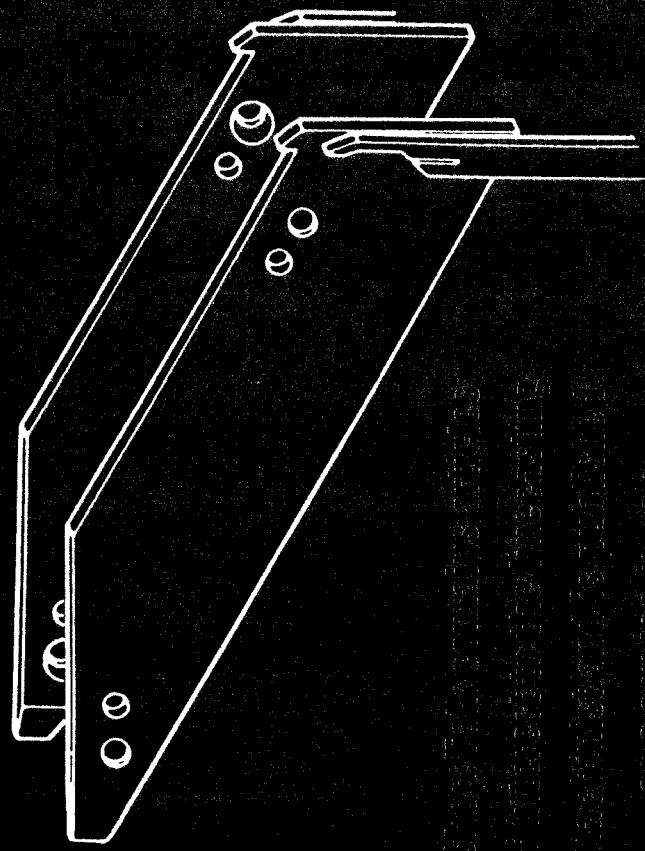


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ATTENTION LINOTYPE MACHINIST

# SHOP TALK

VOLUME 9 NO. 2



**STAR PARTS Co.**  
SOUTH HACKENSACK, NEW JERSEY  
A **Datascan** COMPANY

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# SHOP TALK

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## ADJUSTMENT AND MAINTENANCE OF THE LINOTYPE SPACEBAND BOX

By Walter Butterworth *Star Parts Service Engineer*

The removal of the Linotype spaceband box from the machine is very similar to the Intertype, which was covered in Shop Talk Vol. 9, No. 1.

Depending on the condition of the box, the list of parts below can be used as a guide for the necessary replacements. All parts should be used if a complete re-

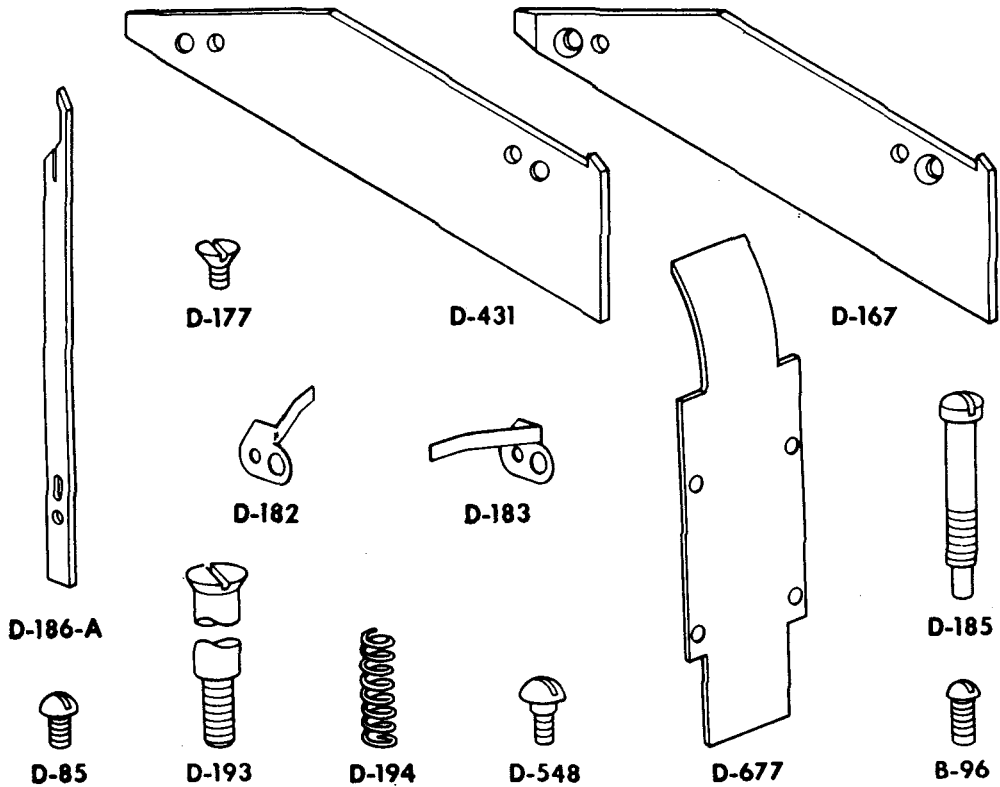


Figure 1

- |  |   |
|--|---|
| 2 — D-186A Improved spaceband box pawl         | 9 — D-177 Spaceband box chute-plate screws  |
| 1 — D-431 Spaceband box plate, front, top rail | 1 — D-677 Spaceband box chute-plate short   |
| 1 — D-167 Spaceband box plate, back, top rail  | 1 — D-182 Spaceband box pawl, spring, front |

- 1 — D-183 Spaceband box pawl, spring back
- 2 — D-185 Spaceband box pawl, lifting screw
- 2 — D- 85 Spaceband box pawl, spring screw
- 1 — D-193 Spaceband lever pawl latch screw
- 1 — D-194 Spaceband lever pawl latch spring
- 7 — B-96 Spaceband chute plate long, screw
- 2 — D-548 Spaceband chute fulcrum screw

building of the spaceband box is required.

Other miscellaneous screws for the spaceband box are listed on page 33 of the Star Parts catalog.

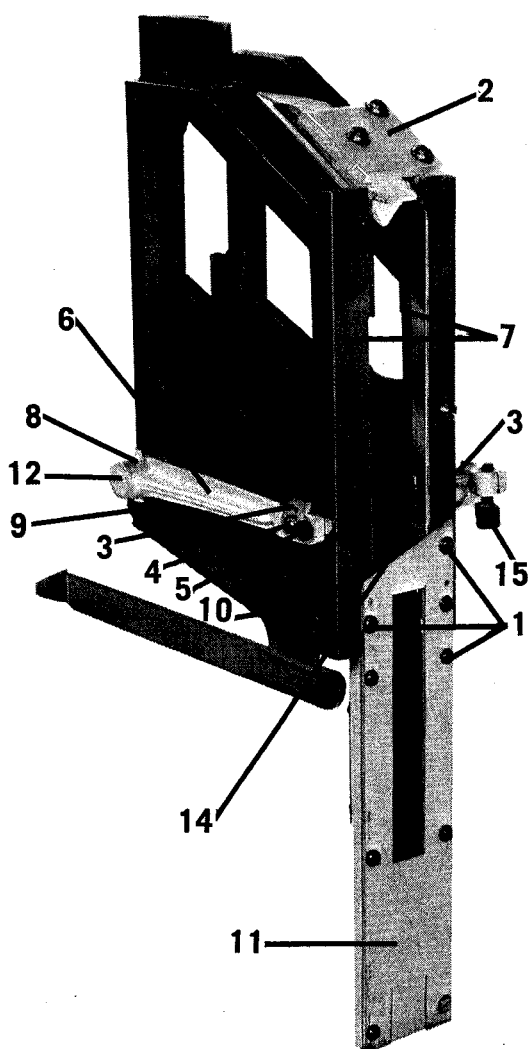


Figure 2

In comparing Linotype and Intertype boxes, the Linotype box has several more moving parts than the Intertype and the dismantling is slightly more involved.

After the box has been removed from the machine, clamp it in a vise. Referring to Figure 2, remove the three 4-48 round head screws securing the long chute plate to the spaceband box casting (1). Then remove the center plate (2) by removing the two 8-32 fastening screws. Remove the pawl lifting screws (4), spring fastening screws (5) and pawl springs (3) from both front and back spaceband box levers (6). Now both pawls (7) are loose and may be removed for inspection later. With a small pin punch drive out the tapered pin (8) located in the spaceband lever (6). Remove lever (6) from the shaft and then remove the two fastening screws (9) and (10). Now the spaceband box castings can be separated.

The front and back top rails (Figure 1 — D-431 and D-167) can be taken off by removing the four fastening screws. If the rails are not badly worn, replacement will not be necessary. Any slight burrs can be removed with a small stone. If the rails are replaced, be sure the fastening screws are below the surface of the rail. The new rails must also sit flat against the machined portion of the casting. A bow in either rail may slow down the movement of the spacebands through the box.

Before you replace any part of the spaceband box, clean all the machined surfaces with fine emery cloth and check all parts for wear and burrs. Disassemble the long chute (11). The inside of

the long chute will sometimes become worn from the constant hitting of the band. With a small file, smooth out any rough spots and check the side rails. Clean the inside of the chute and, if necessary, replace the short chute plate D-677 (Figure 1). Reassemble the two spaceband box castings and polish the spaceband lever shaft (12). Insert the shaft and the one lever you removed earlier. Pin the lever. (This is a tapered pin.)

Insert the new pawls D-186-A (Figures 1 and 3) and slide them up and down. Be sure they move freely.

Note that the two pawl springs D-182 and D-183 have a slight bend near the end. (See Figure 1.) With your fingers, straighten the bend. This will insure better tension on the pawls. If the pawl lifting screws (4) are worn, replace them with new D-185. Hold one pawl in the box behind the upper rail and insert the pawl spring into the slot in the pawl. Hold the spring in place and clamp it with D-85 (5), 4-48 round head screw. Then insert the pawl lifting screw D-185 (4) into the pawl and tighten it. Repeat this procedure for the opposite side. Now clamp the box in a vise again and slowly lift the spaceband levers (6). The two pawls should clear the points of the top rails at exactly the same time. Should one of the pawls clear before the other, the spaceband will twist and jam. To get the two pawls even, lift up on one of the spaceband levers (6) and apply pressure downward on the other. This will even them out. Recheck this each time you bend the levers.

After you have the two pawls raising even, check the spring tension on the two pawl springs

(3). The springs should have only enough tension to return the pawls to normal position. Because they drop by gravity only, too much tension will cause friction, and slow them down.

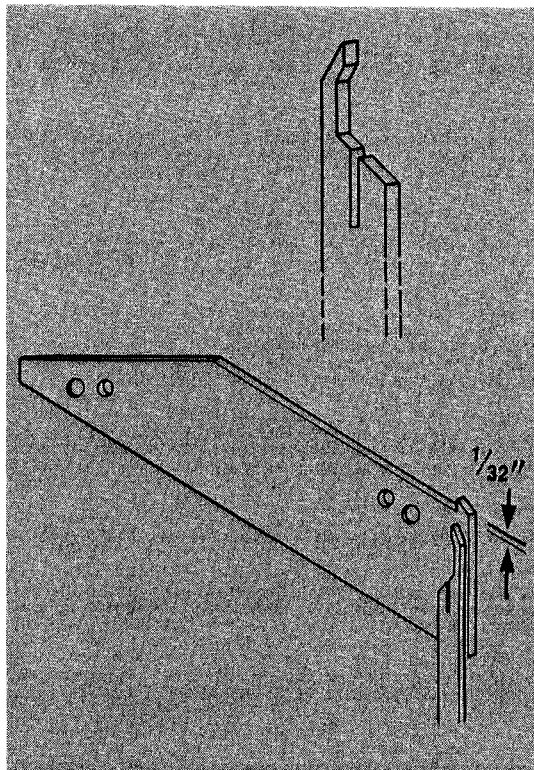


Figure 3

If there is any hesitation in the movement of the pawls, it should be corrected now. If necessary, remove the pawls from the box and rub them on a good clean and straight oil stone.

After the pawls are working properly, assemble the long chute to the spaceband box casting. Place the box in a vise again, and clamp it so it is sitting fairly level. Take several new spacebands or some that are in good condition. Place them in the box and notice where the points on the pawls contact the ears of the band. The pawls should have a full bite on the ears, but should not touch the ears of the second band in the box. If the pawl points

come too close to the second band, they must be moved out.

If you are using Star improved pawls, they can be spread forward slightly by inserting a screwdriver in the slot (Figure 3). Be careful not to bend them sideways when you spread the top. If you are using pawls from one of the other manufacturers, you will have to peen them on the surface where they ride in the spaceband box. If they are peened too much, they can be rubbed down on an oil stone slightly.

After you are satisfied with this operation, replace the center guide (2) and loosen the center guide screw. Adjust the guide so only one band will pass the two pins on the lower part of the guide.

Raise the spaceband lever slowly and see whether the bottom of the band (wedge) clears the retaining plate (14). If the band comes over the rails before it clears the retaining plate, it will be necessary to grind the retaining plate slightly. You can bend the plate also, but extreme care should be taken because the retaining plate is made of spring steel and may break if too much pressure is applied.

Now that the box is completely assembled, replace it on the machine.

Before you attempt to run the spaceband box with machine power, make a few simple tests.

1. Check the keyboard rubber roll.
2. Check the spaceband cam.
  - a) If the teeth are becoming worn, a three-cornered file may be used to sharpen them.
  - b) Check for play on the fulcrum pin.

3. Check the connection between the operating lever which connects to the box at 15 (Figure 2) and spaceband reed. If the hole in either the lever or reed is over-size, use a larger pin or have the hole brazed and redrill.
4. Check the operating lever. It is a three-piece assembly and play is possible between one end and the other. If necessary you can peen it tight.

As a final test remove the keyboard belt and depress the spaceband key. Turn the rollers by hand until the spaceband reed has reached its highest position. At this point the pawls should drop low enough to engage the first band in the box, about  $1/32''$  below the rail. (Figure 3). If this is correct, continue the cycle of the keyboard rollers until the spaceband pawl levers are at their highest point. At this point there should be no lost motion. If any adjustment is necessary, use screw (15).

Before placing spacebands in the box, check them all thoroughly. Lubricate with graphite and be sure the sleeves and wedges move freely.

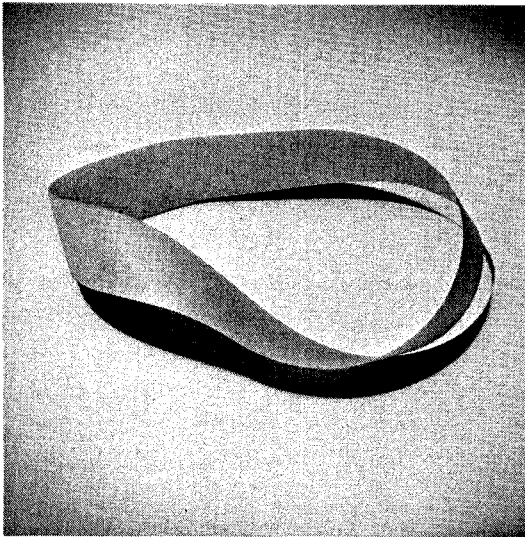
Replace the keyboard belt and try the spaceband box with a full complement of bands. You may find that the last two bands do not fall properly. This is merely because of the lack of weight from behind. That is why it is always very important to have a full set of bands in the box when starting each shift.

It is also very important that oil never be used as a lubricant near the spaceband box. Oil will definitely cause a sluggish operation by building up a gum of graphite and dirt.

# PERFORATOR TAPE CURIOSITIES

The circle of twisted tape in Figure 1 has several unusual and surprising characteristics. It is known as a Moebius band and was discovered over 100 years ago by August Moebius, a German mathematician and astronomer.

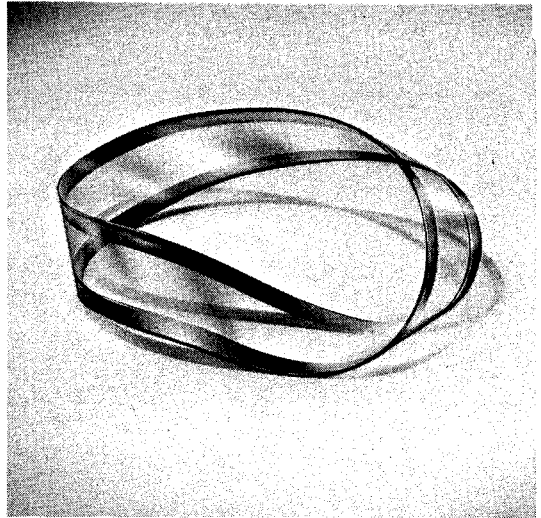
This band is easily made. Cut off about 12 inches of unpunched perforator tape, give it a half twist and attach the two ends to each other.



**Figure 1**

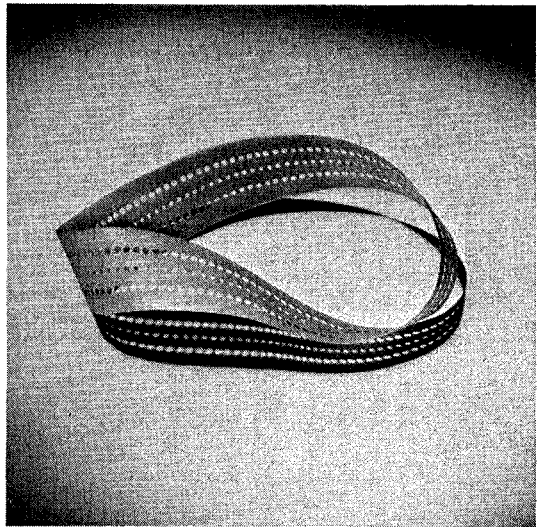
Contrary to all intuitive reasoning, the band you have just made has only one surface. This one-sidedness can be proved by using a pencil to mark a continuous line along the tape. Without raising the pencil from the tape you will inevitably return to the starting point. Another "impossible" characteristic is that the Moebius band has only one edge. This also can be proved by marking an X along any point of the edge and then running the edge continuously between your fingers. Again, the same point will return after having the tape rotate twice. This single-edge char-

acteristic is illustrated in Figure 2 where a cellophane strip has been edged with black plastic tape. Note that the taped edge makes a single, continuous line.



**Figure 2**

Now let's examine a little more complicated configuration of the tape. In Figure 3, code signals for "d" have been perforated in the tape and a Moebius band made



**Figure 3**

as already described. In addition to having only one side and one edge, it also has only one row of information holes (in addition to

the RCC or sprocket feed holes). This can be checked by running a pencil continuously over the larger row of holes. As with the unpunched tape you will always return to the starting point after having marked all the larger holes.

Now, here is a question to ask yourself. What happens when you cut the tape lengthwise along the RCC or sprocket holes? Will you have one loop or two? You may have several surprises. First, as you cut you are adding only one edge not two. The tape had one edge to start with, and after the strip has been cut, it has a total of only two edges. Second, proof that there really is only one row of information holes in the tape is more easily visualized. Third, you have destroyed the Moebius characteristics of the band, since it now has two sides and edges instead of the previous one.

How about cutting the same

tape again, this time along the remaining row of holes. What will you have, one loop, two loops or something else? Better get the scissors if you want to find out.

Here's another one. Make a band from a tape of "d" signals, and cut along the row of larger holes. This time you get two strips, the longer one "two-sided, two-edged", the other "one-sided, one-edged".

The Moebius band and studies of other unusual surfaces (the doughnut, for instance) fall in the general category of topology. If you want to pursue the matter a little further, "The Scientific American Book of Mathematical Puzzles and Diversions" by Martin Gardner covers this and other amusing paradoxes and fallacies. It was written for the layman and published by Simon and Schuster in 1959.

*Alfred Archer*

Previous issues of SHOP TALK have covered a wide variety of machine adjustment areas. The major articles are listed below. To obtain any of this material, just drop a line to the editor of SHOP TALK. As long as the supply lasts, these are yours for the asking.

Descenders—Keep Them on the Slug  
How to Use Oversize Pot Plungers  
Checkpoints for Distributor Box Problems  
Assembling Elevator Adjustments  
Front Lockup  
Drills and Taps

Do's and Don'ts of Distributor Adjustments  
The Matrix Cycle—How to Check  
Parts Inventory—Some Suggestions  
Smooth Matrix and Spaceband Assembly  
The Hairline Problem  
Hints on Matrix Care

# New Anodized Starlite Magazines

Matrices love the new Starlite all-aluminum magazine, because they slide down the channels with the greatest of ease. Made of tempered, jet-plane aluminum for long wear, the lower plate is specially anodized to reduce matrix friction to an absolute minimum.

In addition to providing a smooth matrix track, the anodizing process closes the pores of the lower aluminum plate so that dust cannot stick, and gumminess is removed with only an occasional brushing. Anodizing has the same effect on aluminum as Teflon does on cookware.

Reduced sliding friction and cleaner matrix channels make Starlite the ideal magazine for both high speed and manual operation. Instant matrix release is essential for smooth error-free assembly.

The new Star magazine is truly light weight. The Starlite magazine for Intertypes (with escapement attached) checks in at 21½ lbs. compared to the regular 32 lb. weight of other aluminum magazines. For Linotypes, the Starlite magazine has a similar weight advantage. It tips the scales at 19 lbs. 8 ozs. — a good 40 ozs. lighter than other aluminum magazines, and an amazing 23½ lbs. lighter than aluminum-brass magazines. For Intertypes the Starlite magazine (T-4370) fits Models A, B, C, F, G, V and Monarch. The new magazine for Linotypes (I-3882) fits Models 5, 8, 14, 18, 19, 25, 26, 29, 30, 31, 32, Comet and Elektron. Both are in stock, ready for prompt shipment.

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