable thereafter. Note that there are 2 "cuts" in the sides of the long metal tube, up near the screw off cap, which stop the lead holder from moving further upward.



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For the necessary repair work we'll use the following terms from the above discussion - - the "lead", the "long metal tube", the "lead holder", the "stop" for the lead holder up near the top of the long metal tube, and the "turning knob".

▼Figure 2. The image below illustrates the cause of the problem. All 4 markers had been virtually underwater, or full of rainwater, at some point in their lives. There was rust on both the inside and outside of the long metal tubes, and the leads had partly disintegrated.



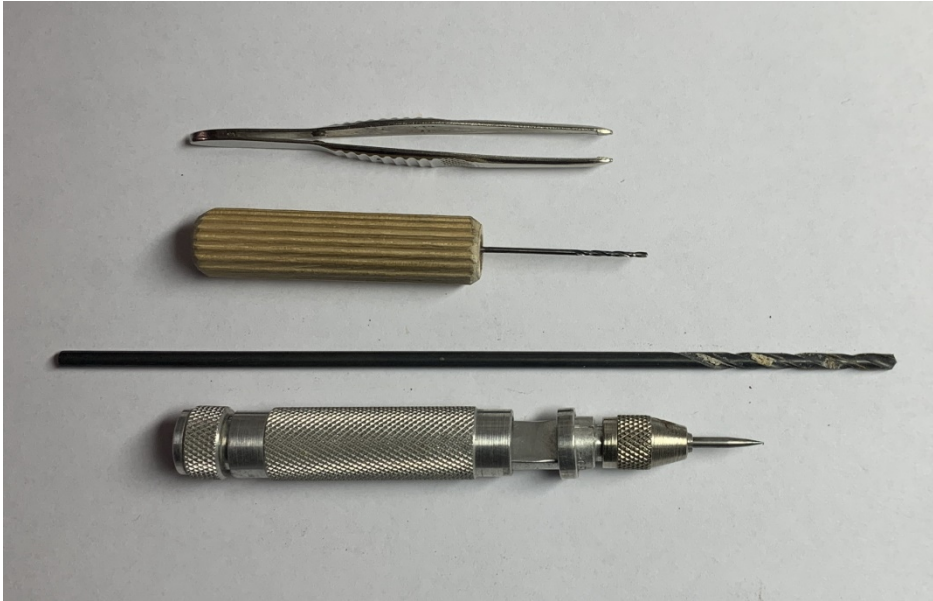
At far left of the above image, you'll notice that there's a "lump" on the top edge of the red lead. That kept the lead from moving smoothly up and down the long metal tube. Also, toward the center of the above image, at the place where the lead enters the very tip of the long metal tube, you can see visible rust on the top edge of the lead, which enlarges the diameter of the lead and keeps it from smoothly moving up and down the long metal tube. Just to the right of the white lead holder, you'll note that both the inside and outside surfaces of the long metal tube are rusty, which also precludes the lead holder from moving smoothly up and down the long metal tube (I had to move the lead part way out of the long metal tube, so we could view the inside of the long metal tube.). In fact, this marker was jammed from the tip of the long metal tube to the stop. The mechanism wouldn't advance the lead even when taken out of the marker.

▼Figure 3. This picture is intentionally distorted to better illustrate the extent of the rust present in all 4 Kohinoor markers, on the outside of the long metal tube, on the side of the long metal tube that isn't slotted for the lead holder, using the green lead marker for this image. It wasn't necessary to clean the rust from the outside of the long metal tube, since it didn't affect proper functioning. But it does provide additional evidence of their immersion in water.



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▼Figure 4. Here are the basic tools I used to make the necessary repairs.



They consist of a common household tweezers, a .036" diameter drill bit mounted in a dowel to provide additional torque (yes, a tool specifically used to unclog Autopoint pencils that utilize "real thin" leads -thank you Father Terry RIP), a 1/8" diameter drill bit with an extra-long shank, and a medium pin vise with a pointed tip on the pin.

You wouldn't have thought water would impair the functioning of a plastic pencil. But it does, and it did, and that's not uncommon with fountain pens and mechanical pencils and markers.

I did the most repair work on the marker with the black lead and black turning knob. It was the most rusty of the 4 Kohinoor markers, and is thus a good project to review. When I began working with that marker, the lead was retracted all the way such that the lead holder was against its stop near the top end of the marker, and the large piece of lead was fully retracted.

Step 1. I put my thumbnail on the ridged segment at the top of the lead holder, and attempted to just push the lead holder down the barrel so the lead and lead holder would be expelled from the barrel. It didn't work. Nothing moved.

Step 2. Then I stuck one of the pointed ends of the tweezers in the small gap in the long metal tube above the lead holder, and tried to push the lead holder down the long metal tube, with the tweezers perpendicular to the long metal tube. It didn't work either. Nothing moved.

Step 3. I suspected the rust residue on and degradation of the lead was causing a lot of friction. Using the pin vise with the pointed tip, I poked the lead through the slot on the side of the long metal tube, and broke up the long piece of lead into small pieces. Then I guided each piece down the long metal tube until it popped out of the open end of the long metal tube.

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Step 4. I repeated steps 1 and 2 above, but the lead holder would still not budge. And I was concerned that even if I could move the lead holder, the rust inside the long metal tube would make it difficult to move the lead holder all the way to the open end of the long metal tube.

Step 5. I stuck the 1/8" drill bit with the extra-long shank up into the long metal tube. I twisted it back and forth, using it like a rotary file, to remove the rust from the inside of the long metal tube, to make it as smooth as possible. The drill bit wasn't tight inside the long metal tube, and with the extended length of its shaft I could angle it back and forth a little, to remove all the high spots of rust and any old lead remnants. The lead holder would still not budge.

Step 6. However, now the lead was completely out of the marker, and the inside of the long metal tube was pretty clean from the open end of the long metal tube up to where the lead holder rested against the stop. So only the corrosion and debris around the lead holder still held the lead holder in place. I set the long metal tube upright, balanced on its open end, and stuck one of the pointed ends of the tweezers in the open gap in the long metal tube above the lead holder, with the tweezers perpendicular to the lead holder. Then I tapped the prong of the tweezers that was sticking out above the lead holder with the handle of the pin vise, and voila – the lead holder moved down the long metal tube. Free at last! As soon as the lead holder reached the part of the long metal tube that I'd already "filed" with the drill bit in Step 5 above, it easily slid down the rest of the long metal tube and I pulled it out of the open end of the long metal tube.

Step 7. Now that the lead holder was out of the marker, I used the 1/8" drill bit to "file" the high spots of rust and lead remnants out of the long metal tube where the lead holder had been. Thus the inside of the entire long metal tube was now clear of rust and lead debris, from the stop at the top for the lead holder all the way down to the open end.

Step 8. The 1/8" drill bit was a bit too big to fit into the tip of the plastic barrel of the marker. So I used the .036" "drill bit on a stick" to very gently file the opening where the lead emerges to begin writing. This cleaned that area of a small amount of lead debris.

Step 9. For those colored leads that I wanted to re-use, I carefully scraped the outside surfaces of each lead, lengthwise against the edge of the open, curved end of the long metal tube. This allowed me to remove all the significant bumps and the deterioration debris from the leads, so they would be of reasonably uniform thickness again. Of course, I had to break the black lead in small pieces to remove it. So I had only a very small piece of black lead which I could put back into the repaired black top pencil.

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▼Figure 5. This is just part of the debris that came out of the 4 Kohinoor markers as I cleaned and repaired them.



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It was not necessary to clean or repair any of the plastic and brass lead holders, after making a visual inspection. Fortunately I have a bottle brush the same diameter as the inside of the plastic marker barrels. So I gave the empty plastic marker barrels a good scrub in warm soapy water, using the bottle brush to clean the spiral grooves inside the barrel as much as possible. Sadly the outside of the white barrels of the markers got dirty during my repair efforts, and some light marks from the leads and the lead debris didn't get completely removed by the soapy water. I may have to use some polishing compound on the outside of the barrels, at a later date.

When reassembled, all four markers advanced and retracted their lead, firmly but readily.

FINDING VINTAGE REFILL LEADS: If you buy common vintage refill leads (since they're fairly cheap) and you're not careful, they may look like this – ▼Figure 6.



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Even worse, they might look like this – ▼Figure 7. Looks like a white fungus!



Never fear. Figure 6 above depicts a bunch of leads which appear too crooked to use. And Figure 7 shows leads with an extreme case of the “white fungus”. But every piece of vintage crayon lead is seldom perfectly straight, and every piece seems to have some degree of the “white fungus”. All of these crayon leads can be cleaned up and used effectively, fairly easily. First I separate the leads, if they’re stuck together like those in Figure 7, so I have individual leads to work with. Then I grab a piece of plain white paper 8-1/2” by 11”, preferably one that has a lot of “tooth” or roughness, like recycled paper often does. I take a single piece of lead in my fingertips (length doesn’t matter) and gently rub it back and forth –lengthwise-while holding it lightly against the paper. At the same time, as I rub the lead back and forth, I also rotate it around its smaller dimension. This two-axial movement tends to rub off the white fungus on to the paper, by simple friction. And the lengthwise movement tends to slowly straighten out the piece of lead, perhaps not perfectly, but likely enough so that it will work satisfactorily. And a single lead like the most crooked one from the middle box in Figure 6 above can at least be partly used, by cutting out the very twisted center section, then just straightening and using the two end pieces. In my experience rubbing the leads lengthwise and “rolling” them slowly as that’s done generates a small amount of heat in the leads, and that helps straighten them out. Then I’d suggest you let them return to room temperature before trying to load them into a marker.

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REFILLING THE MARKERS WITH LEAD: For crayon markers like Scripto and Kohinor which use .120" leads/crayons, refilling them with leads is fairly easy. Just twist the top knob clockwise until all the remnants of lead have been expelled. You may have to manually pull a small piece of lead out of the lead holder. If need be, use a straight pin to clear any visible crayon lead remnants from the lead holder, possibly with a tweezers. Then twist the top knob counterclockwise until the "stop" is reached. Insert a new lead up through the hole in the writing tip, up into the barrel, as far as possible. The lead should then stick out of the barrel just a bit. Press the lead against something hard, like the desk top or a pad of paper, and the crayon lead should stick in place in the lead holder (this is virtually identical to the method used to refill the lead in propel/repel/expel mechanical pencils). Test the marker by advancing and retracting the lead a short distance. If all is well, write on!

If the lead fails to retract, the problem is usually that the lead holder is clogged with bits of old crayon lead, which can harden over time. Turn the threaded metal collar at the top of the barrel counterclockwise until the internal mechanism can be pulled out of the marker. Remove the piece of lead, if it is still in place. Gently pull the lead holder out of the long metal tube. Carefully pick out any crayon lead remaining in the end of the lead holder with a pin or a toothpick, until it is clear of debris. Then push the refill lead into the end of the lead holder, and observe whether it will stick there, or whether it continues to fall out of the lead holder. If the crayon lead stays in place, put the lead holder back in the long metal tube, move the lead holder to the top "stop", insert the mechanism back into the marker, turn the threaded metal collar clockwise until tight, then turn the top turning knob clockwise until the crayon lead emerges from the writing tip/point of the marker. If the lead advances and retracts properly, write on!

If the lead refill still does not stick in place inside the end of the "cleaned out" lead holder, then the lead refill may be at fault. The lead refill can certainly be hardened simply by the passage of time. If you have ample leads at hand, the easiest way is to try another refill lead. If you have a more "fresh" refill lead, use it instead and write on!

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If - like most of us - all you have is crayon leads from the 1950's and 1960's, don't despair. Up inside the lead holder, the crayon lead is held in place by some small protrusions in the tip of the lead holder, where the lead meets the lead holder. Those small protrusions could still be clogged with bits of old crayon leads. Pull out the lead holder again, and get a little “picky” with a pin or a toothpick! Work the point of the tool around the edge of any protrusions you can find that help hold the lead in place, inside the lead holder. Alternatively, if those protrusions look pretty clean, the refill lead could just be too brittle to properly adhere to the protrusions.

If the lead refill seems too brittle, take the easy road first. Just slice off a small section of the end of the lead refill. Then stick the “freshened” end of the lead refill into the lead holder (while the lead holder is outside the marker) and check whether it is now properly held in place. If so, install the mechanism back into the marker (by you should now be quite familiar with that specific exercise) and write on!

The final method to attach the lead refill to the lead holder takes just a little more work. I proudly attribute this method to Roger Russell, who for many years maintained a web page about the Scripto products he collected, cherished and sold (he had many other accomplishments and web pages). Dip the “freshened” and now squared off end of the lead refill into a tiny bit of melted candle wax. Then insert that end of the refill lead into the lead holder. Let the candle wax harden for several hours. Then install the mechanism back into the marker and see if the lead advances and retracts properly. If so, you're done. I'm tired of the phrase "write on", so just start using the marker!

Due simply to the passage of time this final method could – at some point - very well become the required method for using old crayon leads in Scripto, Kohinor and other .120" lead crayon markers. However, the 2-3/4" long .120" diameter crayon leads are available virtually everywhere, especially on eBay. If you're having trouble with getting your refill crayon leads to work properly, try just finding another pack of them. Similarly, Scripto markers that use .120" diameter leads are also everywhere. Even the U. S. government buys them. So parts are readily available, and in my experience, fully interchangeable should the lead holder appear to be the problem. Pencil mechanic that I've become, I'm certainly not above putting a very tiny crimp in the sides of the business end of the lead holder, to hold the lead refill firmly in place - should that be necessary.

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A WORD ABOUT PROPEL/REPEL/EXPEL CRAYON MARKERS: Many markers use .120" diameter crayon leads. Those leads are ubiquitous. However, when a marker is used, especially heavily used, the writing tip of the marker – where the lead emerges – often fills up with bits of lead, because the crayon leads are so soft. This is particularly problematic for markers of the propel/repel/expel variety, like the Delva markers, the Du-All markers, and the Kwik-Klik markers. It doesn't take many bits of soft crayon marker leads to jam up the small hole in the writing tip, which is sized to tightly fit the .120" in diameter crayon leads (should you doubt this, take another look at Figure 5, *supra*). If the hole was too loose, the leads would flop back and forth and you wouldn't be able to draw a straight line. So the hole in the end of the barrel at the writing tip of the marker is fairly precise.

I've found - especially while repairing markers like the Delva and the Koh-i-noor and the Scripto markers - that the hole in the writing tip needs to be pretty clean and unobstructed. So out of about 17 Delva markers, most of them wouldn't write because the mechanism seemed to be "bound up" somehow. But a little work with a straight pin or equivalent worked wonders. You just need to clean crayon debris out of the inner edge of the hole, so it passes a spare piece of crayon lead with a very slight clearance all around the perimeter of the hole (usually any crayon bits accumulate right on the inside of that hole). Also, run the lead holder all the way down the marker, as if you want to expel the crayon lead. Then pull out the piece of lead, and use a straight pin or equivalent to clean the outer perimeter of the lead holder, as well as the receptacle where the crayon lead got pulled out of the lead holder, of any and all crayon lead debris. You'd be absolutely amazed how well that makes the internal mechanism of the marker work, since you've just reduced the friction inside the marker by a very large amount. After this rudimentary surgery, all 17 Delva crayon markers were working just fine again. And they were probably from the 1950's or 1960's, so they were at least 50 years old!

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WRAP-UP AND COMMENTS: These repairs and some light maintenance aren't rocket science. Really, anyone can do them. All it takes is a little patience and a few household tools.

However, the Scripto and Kohinor brands of markers are hard to "keep perfectly running". Those manufacturers have decided to equip their markers with relatively long pieces of lead, and thus a long metal tube is necessary to advance and retract the relatively long piece of lead. As discovered and repaired *supra*, the long metal tube can be easily be "fouled" with contaminants like rust, remnants of lead, dirt, etc. Because the metal tube is so long, and has an open lengthwise slot for the lead holder to advance and retract, there are many critical places in that mechanism which can get fouled with pieces of crayon lead and other contaminants. Also, because the lead holder is essentially moved down the long metal tube by two small ridges of plastic protruding from the side of the lead holder, any excess torque from twisting the turning knob at the top of the marker when there are contaminants in the long metal tube will likely damage the relatively fragile plastic ridges of the lead holder, and the lead will no longer advance and retract. In that instance the lead holder will have to be replaced to make the marker function properly. Further, there's no practical way to keep the internal spiral grooves down the inside of the barrel clean, much less lubricated. If the spiral grooves aren't clean, the marker also won't easily advance or retract its lead, and the lead holder may get locked in place. Fortunately Scripto markers are ubiquitous, and parts can easily be pirated from another marker.

I believe that Listo mechanical grease pencils offer several much better solutions. The body of all current Listo markers is black, save for special markers that get imprinted, etc. The turning knob at the top is the only part which is colored, and indicates the color of lead in the marker. So, unlike the Kohinor markers, the black Listo markers don't generally show much external dirt. More importantly, the Listo markers are designed to fit thick leads that are only about 1-1/2" long. When the plastic writing tip of a Listo marker is removed, it is almost exactly the length of a piece of Listo lead, so the entire length of lead is also removed with the writing tip. And the Listo lead is contained in a metal "tension sleeve", within the plastic writing tip. So if the lead isn't advancing or retracting properly in a Listo mechanical grease pencil, only the writing tip needs to be removed. All that generally has to be done is to withdraw the metal "tension sleeve" with the lead inside, throw that away, insert a replacement "tension sleeve" (one is included in every packet of 6 leads), insert a new piece of lead in the "tension sleeve" and you're ready to write again. Even a rusty tension sleeve is readily replaceable, because it's so short. If there are any contaminants in the writing tip that don't get removed by this process, it's easy to gently use a drill bit to clean it out when necessary.

For what it's worth, I have several Listo markers from the 1940's that may have been used hard and put away wet, but they still function properly.

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This is just a quick compilation of repair techniques that I've used. I hope that posting this essay will elicit some additional insight about repairing and maintaining these markers, and further the discussion of ways to repair these marker pencils. If you have additional information, pictures or techniques that you'd be willing share so it could be added to the appropriate place in these pages, please don't hesitate to contact me at jimstauffer@gmail.com. I'm always happy to provide proper attribution for material which expands this content. Error correction is also appreciated. Please note that all images, text and other content on these pages are copyrighted, and may not be reproduced in whole or in part without the express written permission of the author. Personal use of this content, however, is absolutely and cheerfully permitted. And you can freely make links to this web site from other web pages.

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