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TELETYPESETTER

DESCRIPTION OF THE OPERATING UNIT

TELETYPESETTER
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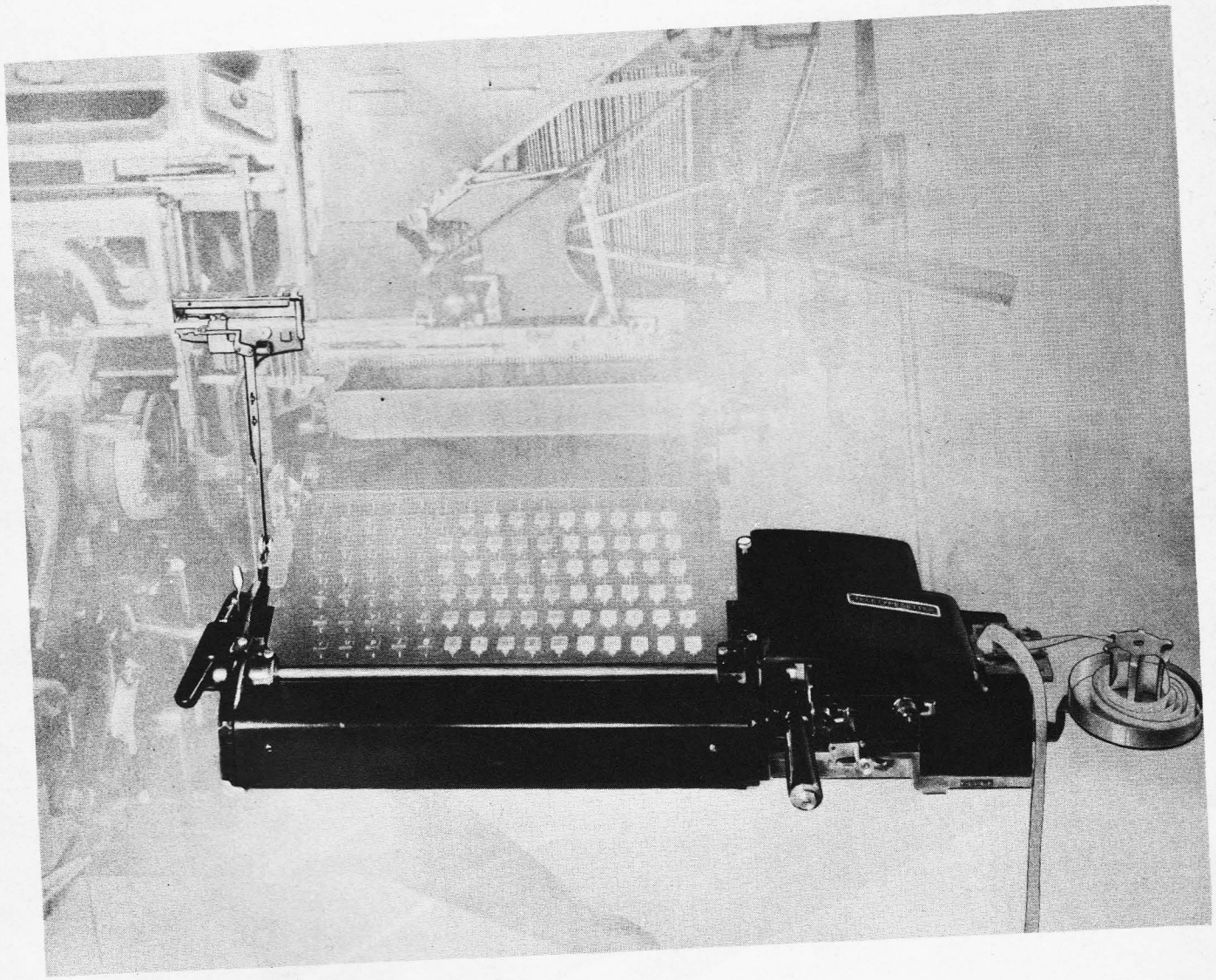

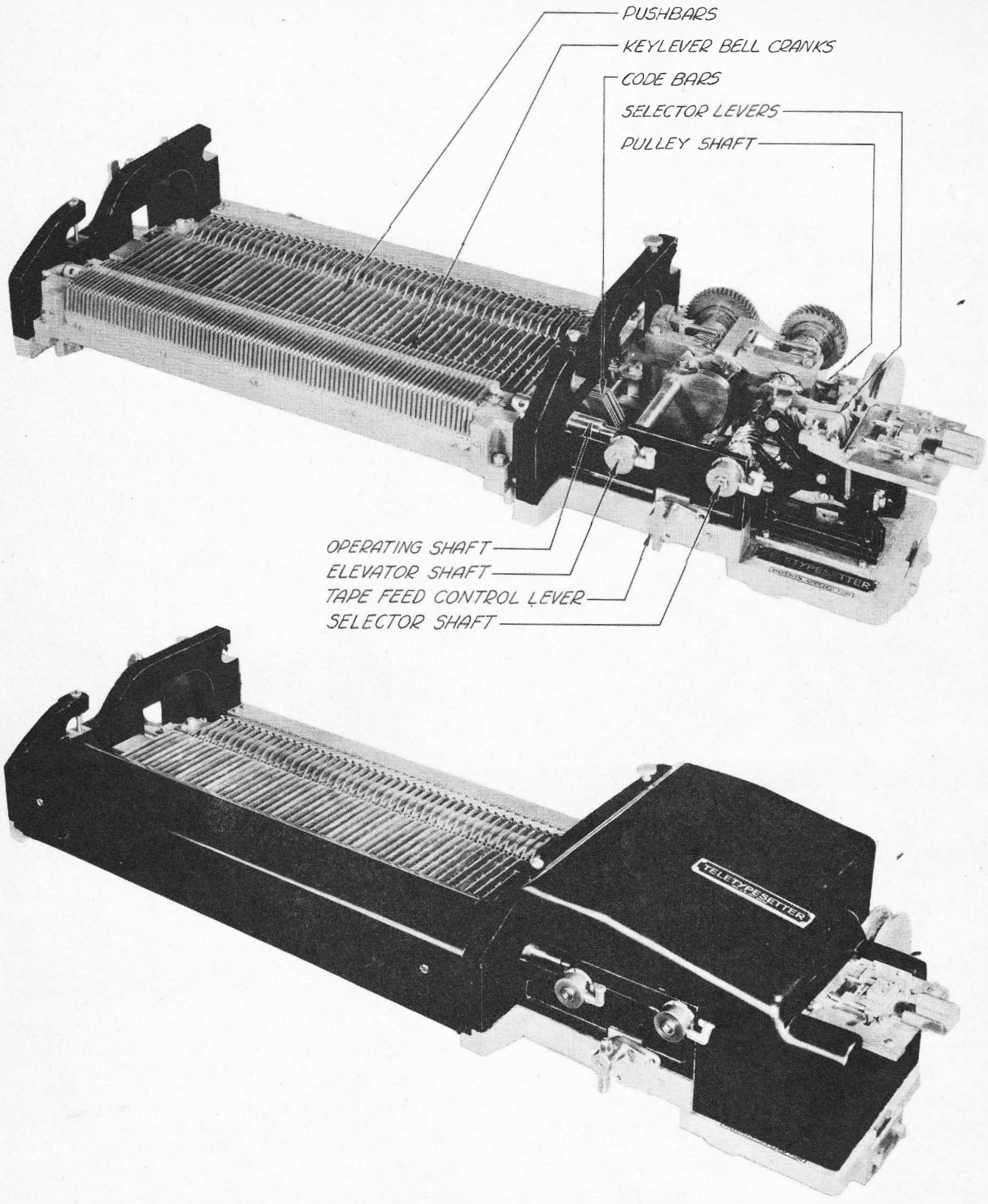

ILLUSTRATION A

DESCRIPTION OF THE TELETYPESETTER OPERATING UNIT

GENERAL

The Teletypesetter Operating Unit is a mechanical device, which when controlled by a prepared perforated tape automatically operates a slug line casting machine. The application of the Operating Unit, however, does not interfere with the manual operation of the slug line casting machine. The frontispiece shows a Teletypesetter Operating Unit mounted on a slug line casting machine.

When this perforated tape (prepared by either a Teletypesetter Keyboard Perforator or a Teletype Reperforator) is fed through the tape mechanism of the Operating Unit, operations will be performed on the slug line casting machine that will correspond to the perforations in the tape.

The Operating Unit consists primarily of a tape feeding and selecting mechanism, transfer mechanism, code bars, pushbars, and keylever bell cranks. By means of a pulley added to the slug line casting machine and a belt, the driving shaft (pulley shaft) of the Operating Unit is rotated.

Signal Code

The various code combinations perforated in the tape are in accordance with the Teletypesetter six unit code (Fig. 1). With this code a total of sixty-four combinations of operating and non-operating impulses are possible. Two of the sixty-four combinations are used for the purpose of shifting to the upper or lower case. With this arrangement it is possible to provide a total of 124 operations for use in controlling the slug line casting machine.

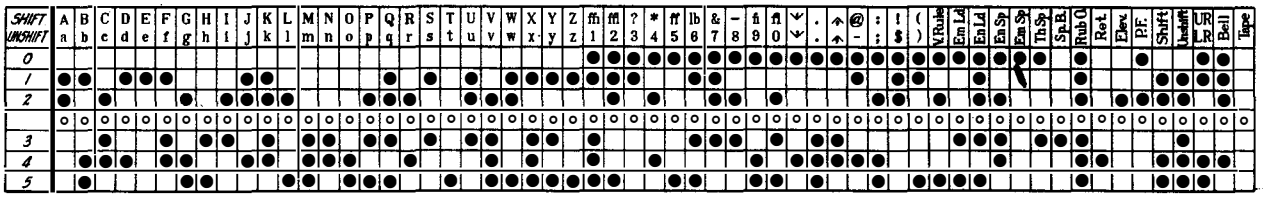

FIGURE 1

As the perforated tape is feeding through the tape mechanism, each code combination will cause the selector mechanism of the Operating Unit to depress a key or operate a function on the slug line casting machine.

Selector Mechanism

Operating impulses are those which position the corresponding code bars of the Teletypesetter Operating Unit to the left and are represented in the tape by perforated holes, whereas the impulse positions on the tape for non-operating impulses (those which position the code bars to the right) are not perforated. The numerical sequence of the impulses on the tape is from the upper to the lower edge. Therefore, the first horizontal row of operating or non-operating impulses represents the zero impulses; the second horizontal row, the first impulses; and the third horizontal row, the second impulses. The small holes below the third row are feed holes and are for the purpose of advancing the tape through the Keyboard Tape Perforator, Operating Unit, or Transmitter. The remaining three horizontal rows are for the third, fourth, and the fifth impulses respectively. Each vertical row represents the six impulses of a complete character or function.

Attached to the right ends of six selector levers (Fig. 2 & Illus. A) are six small tape pins which are moved upward and downward, through a slot in the tape guide, in line with a vertical row of perforations in the tape. Attached to the selector levers are springs which tend to pull the tape pins upward against the tape. When the unit is stopped the left ends of the selector levers are held in their upper

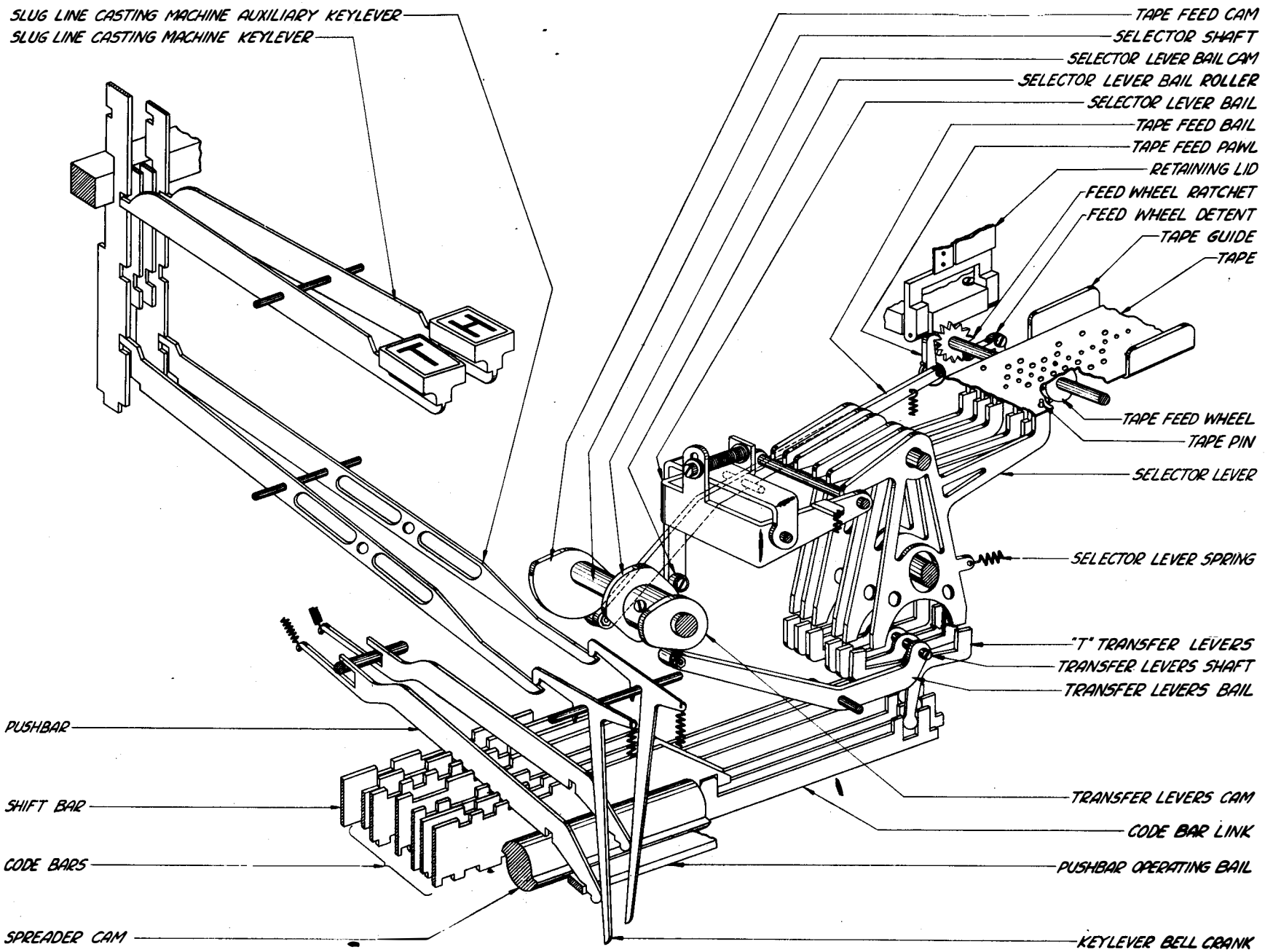
SLUG LINE CASTING MACHINE AUXILIARY KEYLEVER
SLUG LINE CASTING MACHINE KEYLEVER
TAPE FEED CAM
SELECTOR SHAFT
SELECTOR LEVER BAIL CAM
SELECTOR LEVER BAIL ROLLER
SELECTOR LEVER BAIL
TAPE FEED BAIL
TAPE FEED PAWL
RETAINING LID
FEED WHEEL RATCHET
FEED WHEEL DETENT
TAPE GUIDE
TAPE
TAPE FEED WHEEL
TAPE PIN
SELECTOR LEVER
SELECTOR LEVER SPRING
"T" TRANSFER LEVERS
TRANSFER LEVERS SHAFT
TRANSFER LEVERS BAIL
PUSHBAR
SHIFT BAR
CODE BARS
SPREADER CAM
TRANSFER LEVERS CAM
CODE BAR LINK
PUSHBAR OPERATING BAIL
KEYLEVER BELL CRANK

FIGURE 2

positions by the selector lever bail, the roller of which is on the high part of the selector lever bail cam and the tape pins are beneath the surface of the tape guide.

The selector lever bail cam is mounted on the selector shaft which is driven by the pulley shaft through the medium of gears and a jaw clutch. When the selector lever bail cam starts to revolve, the selector lever bail roller will ride onto a low portion of its cam, moving the right end of the bail downward (Fig. 2). As the right end of the bail moves downward, the selector lever springs will be permitted to rotate their selector levers counter-clockwise, thereby moving the tape pins upward (a retaining lid is provided to hold the tape against the surface of the tape guide). The tape pins that rise through perforations in the tape will permit their levers to be rotated counter-clockwise farther than the levers that have their tape pins stopped by unperforated portions of the tape.

Located beneath and in line with the six selector levers are six "T" transfer levers, which are mounted on the transfer lever shaft at the right end of the transfer lever bail. The operated selector levers (those which have their pins through perforations in the tape) have their right lower extensions in line with the right arms of the transfer levers while the lower left extensions of the unoperated selector levers are in line with the left transfer lever arms. After the tape pins have moved upward, the transfer lever bail cam roller rides up onto the high portion of its cam, moving the transfer levers upward against the lower extensions of the selector levers. This will rotate the transfer levers which engage operated selector levers in a clockwise direction, whereas those engaging unoperated selector levers will be rotated counter-clockwise.

The lower extensions of the "T" transfer levers engage the six code bar links and the vertical extensions of these code bar links in turn engage the six code bars. Those transfer levers which are rotated clockwise will position the corresponding code bars to the left and those which are rotated counter-clockwise will position their code bars to the right. Thus it may be seen that operating impulses (represented by holes in the tape) will position the corresponding code bars to the left and non-operating impulses will position the code bars to the right.

The six code bars extend across the width of the slug line casting machine keyboard and have their upper and lower edges notched according to the requirements of the code. The shift bar is located to the rear of the six code bars and is used to determine whether upper or lower case characters are to be selected.

Located above and below, and at right angles to the code bars are ninety-six pushbars. Passing between the upper and lower sets of these pushbars, just in front of the code bars, is the spreader cam. This cam is mounted on the operating shaft which in turn is driven by the selector shaft. During the time that the code bars are being positioned, the high portions of the spreader cam hold the upper and lower pushbars away from the notched edges of the code bars. After the selection has been transferred to the code bars, the selector shaft will have rotated the spreader cam so that the pushbar springs will be permitted to move the pushbars against the notched edges of the code bars. The alignment of the notches in the code bars (and shift bar) opposite the pushbar to be selected will permit this pushbar to be pulled farther than the rest so that the notch in the forward end of the selected pushbar will be in the path of the pushbar operating bail. This pushbar operating bail like the spreader cam, passes between the two sets of pushbars. It is located in front of the spreader cam and moves back and forth in a horizontal path. The pushbar operating bail is actuated by two cams mounted on the operating shaft, one at each end of the spreader cam. After a pushbar has been selected, one of the high portions on both cams moves the pushbar operating bail forward (through the medium of the pushbar bail levers and cam rollers) carrying with it the selected pushbar. It should be noted that the spreader and pushbar operating bail cams have two high and low portions which permit two complete operations for each revolution of the operating shaft.

Located at the extreme forward end of the pushbars is a bank of keylever bell cranks. The lower arms of these bell cranks are opposite the forward ends of the pushbars and the upper arms project over keylever extensions or auxiliary keylevers of the slug line casting machine keyboard. When the selected pushbar is moved forward by the pushbar operating bail, the lower arm of the corresponding bell crank will also be moved forward, causing the upper arm to pivot downward, carrying with it the selected keylever on the slug line casting machine.

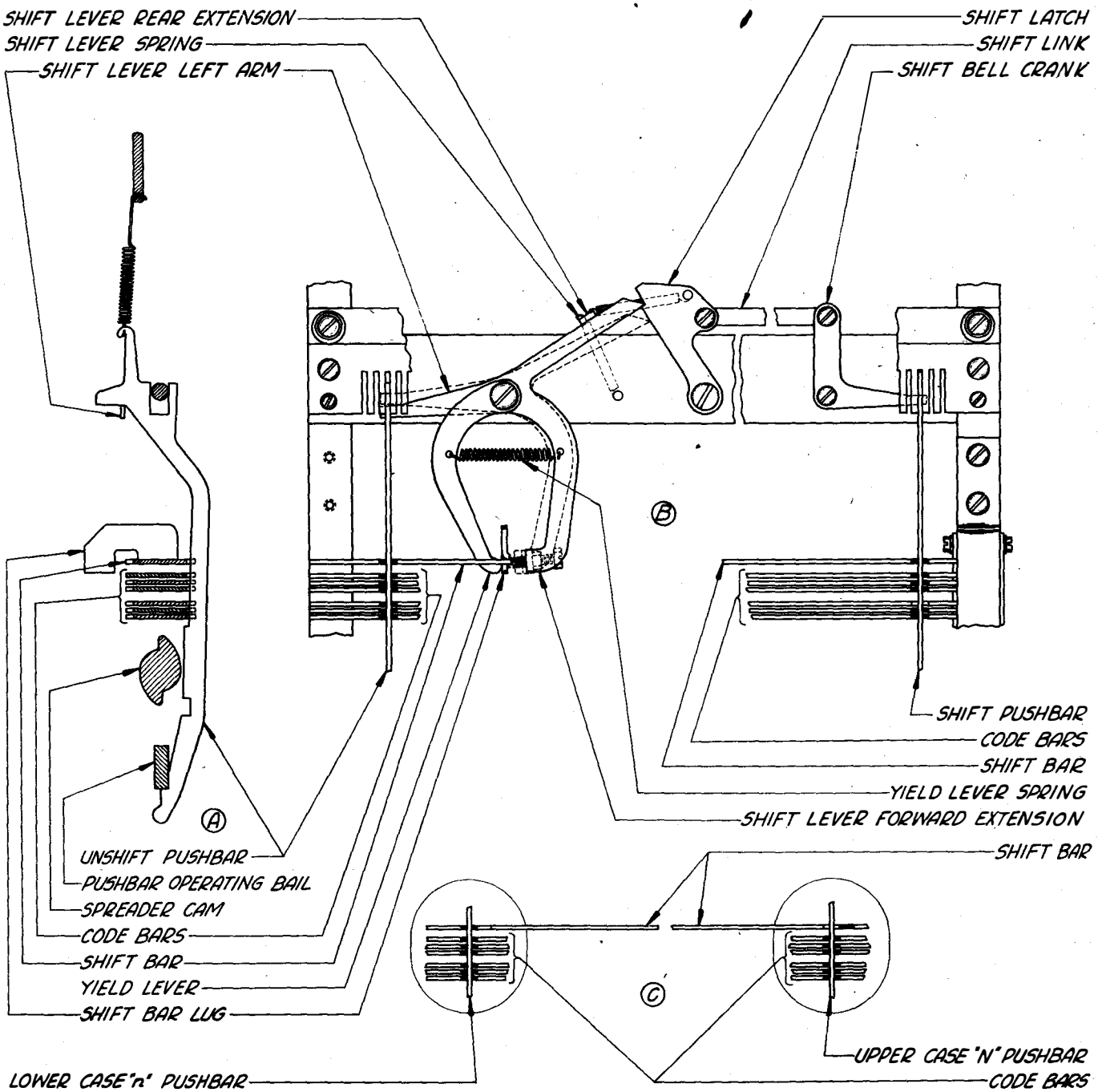
SHIFT LEVER REAR EXTENSION
SHIFT LEVER SPRING
SHIFT LEVER LEFT ARM
SHIFT LATCH
SHIFT LINK
SHIFT BELL CRANK
SHIFT PUSHBAR
CODE BARS
SHIFT BAR
YIELD LEVER SPRING
SHIFT LEVER FORWARD EXTENSION
UNSHIFT PUSHBAR
PUSHBAR OPERATING BAIL
SPREADER CAM
CODE BARS
SHIFT BAR
YIELD LEVER
SHIFT BAR LUG
LOWER CASE 'n' PUSHBAR
SHIFT BAR
UPPER CASE 'N' PUSHBAR
CODE BARS
A
B
C

FIGURE 3

As the operating shaft continues to revolve, the spreader cam will disengage the selected pushbar from the pushbar operating bail and move all the pushbars away from the code bars. The selected keylever bell crank in the meantime will be restored to its unoperated position by its spring. Immediately thereafter the low portions of the pushbar operating bail cams will permit the springs of the pushbar operating bail levers to return the pushbar operating bail to its rear unoperative position.

Tape Feeding

At the same time that the pushbar operating bail is moving the selected pushbar forward, the tape pins are brought down below the surface of the tape guide and the tape is advanced the distance required to bring the succeeding vertical row of perforations in line with the tape pins.

Located to the right of the tape pins is the tape feed wheel, the pins of which engage the feed holes in the tape (Fig. 2). Attached on the same shaft with the tape feed wheel is the feed wheel ratchet. The ratchet and feed wheel are rotated by the tape feed pawl, which is pivoted on the right end of the tape feed bail. The tape feed bail cam roller rides on the tape feed cam which is located on the selector shaft. When this roller rides onto the high portion of its cam, the tape feed pawl will be moved upward to engage the next tooth on the feed wheel ratchet. As the tape feed bail cam roller rides onto the low portion of its cam, the tape feed pawl will be moved down, advancing the feed wheel ratchet and wheel. The feed wheel detent is provided to insure equi-distant feeding of the tape.

Shift and Unshift Mechanism

When a character is being selected, the code bar notches are so aligned as to provide paths opposite both the upper and lower case pushbars for that character. Whether the upper or lower case pushbar is selected will be determined by the position of the shift bar which is located to the rear of the code bars (Figs. 3A & B). This shift bar is moved either to the left or right by the shift or unshift combinations respectively and permits one of the two character pushbars to enter the path in the code bars and be operated. When upper case characters are to be selected, code combinations for these characters are preceded by a shift combination, after which upper case characters will continue to be selected until an unshift combination is introduced.

Mounted on a plate beneath the lower set of pushbars are the yield lever, shift lever, shift latch, and shift bell crank. Attached near the left end of the shift bar and extending downward between the front ends of the shift and yield levers is the shift bar lug.

When the unshift pushbar is pushed forward, the rear extension of this pushbar engages the shift lever left arm. The shift lever is then rotated until its rear extension is latched in the notch of the shift latch withdrawing the forward extension from the shift bar lug. Then when the pushbars are spread away from the shift bar, the yield lever being pulled against the shift bar lug by its spring, will move the shift bar to the right. So long as the shift bar remains in this position all of the selections will be in the lower case.

When the shift pushbar is pushed forward its rear extension will engage the shift bell crank. The shift bell crank is connected to the shift latch by means of the shift link, so that when the shift pushbar moves the bell crank the shift latch will be disengaged from the shift lever. Then when the pushbars are spread away from the shift bar, the shift lever spring will pull its lever against the shift bar lug, moving the shift bar to its left (upper case) position.

Assuming that the shift bar has been moved to its unshifted position (lower case) and the code bars have been set for the "N" combination, notches in the code bars and shift bar will be lined up as shown in Figure 3C. A path is set up for the lower case "n" pushbar, whereas the upper case "N" pushbar will be blocked by an unnotched portion of the shift bar. The lower case "n" pushbar will then move into the path set up for it and the corresponding keylever bell crank and keylever will be operated.

Elevator Operation

The elevator (ELEV.) combination appears in the tape at the end of each complete line of character and space combinations. After the proper number of matrices and

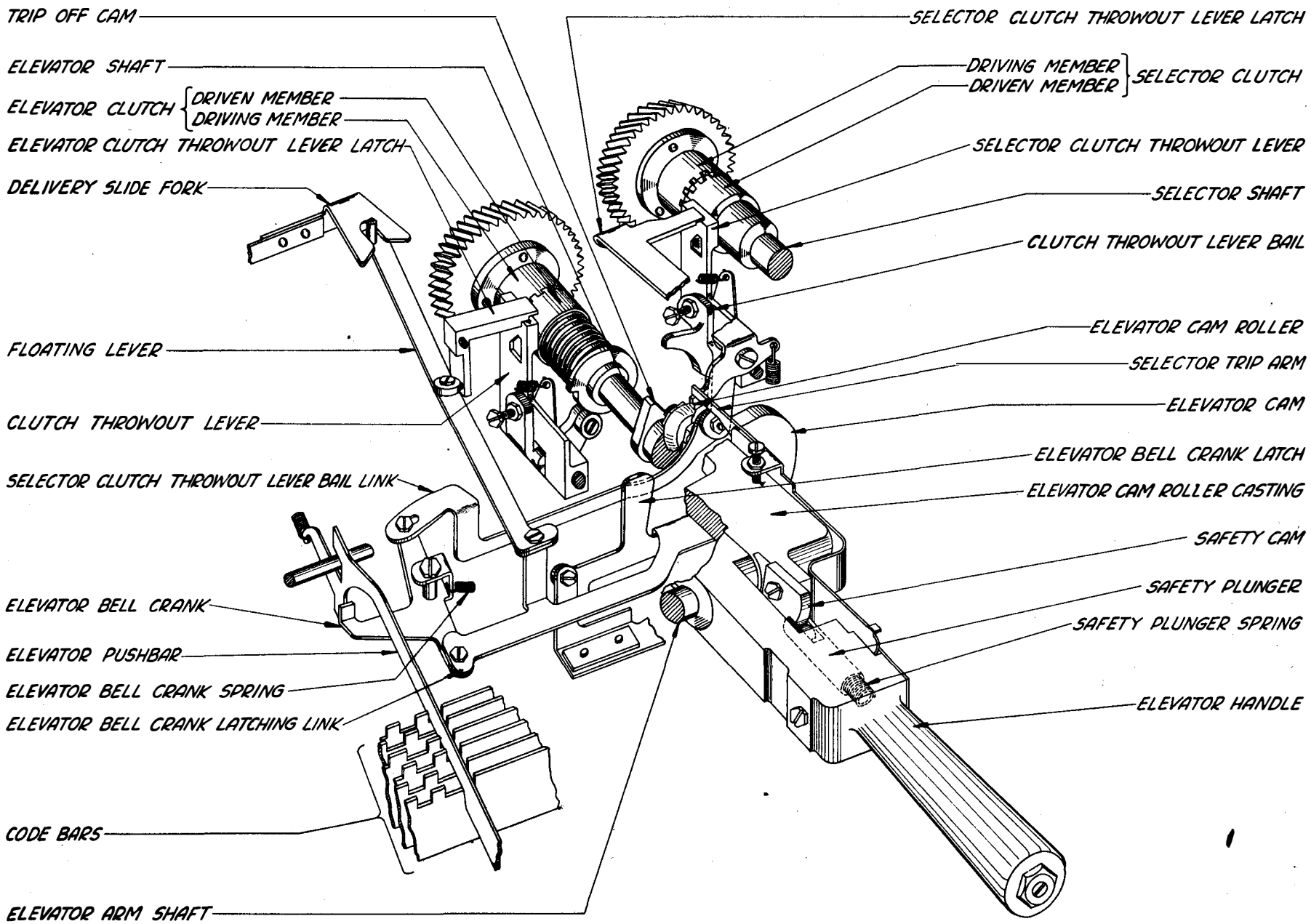
TRIP OFF CAM
ELEVATOR SHAFT
ELEVATOR CLUTCH
DRIVEN MEMBER
DRIVING MEMBER
ELEVATOR CLUTCH THROWOUT LEVER LATCH
DELIVERY SLIDE FORK
FLOATING LEVER
CLUTCH THROWOUT LEVER
SELECTOR CLUTCH THROWOUT LEVER BAIL LINK
ELEVATOR BELL CRANK
ELEVATOR PUSHBAR
ELEVATOR BELL CRANK SPRING
ELEVATOR BELL CRANK LATCHING LINK
CODE BARS
ELEVATOR ARM SHAFT
SELECTOR CLUTCH THROWOUT LEVER LATCH
DRIVING MEMBER
DRIVEN MEMBER
SELECTOR CLUTCH
SELECTOR CLUTCH THROWOUT LEVER
SELECTOR SHAFT
CLUTCH THROWOUT LEVER BAIL
ELEVATOR CAM ROLLER
SELECTOR TRIP ARM
ELEVATOR CAM
ELEVATOR BELL CRANK LATCH
ELEVATOR CAM ROLLER CASTING
SAFETY CAM
SAFETY PLUNGER
SAFETY PLUNGER SPRING
ELEVATOR HANDLE

FIGURE 4

space bands have been assembled in the slug line casting machine and the delivery slide is positioned to receive the assembly, the elevator combination will stop the feeding of the tape and operate the elevator. After the elevator operation has been completed, the feeding of the tape will be resumed automatically.

The elevator combination selects the extreme right hand pushbar (Fig. 4). The elevator bell crank (located near the rear end of the elevator pushbar) is a "T" shaped lever which has its left extension turned up in the path of the rear extension on the elevator pushbar. When the elevator pushbar is operated, it will move against the left extension of the bell crank rotating it counter-clockwise on its pivot. The rear arm of the bell crank will be moved to the left and the front arm to the right. The bell crank latching link (which is attached to the front arm of the bell crank) will move to the right in its guide and engage with the bell crank latch holding the bell crank in its operated position. At the same time, the selector clutch throwout lever bail link (attached to the rear extension of the bell crank) is moved to the left. The clutch throwout lever bail, which is connected to the right end of the selector clutch throwout lever bail link, will be rotated on its pivot far enough to bring the notch in the clutch throwout lever into the path of the stud on the driven member of the selector shaft. As the selector shaft revolves, the stud on the clutch driven member will engage the clutch throwout lever and the driven clutch member will be cammed out of mesh with the driving member, bringing the selector shaft to rest.

The elevator shaft is located to the left of the selector shaft and is driven by the pulley shaft through the medium of gears and a jaw clutch. Normally the elevator shaft clutch members are held out of engagement by the elevator shaft clutch throwout lever, and the elevator shaft is at rest.

The floating lever is provided to prevent operation of the elevator by the elevator pushbar until the delivery slide has returned to its right hand position (Fig. 4). The front end of the floating lever is pivoted on an inverted "L" shaped extension on the bell crank latching link. The rear end of the floating lever engages in the delivery slide fork. When the delivery slide fork is holding the rear end of the floating lever to the right and the elevator pushbar is rotating the bell crank, the forward end of the floating lever will be moved towards the right. This will disengage the latch from the elevator clutch throwout lever, permitting the clutch to engage and the elevator shaft to revolve. If, however, the elevator bell crank is operated and the delivery slide fork is holding the rear end of the floating lever to the left, the elevator shaft clutch will not be permitted to engage until the rear end of the floating lever is also moved to the right.

Normally the elevator handle cam roller is resting on the low portion of the elevator cam (located on the elevator shaft); the elevator handle is in its upper unoperated position and the selector clutch throwout lever latch is being held above the clutch throwout lever by the selector trip arm (mounted on the elevator handle); see Figure 4. As the elevator handle cam roller rides up onto the high portion of the elevator cam, the selector trip arm moves upward, permitting the selector clutch throwout lever latch to be moved into engagement with the selector clutch throwout lever. Then as the elevator shaft continues to revolve, the trip-off cam, which is located to the rear of the elevator cam, will move against the upper surface of the elevator bell crank latch, releasing the elevator bell crank latching link. The elevator bell crank spring will then return the bell crank to its unoperated position. However, the selector shaft will not be permitted to revolve until the elevator handle returns to its normal unoperated position because the selector trip arm continues to engage the clutch throwout lever.

During normal operating conditions when the elevator cam roller rides onto the high portion of its cam, the slug line casting machine elevator will be operated. Should the upward stroke of the elevator be blocked, the movement of the cam will not be interrupted, but the motion will be taken up in a safety plunger and spring through the medium of a safety cam without causing damage to any of the mechanism (Fig. 4).

The safety cam is located on the forward end of the elevator cam roller casting and the safety plunger with its spring is located within the elevator handle. The elevator cam roller casting is pivoted on the elevator arm shaft of the slug line casting machine to the right of the handle, so that normally the low portion of the safety cam meshes firmly with the roller on the end of the safety plunger. Then as the elevator cam roller rides up onto the high portion of its cam, the cam roller casting and elevator handle will move as one piece, rotating the elevator arm shaft. The selector shaft trip arm will be moved out of the path of the clutch throwout

lever latch to permit disengagement of the selector shaft clutches and stop the feeding of the tape as previously described. When the cam roller rides onto the low portion of the elevator cam, the elevator is permitted to return to its normal unoperated position, the selector shaft trip arm moves against the clutch throwout lever latch and the selector shaft clutches are permitted to engage and feeding of the tape is resumed.

Near the end of the revolution of the elevator shaft, the clutch throwout reset lever roller (mounted on the clutch throwout lever) rides up onto the high portion of its cam and moves the elevator cam clutch throwout lever into engagement with its latch. When the stud on the elevator cam shaft clutch driven member enters the notch on the throwout lever, the clutch members will be cammed out of mesh and the elevator shaft will come to rest.

Should the elevator be prevented from rising, the cam roller casting will be operated as usual, but the power exerted by the safety cam against the safety plunger will be utilized in overcoming the tension of the safety plunger spring instead of raising the elevator. An extension on the selector shaft trip arm will be engaged by the cam roller casting, and the rear end of the trip arm will be moved upward where it will be held by a detent. Then when the cam roller rides onto the low part of the cam, the trip arm will not be moved against the clutch throwout lever latch and feeding of the tape will not be resumed until the selector shaft trip arm is restored to its normal position manually.

Manual Tape Feed Control

The manual tape feed control lever, mounted on the forward end of the tape control shaft near the right end of the Operating Unit (Illus. A), is used for the purpose of manually starting and stopping the feeding of the tape. Attached to the rear end of the tape control shaft is the tape control cam. The tape control cam will move the

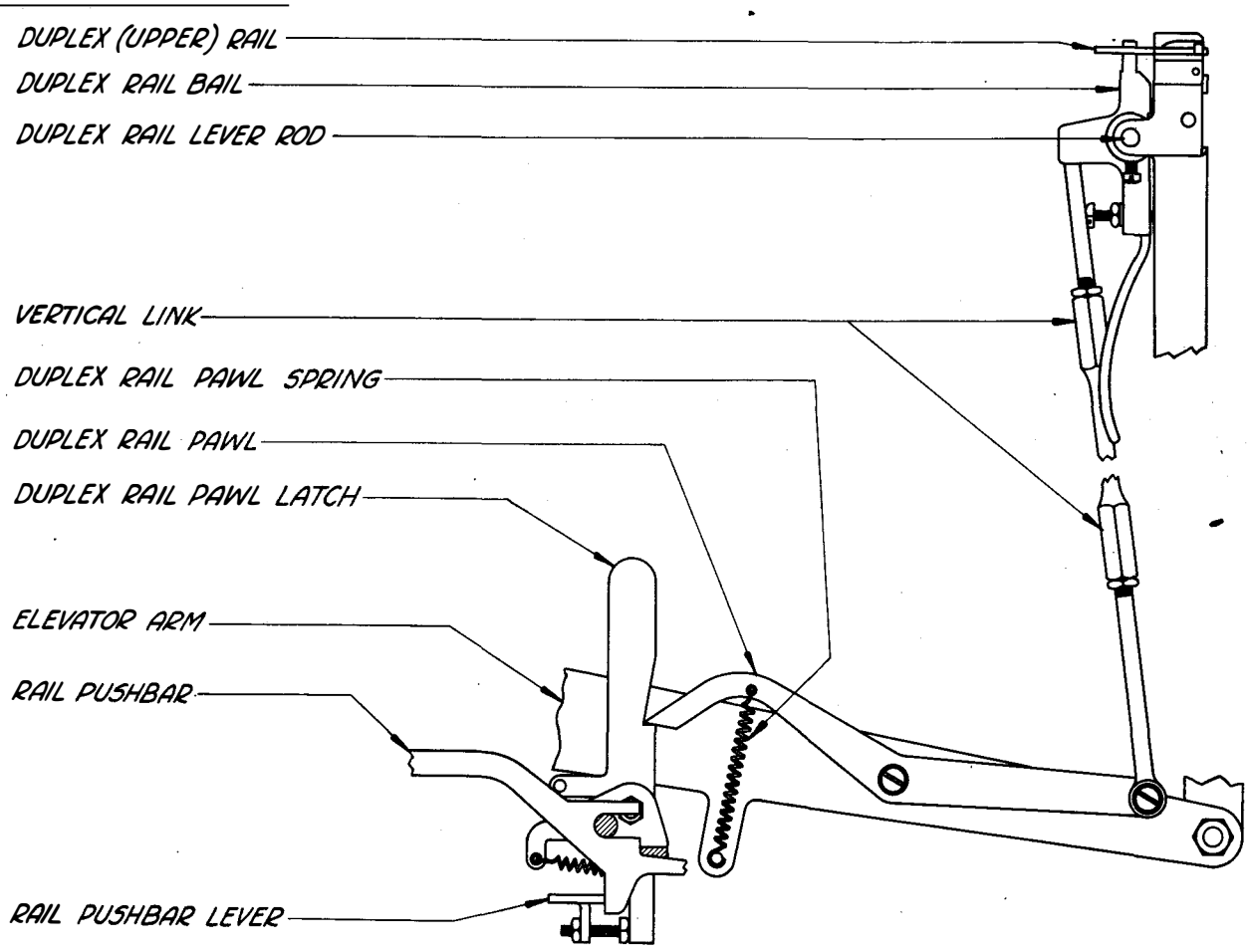

FIGURE 5

selector clutch throwout lever bail against the clutch throwout lever when the tape control lever is turned counter-clockwise. The clutch throwout lever will in turn hold the selector cam shaft clutch members out of engagement and the tape will not be fed.

When the tape control lever is turned clockwise, the tape control cam will be moved away from the selector clutch throwout lever bail. This will permit the clutch throwout lever to be pulled by its spring away from the stud on the selector cam shaft driven clutch member.

Standard Duplex Rail (Split Rail) Control

Some Operating Units are equipped with the standard duplex rail (split rail) control mechanism which automatically controls the operation of the duplex rail on the composing machine.

When the duplex rail control signal ("U.R. - L.R.") follows the shift (upper case) signal, the extreme left pushbar, which is the duplex rail pushbar, will be selected. Mounted on a bracket to the left of the duplex rail pushbar is the duplex rail pushbar lever and duplex rail pawl latch (Fig. 5). When the duplex rail pushbar is moved forward by the operating bail, its rear extension engages the right end of the pushbar lever, pivoting the left end against the duplex rail pawl latch. The upper end of the duplex rail pawl latch will then move forward, allowing the front end of the duplex rail pawl to unlatch and be pulled downward by its spring. The duplex rail pawl is pivoted on the elevator arm and its rear end is attached to a vertical link which connects it to the duplex rail bail. The duplex rail bail replaces the manual lever (on the slug line casting machine) and is located on the duplex rail lever rod. Thus it may be seen that when the upper case ("U.R. - L.R.") signal is introduced, the duplex rail will be "cut in." The duplex rail will be held in this position by the duplex rail pawl spring and the matrices will now be assembled on the upper rail until the line is delivered.

When the elevator arm moves upward, the duplex rail pawl will engage in the duplex rail pawl latch so that when the elevator arm moves downward again, the rear end of the duplex rail pawl will also be moved downward, restoring the duplex rail to its normal unoperated position through the medium of the vertical link and duplex rail bail.

The duplex rail pawl latch is extended upward to facilitate manual operation of the duplex rail.

Lateral Duplex Rail Control

Some Operating Units are equipped with lateral duplex rail mechanism which is used to control the raising of one or more matrices at a time in any portion of a line to be cast (Fig. 6). The operation of the lateral rail is controlled by the upper rail ("U.R. - L.R.") signal preceded by the shift (upper case) signal and is restored to its inoperative position by the lower rail signal ("U.R. - L.R.") preceded by the unshift (lower case) signal. (The lateral rail will also be restored by the delivery of the line.)

When the upper rail pushbar (second from the right) has been selected and is being operated, its rear extension will move against the right end of the upper rail pushbar lever, rotating it. The left end of the upper rail pushbar lever will in turn move the upper operating link toward the rear. The duplex rail bell crank which is attached to the rear end of the operating link and pivots on the elevator arm will be rotated so as to move its rear extension downward. The vertical link which is attached to the rear extension of the bell crank will also be moved downward through the medium of the link spring. The lateral rail actuating lever, pivoted on a bracket which is attached to the assembling elevator, has its right extension attached to the vertical link. Then when the vertical link is moved downward, the lateral rail actuating lever will be rotated so that its upper extension will push the lateral rail (located beneath the assembling elevator duplex rail cap) to the right. The matrices will then be assembled on the upper (lateral) rail until the lower rail signal ("U.R. - L.R.") preceded by the lower case signal has been received or the line is delivered.

When the lower rail pushbar (first from the right) is operated, its rear extension will move against the lower rail pushbar lever, moving the lower operating link

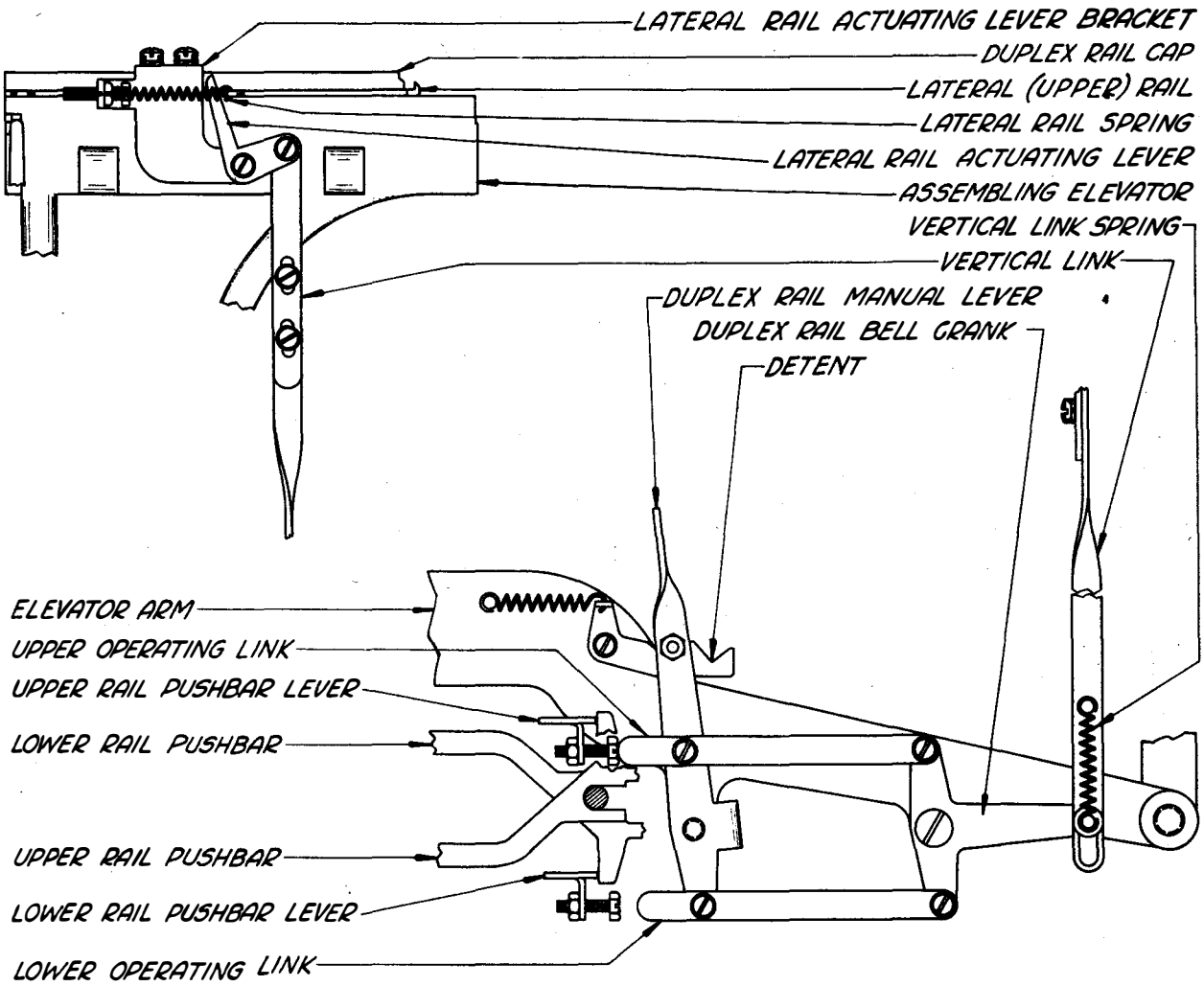

FIGURE 6

toward the rear. The lower operating link which is pivoted to the lower extension on the bell crank will in turn rotate the bell crank so that its rear extension will move upward. The lateral duplex rail actuating lever will be rotated through the medium of the vertical link and its upper extension will be moved away from the lateral duplex rail. The lateral rail spring will then return the rail towards its left or unoperated position as the matrices which follow are assembled on the lower rail.

The duplex rail manual lever is provided to facilitate the operation of the rail when the composing machine is being operated manually. The detent and its spring, operating in conjunction with the roller mounted on the duplex rail manual lever, is provided to hold the lateral rail actuating lever in either the operated or unoperated position.