SHOP TALK

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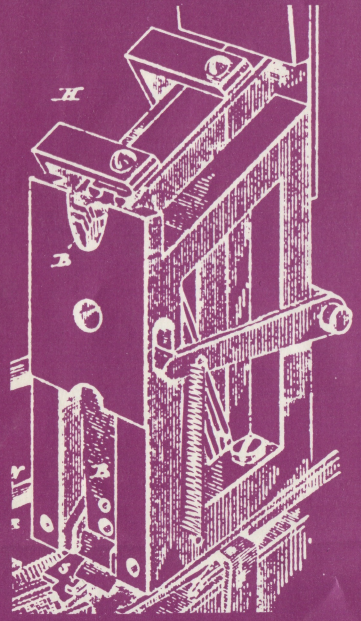

Shop Talk contains articles of interest to the linecasting machinist and is published as a service to help make his job easier.

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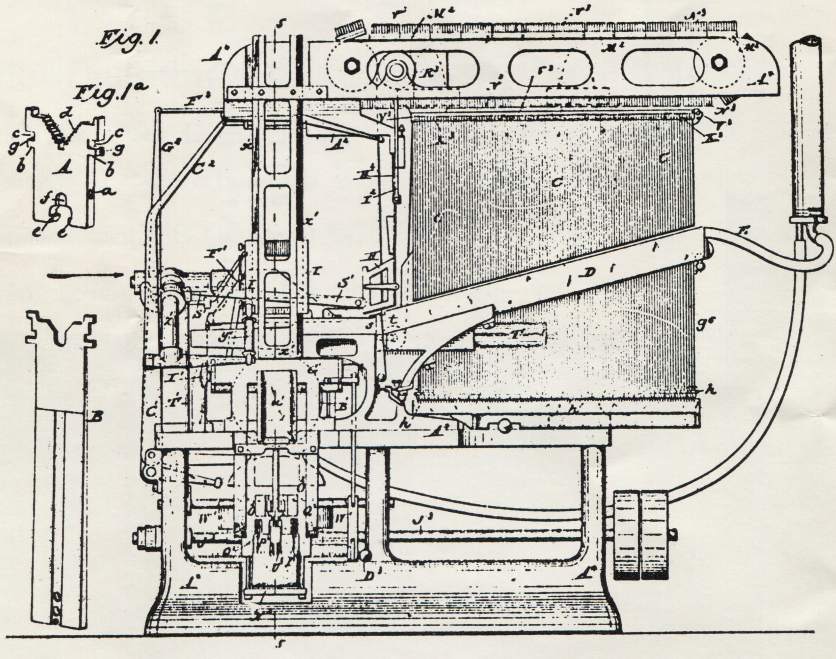
OTTMAR'S MARVELOUS MACHINE

by Alfred Archer



The illustrations on this page and on our front cover are from a patent application filed by Ottmar Mergenthaler covering the first practical linecasting machine. The "Blower" Linotype, as it was known, first operated in the composing room of the New-York Tribune on Sunday, July 4, 1886. It set as much type in an hour as could six hand compositors. This may have been the reason the first machine was installed and operated on a long weekend.

At first glance this machine may seem to have little relationship to linecasting equipment of today. Yet the principal sections of assembling, casting, distribution and driving in modern machines are found in the original.

The magazine, instead of con-

sisting of two large parallel channel plates, was a series of vertical tubes (C), each with an escapement mechanism at the bottom. The machine was known as the "Blower" because the matrices were propelled to the assembly point by intermittent blasts of air, down chute (D).

Spacebands were dropped into the line at the end of each word from an easily recognizable spaceband box (H), and as shown on the cover.

Two interesting safety devices were built into the original machine, which do not exist on modern manual machines. Matrices could not be released from the magazine when the assembly area was not available to receive them. Also, assembly stopped if any of the tubes ran out of mats.

One of the more prophetic aspects of the original machine was its "straight-line" delivery, in which the mats moved directly from the assembling area (S) to the combination first and second elevator. Delivery slide fingers were used, the one on the left being spring loaded and the other one fixed as on modern machines.

The assembled line of matrices and spacebands descended to the front of the mold disk. The upward and downward motion of the matrices was cushioned by spring-loaded linkage (Y), which served the same function as the modern first elevator lever link.

There is marked similarity between modern front lockup and that on the machine illustrated. In order to achieve alignment with the grooves in the mold, the position of the mats could be adjusted by means of a screw, with the same function as the large adjusting screw on the top of today's first elevator.

The mold was equipped with liners which could be changed for body size, and the disk was driven one-half turn in order to reach an ejection point and another half turn to bring it back to casting position again.

A description of first and second justification is contained in the original patent application, and is as accurate today as it was then. First justification took place before the line was completely locked up, and the bar brace rose for the second time immediately prior to casting. Then a plunger-operated metal pot forced metal into the mold and against the matrices.

Compared to modern slugs, apparently the original product was somewhat rough, since two pairs of trimming knives were provided. The slug was forced through both sets by an ejector blade, the first pair removing "any large projections or irregularities". The second pair "act on opposite faces of the type bars to dress them accurately to the required thickness as they pass between them"

After casting, the mats were not transferred to a second elevator, but rather were raised in a single operation to the distributor. There a matrix lift raised each mat individually until its teeth engaged the combination bar and was moved along the bar by means of the slotted racks, seen at the extreme top of the machine, operated on an endless chain.

Parts of the distribution system were insulated from the rest of the machine, and if a matrix failed to drop properly, it closed a circuit which energized an electromagnet and disengaged the distributor clutch to prevent damage.

Because of limited "magazine" capacity as well as a generally slow distribution system, it was essential that the most frequently used characters return to their

Continued on page 7

MATRIX TRANSFER FROM FIRST TO SECOND ELEVATOR (PART II)

By Walter Butterworth *Star Parts Service Engineer*

Step 5. The next step is to set the transfer slide finger and the spaceband pawl. The transfer finger should be set so there is 5⅝″ between the right side of the finger and left side of the intermediate channel and 7⅝″ on 42 em machines. This adjustment is made by having the machine in normal position and moving the transfer lever closer or further away from the transfer cam. (See Figure 3). Loosen the two clamp screws (1) on the transfer roller lever (3). Pull the transfer slide back until it latches at point B (Figure 3). Then back up the machine until the roller on the lever (3) comes to rest on the cam at the point where the cam starts to drop off (point "A"). Bring roller in to touch the cam, and lock the two clamp screws (1).

Then turn the machine forward to normal position and then check the 5⅝″ setting. If there is more than 5⅝″ loosen screws (1) slightly and the transfer slide may slip. If it does not push on the slide lightly until it moves into 5⅝″. If the setting is too short, back up the machine again to point "A". Loosen screws (1) and move the roller lever closer to the cam. Repeat this operation until you have 5⅝″.

Now that the transfer slide is properly set, adjust the spaceband pawl, by means of the turnbuckle which connects the spaceband and transfer levers. The pawl should carry the bands about ⅛″ past the level portion of the rails in the spaceband box. At this point you should be able to lock the spaceband lever with the latch for recasting a line. When the spaceband latch is in a locked position there should be very little space between these two parts, the transfer finger will move the mats to the right on a recast line and may cause spills.

Step 6. Now refer to Figure 4. When line transfer to the second elevator bar is completed, the right side of the transfer finger (2) should be even with the left hand edge of the second elevator bar plate (1) or it should push the last mat in the line ¼″ past the left end of the second elevator bar. This adjustment is made by turning screw (3) closer or further away from the automatic safety pawl (4) which regulates the distance the transfer slide will move to the right. Referring to Figure 5, the spaceband and transfer levers come together for the second time after the second elevator starts its rise to the distributor. When the two levers meet there should be a ⅛″ space between the right side of the transfer finger (1) and spaceband pawl (2). This adjustment is made by loosening nut (3) and turning screw (4) in or out, whichever is necessary.

This completes the basic steps in adjusting the transfer and spaceband levers. Smooth matrix

transfer at the points discussed in this article will increase matrix life and make the machinist's job easier by reducing machine stoppages.

CARE AND ADJUSTMENT OF THE INTERTYPE SPACEBAND BOX

The role of the spaceband as a potential cause of hairlines was discussed in "Shop Talk", volume 6, number 1 and number 2. Proper adjustment and maintenance of the spaceband box is of nearly equal importance.

The spaceband box should be kept clean. Because spacebands move through the box and down the chute entirely by gravity, excessive dirt and oil in the box will slow down operation, possibly resulting in transpositions or poor assembly.

To remove the box, run the machine around to the second transfer position. That is, when the spaceband and transfer levers come together for the second time. Remove the 3/8 x 16 fillister screw located in the center of the rear plate. Being careful not to damage the top rail, the spaceband box can now easily be removed from the machine. Examine the back and front spaceband rails (T-599 and T-597). If the tops of the rails are notched or worn, they should be replaced.

To replace the rails, remove screws 3 and 4 (Figure 1) and the chute plate can then be removed. After removing the screws 1 and 2 (Figure 2) you will be able to separate the front and back castings. Remove the old rails, 10 and 11, and clean the surface where the rails fit to the front and back plates. It is most important that the new rails fit snugly against the casting.

Be sure that the four fastening screws 12, are well below the surface of the rail. Any burr on these screws will interfere with the movement of the spacebands through the box.

If the rails have only slight burrs, it is permissible to rub the top of the rails with a stone. While the box is still disassembled, check stop pin 3 and the releasing plunger 4.

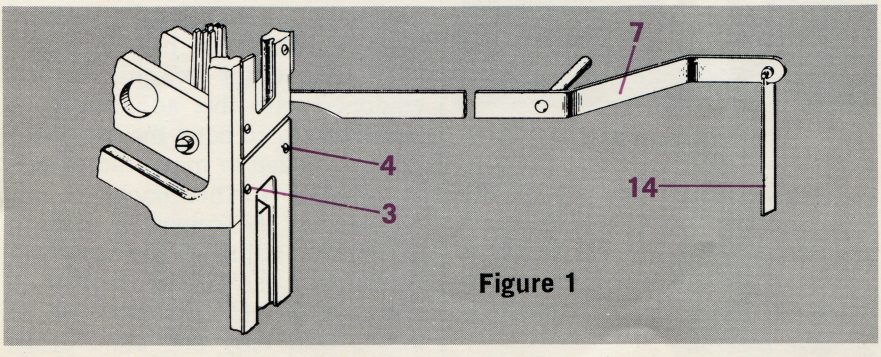


Figure 1

The stop pin should protrude far enough to stop the first band in the box. Then check to see whether the releasing plunger operates freely. Put the back plate in a vise and check plunger pawl 5 for play on the fulcrum pin 6 (W-354). If the pin is worn it should be replaced; otherwise there will be lost motion in the plunger. Also, check the return spring 13 and if it is weak or brittle it also should be replaced.

Now reassemble the box. Before you replace the chute, check the side rails for burrs. If they seem in good condition, replace the chute and then put the box back on the machine. Hook lever 7 into the plunger pawl 5.

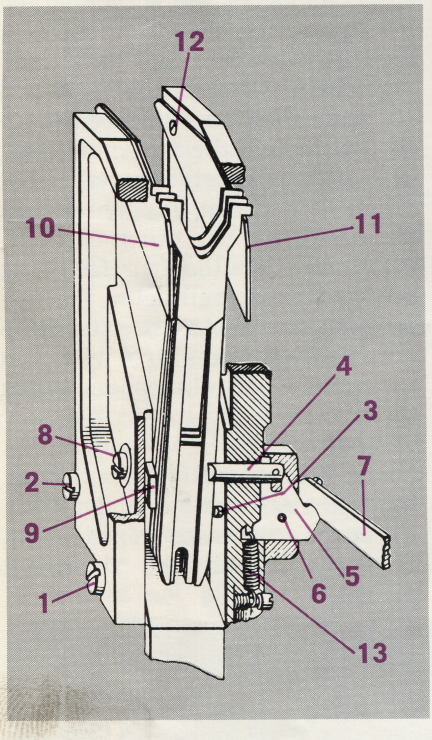


Figure 2

Before you check the spaceband box for proper operation, inspect the keyboard cam rubber roll for excessive wear. Make sure that the large spaceband cam turns freely. If either cam or roller are defective they should be replaced.

Now remove the belt from the keyboard pulley and depress the spaceband key once. Turn the keyboard rollers slowly to see whether plunger 4 moves back flush with or below the surface of the back plate. If the plunger does not move far enough, check the connection between keyrod 14 and lever 7. The hole in lever 7 may be enlarged and should be brazed closed and redrilled.

The key rod 14 on late machines is slightly different at the top. Instead of using a cotter pin or a piece of wire to connect the key rod to the spaceband key lever, as shown in Figure 1, the manufacturer has installed a button on the key lever and added an adjustable connecting link to the key rod.

This adjustable linkage makes your job easier and more accurate when you are setting the releasing plunger 4. When you loosen the two fastening screws, at the top of the adjustable link, you can move it up or down. This will move the plunger in the spaceband box either in or out, whichever may be necessary. On older machines, not equipped with this adjustment, it is necessary to bend the key lever down in order to move the releasing plunger further back.

Now that the releasing plunger is properly adjusted, the next part to check is the retaining block 9. The purpose of this block is to insure that only one band drops

for each stroke of the spaceband key.

To adjust the retaining block 9, place several spacebands in the box. Then loosen screw 8 and slide the block so that its edge covers approximately 1/2 of the second band in the box. When the plunger 4 pushes the band over pin 3, the retaining block should hold the second band from dropping until the next cycle of the spaceband keyboard cam.

Now that you have completely checked your spaceband box and have it properly adjusted, clean the bands and place a set of them in the machine. Clean spacebands are very important in the smooth operation of the spaceband box. Replace the keyboard belt and try the spaceband box with machine power. The spacebands should drop freely, but if they do not then the adjustments described above plus the general cleanliness of the spaceband box should be rechecked.

Should you be plagued with transpositions caused by the spaceband arriving too soon in the assemblying elevator, there are two easy adjustments (crutches) that you can try. First, there is a plate (T-606) made of spring steel located on the left side of the spaceband chute. The lower portion of this plate can be bent slightly closer to the chute. This will probably slow down the band enough to eliminate the transpositions. If you bend this plate, remember that you must leave enough clearance in the chute so that the largest band you use will pass through freely. Lowering of the spaceband key will also delay the band, because the operator's hand must travel slightly further to strike the key.

OTTMAR'S MARVELOUS MACHINE *Continued*

channel first. Since the most frequently used character in English is lower case "e", followed by t, a, o, i, n this mechanical requirement dictated the layout of machine keyboards which still exists today.

A reprint of the illustration on page 2, enlarged to 8-1/2 x 11 inches, is available on request. Just send 12 cents in stamps (no coins please) to cover postage and we'll mail it to you.

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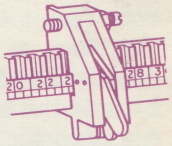

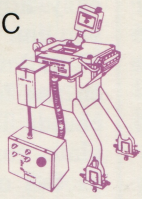

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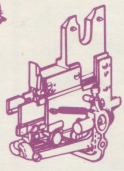

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