TELEPRINTER MODEL 32
KEYBOARD AND PRINTER EQUIPMENT
TRAINING COURSE

STUDENT'S GUIDE

FOR INSTRUCTION PURPOSES ONLY

DISASSEMBLY INSTRUCTIONS

Do NOT remove mounting screws of any components except those of the motor.

1. Platen
2. Carriage
3. Motor
4. Function Box
5. Clutch Trip Shaft
6. Selector Cam Assembly
7. Selector Assembly
8. Code Bar Assembly
9. Main Shaft
10. Distributor Shaft

To reassemble, reverse the above prodedure except for the Platen, Carriage, and Motor.

KEYBOARD

A. KEYLEVER IS DEPRESSED

(1) Depressing KEYLEVER moves

(2) Code BARS which

(3) rotate "T Levers" and position

(4) CONTACTS

B. TRIPPING DISTRIBUTOR CLUTCH

(1) KEYLEVER is depressed

(2) UNIVERSAL BAR moved down

(3) rotating TRIP MECHANISM

(4) releasing the KEYBOARD TRIP ARM
   (a) KEYBOARD CONTACT BAIL frees CONTACTS
   (b) KEYBOARD TRIP ARM moves up locking T LEVERS in selection
   (c) TRIP LINK moves rotating KEYBOARD TRIP LEVER which operates the STOP BAIL ---------- CLUTCH engages

C. KEYBOARD RESET

(1) CAM ROLLER on clutch assembly operates

(2) KEYBOARD TRIP LEVER
   (a) operates clutch STOP BAIL latching clutch
   (b) and drives KEYBOARD TRIP ARM down to latch position

PRINTER

A. SELECTOR

(1) ARMATURE spacing unlatches

(2) START LEVER rotates

(3) CLUTCH TRIP LEVER

(4) CLUTCH engages

(5) SELECTOR CAM assembly rotates and

(6) START LEVER moved away from ARMATURE

(7) PUSH LEVER RESET BAIL strips previous selection of PUSH LEVERS

(8) SELECTOR LEVERS operate
- (a) Marking
  - (1) SELECTOR LEVER rides to low part of cam and locks armature
  - (2) PUSH LEVER falls under SELECTOR LEVER
  - (3) SELECTOR LEVER CAM drives SELECTOR LEVER, PUSH LEVER and rear of BLOCKING LEVER down
  - (4) front of BLOCKING LEVER rises unblocking associated CODE BAR
- (b) Spacing
  - (1) SELECTOR LEVER blocked by ARMATURE
  - (2) Spacing LOCK LEVER rides to low part of cam and locks armature spacing
  - (3) PUSH LEVER and BLOCKING LEVER remain unoperated
  - (4) front of BLOCKING LEVER remains down blocking associated CODE BAR

B. CODE BAR MECHANISM

(1) SELECTOR CAM assembly rotating causing

(2) CODE BAR CLUTCH TRIP LEVER to rise and release

(3) CODE BAR CLUTCH

(4) CODE BAR CLUTCH rotates permitting

(5) CODE BAR BAIL to rise releasing

(6) CODE BARS (1,2,3,4,5,PS, and zero)

(a) Marking
  (1) front of BLOCKING LEVER UP permits
  (2) CODE BAR to move up and to the left
(b) Spacing
  (1) front of BLOCKING LEVER down blocking
  (2) CODE BAR

(7) Resetting CODE BARS
  (a) CODE BAR cam assembly rotating
  (b) CODE BAR BAIL down resetting all
  (c) CODE BARS

C. FUNCTION CAM ASSEMBLY

(1) CODE BAR cam assembly rotating causing

(2) FUNCTION CLUTCH to be tripped

(3) FUNCTION CAM assembly embodies motion into
  (a) FUNTION BAIL
  (b) CARRIAGE DRIVE BAIL
  (c) PRINT SUPPRESSION LEVER
  (d) FUNCTION STRIPPER

D. FUNCTION BAIL

(1) FUNCTION CAM assembly rotates causing

(2) FUNCTION DRIVE ARM to rotate the

(3) FUNCTION ROCKER SHAFT moving the

(4) FUNCTION BAIL up and down permitting the

(5) FUNCTION LEVERS to sense the CODE BARS

(6) FUNCTION LEVER (SELECTED)
  (a) FUNCTION LEVER moves up between the notches in Code Bars
  (b) FUNCTION LEVER overtravels step on associated
  (c) FUNCTION PAWL
  (d) FUNCTION BAIL drives FUNCTION LEVER and FUNCTION PAWL down
  (e) FUNCTION PAWL operates a contact and/or mechanical motion

(7) FUNCTION LEVER(NON-SELECTED)
  (a) FUNCTION LEVER moves up but blocked by one or more
  (b) CODE BARS (no further travel)

E. PRINTING CARRIAGE (VERTICAL)

(1) CARRIAGE DRIVE BAIL operates

(2) POWER BAIL imparts a vertical motion into the rear of the

(3) VERTICAL POSITIONING BAIL which is secured to the

(4) TYPEWHEEL SHAFT, SPIDER, and TYPEWHEEL.

(5) VERTICAL POSITIONING BAIL drives the

(6) TYPEWHEEL upward until it engages one of four

(7) VERTICAL STOPS
- (a) Row One
  - (1) Number four, five, and common stops are spacing and the Vertical positioning Bail strikes the common stop (lowest stop). Printing will occur in row one.
- (b) Row Two
  - (1) Number five marking causes common to mark. Leaving number four spacing will cause the Vertical Positioning Bail to strike number four stop (second stop). Printing will occur in row two.
- (c) Row Three
  - (1) Number four marking causes common to mark. Leaving number five spacing will cause the Vertical Positioning Bail to strike number five stop (third stop). Printing will occur in row three.
- (d) Row Four
  - (1) Number four, five, and common are marking. The Vertical Positioning Bail will now strike the hub of the common (fourth stop). Printing will occur in row four.

F. ROTARY POSITIONING DIRECTION

(1) POWER BAIL operates

(2) ROTARY POSITIONING BAIL drives

(3) THIRD PULSE SHIFT LINK which pulls the right or left

(4) RACK.

(5) TYPEWHEEL clockwise
- (a) Number three CODE BAR down (spacing)
- (b) THIRD PULSE LINKAGE spacing
- (c) THIRD PULSE SHIFT LINK up engaging right
- (d) RACK rotating pinion and
- (e) TYPEWHEEL clockwise

(6) TYPEWHEEL Counterclockwise
   (a) Number three Code Bar up (marking)
   (b) THIRD PULSE LINKAGE marking
   (c) THIRD PULSE SHIFT LINK down engaging left
   (d) RACK rotating pinion and
   (e) TYPEWHEEL counterclockwise

G. ROTARY POSITIONING STOPS

(1) THIRD PULSE SHIFT LINK drives right or left rack until the opposite rack is stopped by the 0, 1, 2 or common

(2) STOP SLIDE.

H. ROW ONE (Letters Field)

(1) Number one and two STOP SLIDE spacing causing

(2) COMMON STOP SLIDE to remain spacing (down)

(3) RACK stopped by COMMON STOP SLIDE (first stop)

I. ROW THREE (Letters Field)

(1) Number one STOP SLIDE marking causing

(2) COMMON STOP SLIDE to mark - Number two stop slide spacing (down)

(3) RACK drives through a hole in COMMON STOP SLIDE and is stopped by number two STOP SLIDE (second stop)

(4) Printing will occur in row three either clockwise or counterclockwise.

J. ROW FIVE (Letters Field)

(1) Number two STOP SLIDE marking causing

(2) COMMON STOP SLIDE TO mark - Number one stop slide spacing(down)

(3) RACK drives through holes in common and number two STOP SLIDES and is stopped by number one STOP SLIDE(third stop)

(4) Printing will occur in row five either clockwise or counterclockwise.

K. ROW SEVEN (Letters Field)

(1) Number one and two STOP SLIDE MARKING causing

(2) COMMON STOP SLIDE to mark - Zero stop slide spacing (down)

(3) RACK drives through holes in common, one and two STOP SLIDES and is stopped by Zero STOP SLIDE (fourth stop)

(4) Printing will occur in row seven either clockwise or counterclockwise.

L. FIGURES SHIFT

(1) ZERO CODE BAR moves up causing the

(2) ZERO SLIDE to present a narrower outline to the stop bracket

(3) RACK now strikes one of the four stop slides driving the SLIDE GUIDES and STOP SLIDES one character typewheel rotation.

(4) Printing will now occur in the ~~odd~~ EVEN numbered rows either clockwise or counterclockwise.

M. PRINT SUPPRESSION (Blocked)

(1) FUNCTION CAM rotates

(2) PRINT SUPPRESSION LEVER up latching

(3) PRINT SUPPRESSION CODE BAR down

(4) FUNCTION LEVER selects and blocks PS CODE BAR as

(5) PRINT SUPPRESSION LEVER unblocks then reblocks

(6) PRINT SUPPRESSION CODE BAR.

(7) PS CODE BAR remained blocked during entire cycle (Printed suppressed)

N. PRINT SUPPRESSION (Unblocked)

(1) PRINT SUPPRESSION LEVER moves down unblocking

(2) PRINT SUPPRESSION CODE BAR moves up (no functions selected) driving

(3) BLOCKING LATCH away from

(4) PRINT HAMMER BAIL

O. SPACING

(1) CARRIAGE DRIVE BAIL ROLLER operates

(2) TOGGLE LINKAGE drives

(3) FEED PAWL rotates

(4) SPACING RATCHET rotates

(5) SPACING DRUM drives

(6) TIMING BELT PULLY and CARRIAGE.

P. SPACE SUPPRESSION (On Functions)

(1) PRINT SUPPRESSION CODE BAR latched and fails to operate

(2) SPACE SUPPRESSION LEVER - The space suppression lever blocks

(3) TOGGLE LINKAGE (Spacing suppressed on all functions except space).

Q. CARRIAGE RETURN

(1) CARRIAGE RETURN FUNCTION LEVER rises and overtravels the step on its

(2) FUNCTION PAWL then drives down against the

(3) CARRIAGE RETURN DRIVE BAIL & LINK causing the

(4) CARRIAGE RETURN LEVER to disengage and latch

(5) SPACING / CHECK PAWLS from the

(6) SPACING RATCHET.

(7) CARRIAGE returns and unlatches

(8) SPACING CHECK PAWLS (unit now ready to resume spacing).

R. LINE FEED

(1) LINE FEED FUNCTION LEVER rises and drives the

(2) LINE FEED BLOCKING LEVER over the step of the

(3) LINE FEED DRIVE LINK.

(4) A LINE FEED DRIVE ARM operates the line feed blocking lever and line feed drive link causing the

(5) LINE FEED PAWL to rotate the

(6) PLATEN

S. LETTERS FUNCTION

(1) LETTERS FUNCTION LEVER rises and latches to

(2) LETTERS FUNCTION PAWL drives down and cams the

(3) BLOCKING PAWL to the rear releasing the

(4) BLOCKING LEVER which now blocks the

(5) ZERO CODE BAR (Letters Field)

T. FIGURES FUNCTION

(1) FIGURES FUNCTION LEVER rises and latches to

(2) FIGURES FUNCTION PAWL drives down against the

(3) BLOCKING LEVER down which latches under the

(4) BLOCKING PAWL. -

(5) BLOCKING LEVER now unblocks

(6) ZERO CODE BAR (Figures Field)

I. IDLE LINE

A. TB-8 +120

B. TB-9 -120
   (1) 5 MA in loop
      (a) ~~47K~~ 43.3K in sub set 4K IN LOOP TOTAL APPROX 48K

C. Transistors
   (1) Q1↑(clamped to gnd.)
   (2) Q2↑)"a" relay flip flop
   (3) Q3↓)- A
   (4) Q5↑This Transistor is an amp. - always on to some degree
   (5) Q4↑)"H" relay flip flop
   (6) Q6↓) H
   (7) Q7↓(Uni Junction)
   (8) Q8↓)"W" relay flip flop
   (9) Q9↑

II. SUB PREPARES TO SEND MAG

A. Depress start
   (1) Loop 60 MA
      (a) Start CTX short out 47K Res.
      (b) Q1↑ (not clamped to gnd.)
      (c) All transistors same as idle

B. Exchange send proceed to dial pulse
   (1) Loop open 25 MS
      (a) Q1↓
      (b) Q2↓
      (c) Q3↑A↑
   (2) Start Button Released

C. Exchange closes loop
   (1) 60 MA
      (a) 47K shorted by "A" Ctx
   (2) TB8 +120
   (3) TB9 -120

D. Sub Dial
   (1) Dial Pulses sent to loop

E. Dialing Completed

F. Exchange Reverses Batt
   (1) Loop 60 MA
      (a) TB8 ~~+120~~ -120
      (b) TB9 ~~-120~~ +120

(2) Q5 Conducts less
(a) Q4↓
(b) Q6↑
(1) H ↑
(2) MC↑
(3) Q2↑
(4) Q3↓
(a) A↓
(3) Kybd. & Sel. drivers in loop
(4) Msg. sent

G. Stop button depressed
(1) Loop open
(2) Exchange reversed Batt
(a) TB -8 +120
(b) TB -9 -120
(c) Q5 Conducts More
(d) Q4↑
(e) Q6↓
(1) H ↓
(2) MC ↓
(3) Kybd. & Sel. driver in local ckt.
(4) Loop 5 MA

III. IDLE COND.

IV. LOCAL OPERATOR (This Ckt inoperative if A or H relay were up)

A. Loop & Transis. Same as Idle
(1) Local Push Button Depressed
(a) Q8↑
(1) W ↑
(2) MC↑
(3) Q9↓
(4) Kbd. & Sel. driver in local ckt.

B. THREE methods of restoring to normal
(1) Depress Stop Button
(a) Q8↓
(1) W ↓
(2) MC↓
(b) Q9↑
(2) Depress Start Button
(a) Same as stop Button, CTX of each in series

(3) Receive connection from Exchange
- (a) TB8 -120
- (b) TB9 +120
  - (1) Q5 Conducts less
  - (2) Q4↓
  - (3) Q6↑
    - (a) H↑
    - (b) Buzzer sounds
    - (c) Q7↑ (2.3 secs.)
      - (1) Q8↓
      - (2) W ↓
      - (3) Q9↑
- (c) ~~Idle Cond.~~

V. CONN. FROM EXCHANGE

A. Loop & transis. same as Idle Line
- (1) Exchange rev. batt
  - (a) TB 8 -120
  - (b) TB 9 +120
    - (1) Q5 Conducts less
    - (2) Q4↓
    - (3) Q6↑
      - (a) H ↑
      - (b) MC ↑
      - (c) Kybd. & Sel. driver in loop
- (2) MSG
- (3) Exchanges Disconn.
  - (a) Exchange reverses
    - (1) TB8 +120
    - (2) TB9 -120
      - (a) Q5 Conducts more
      - (b) Q4 ↑
      - (c) Q6↓
        - (1) H ↓
        - (2) MC↓
- (4) Idle Cond.

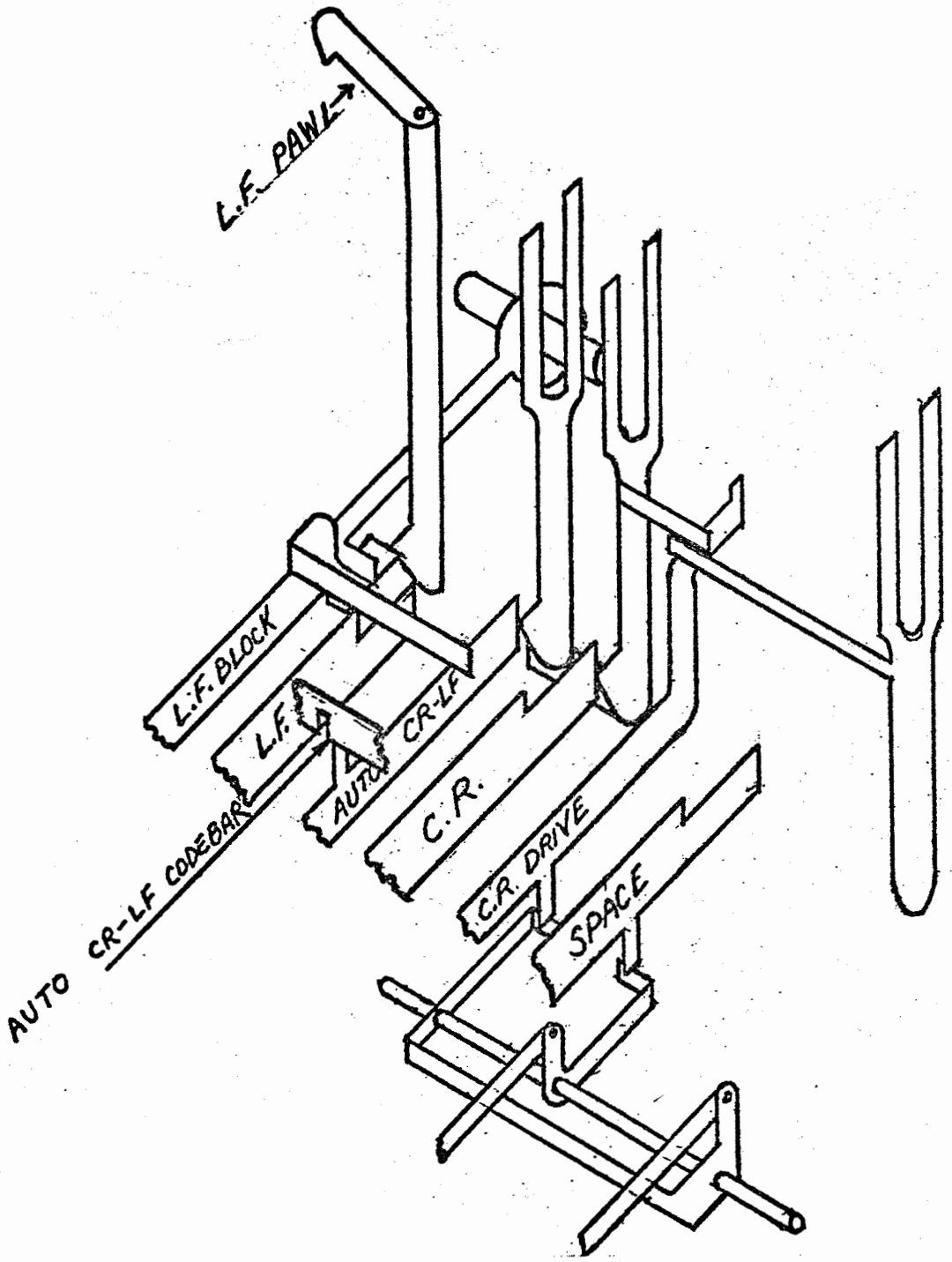
TELEPRINTER

MODEL 32

FUNCTIONS and ANSWER-BACK

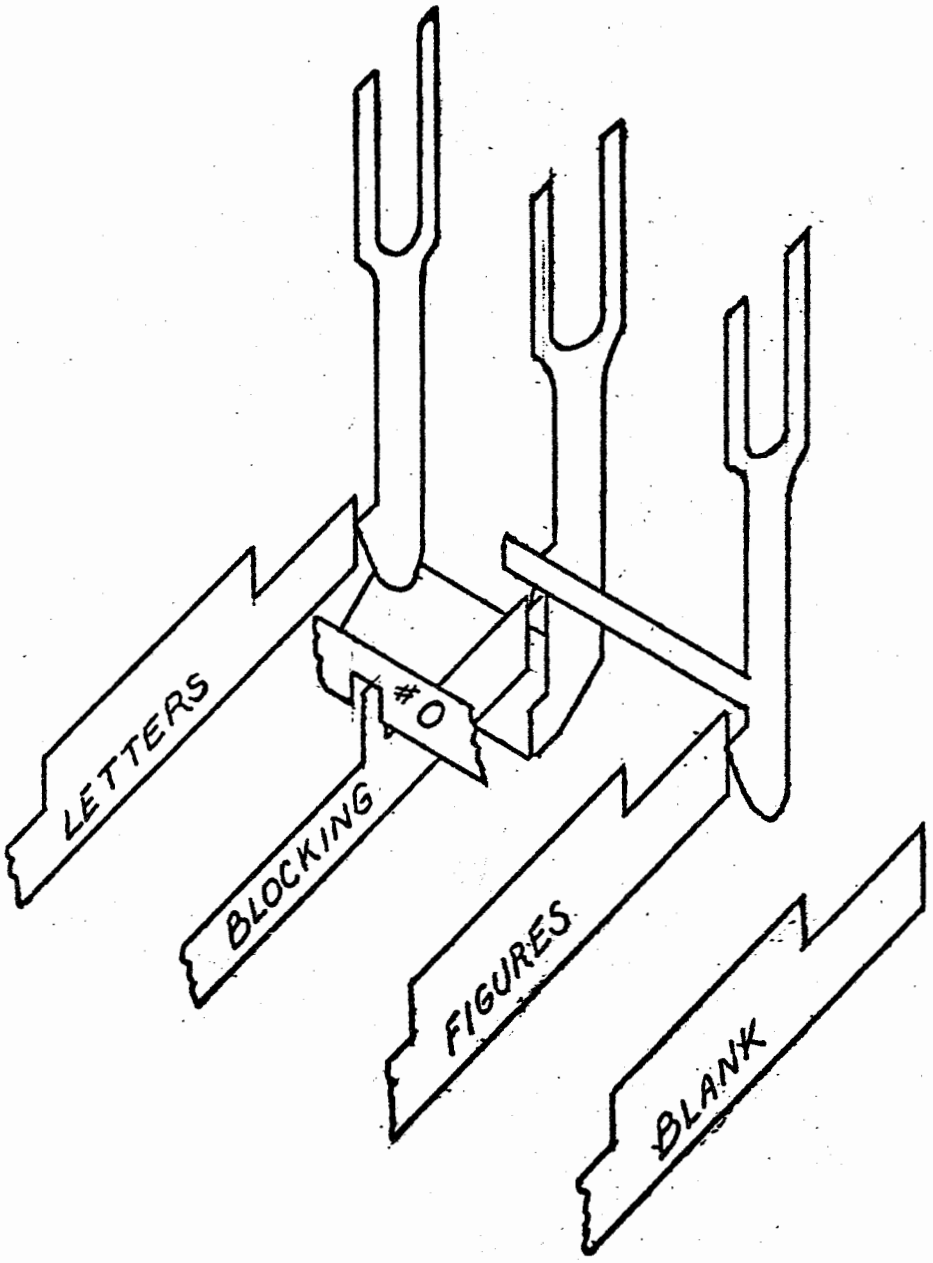
Line Feed ----------Page 15

C. R. ----------Page 14



Automatic carriage return line feed. As the carriage approaches the right hand margin a projection from the carriage lower plate picks up a projection on the automatic carriage return code bar. When the carriage has moved the automatic code bar a sufficient distance the automatic function lever, which is located between the line feed and carriage return function levers, will sense the notch located in the bottom of the automatic code bar. The sensing motion of the automatic function lever is transmitted to the line feed blocking lever as in the line feed dunction to produce the line feed at the platen. The automatic function lever picks up its pawl which then drives the carriage return function pawl downwards, thus accomplishing carriage return.

Spacing Function. The space function is the only function which requires print suppression but not space suppression. This is accomplished by a second control on the space suppression lever. The second control utilizes the sensing motion from the space funtion lever and transmits this motion through a series of levers and links to unlatch the space suppression lever and allow spacing.

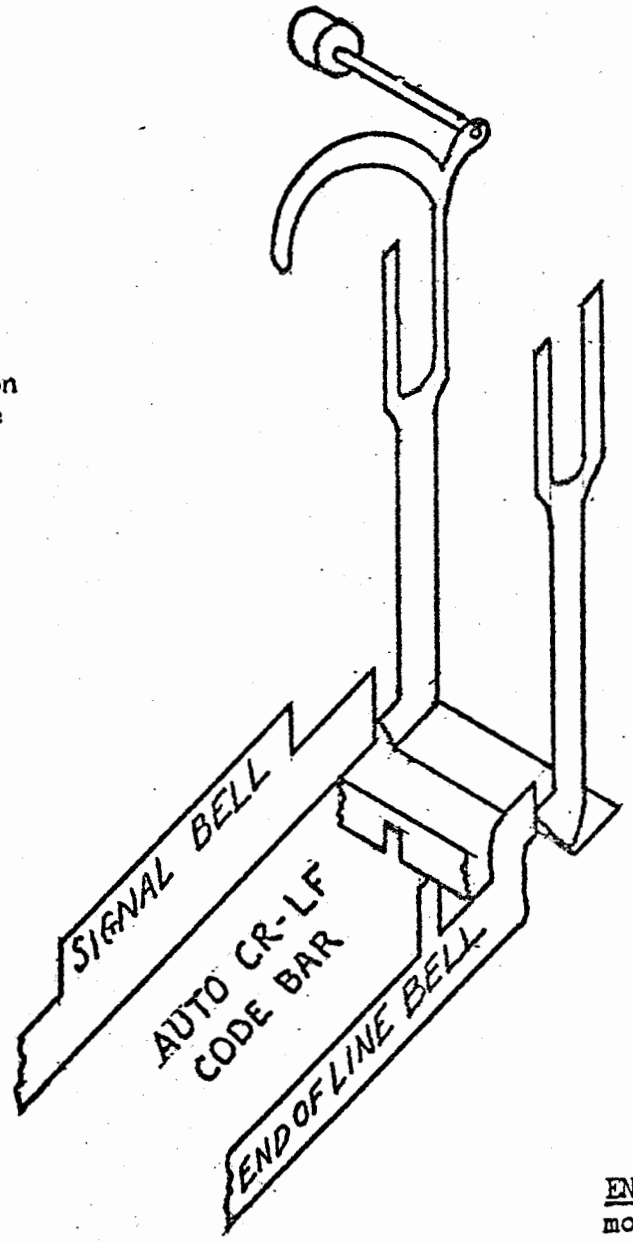


THEORY

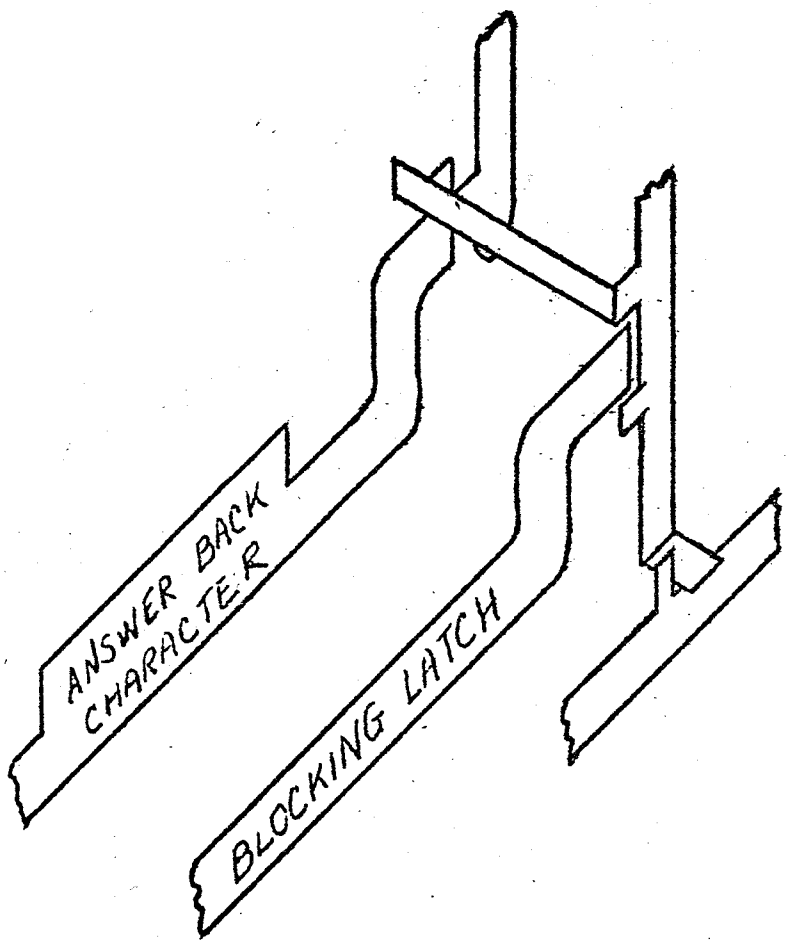
LTRS. - FIGS----------Page 15

BLANK - suppression of space when line is open.

BELL FUNCTION. When the signal bell Character is set up in the code bars, the signal bell function lever will rise with the function bail and latch on its function pawl. When the function lever and pawl are driven downward, the function pawl spring is stretched. The function pawl is stripped off, the spring loaded pawl is reset, and the clapper strikes the bell.



END OF LINE BELL. When the carriage moves the Automatic CR-LF code bar far enough to the right, the end of line bell function lever will sense a notch in the code bar and latch on its pawl. When the function lever and pawl are driven downward by the function bail the end of line bell pawl will also move the signal bell pawl down and the bell will be sounded as in the Bell Function.



SEE ANS.-BACK THEORY

ANSWER BACK MECHANISM

I. The answer back mechanism consists of a drum controlled set of contacts with a stopping and starting mechanism. The contacts are wired in parallel with the keyboard contacts to the distributor disc.

The answer back mechanism may be operated from the "Here-is" key for local station identification and by receipt of the answer back character for remote station identification. It may also be tripped automatically by means of a magnet trip, however, this is an accessory and its operation is not included in this guide.

II. Here-Is. When the "here-is" key (8) is depressed the "here-is" bell crank (9) rotates pulling the answer back trip link (34) to the front of the unit. The trip link in its forward movement rotates the answer-back control lever (52) clockwise. A lug on the control lever rotates the clutch stop bail (61) clockwise engaging the clutch (42). An additional lug (48) on the control lever (52) unblocks the answer-back feed lever (43) and allows it to follow the motion generated by the camming roller (49) during the answer-back operation. The follower on the answer-back feed lever (43), however, normally rests on the roller in the stop position. Therefore, as soon as the clutch begins to rotate clockwise until it again strikes the lug (48) on the control lever (52) as a stop. The answer-back feed pawl (60) is pivoted from an extension on the feed lever (43). The trip link (34) and hence the answer-back control lever (52) would begin to return to the unoperated position, (into the indent of the cam (69) which would pull the camming surface on the feed lever (43) out of the path of the camming roller and hence prevent the lever from feeding during the first cycle, which in turn would cause the answer-back to stop after the first cycle). However, when initially unblocked, the feed lever rotates clockwise far enough to pick up a new tooth on the answer-back drum (59). The drum detent (56) spring is strong enough so that the spring torque on the answer-back control lever (52) is unable to overcome both the feed lever (43) and the detent (56) opposition. The first tooth thus serves as a latch to latch the control lever (52) in the operated position during the first cycle. The first answer-back character transmitted is always "blank", since the contacts must be held open in the stop position so as to not interfere with selections set up during keyboard or reader operation. This character, however, is blinded from the signal line by the first character blinding contact (54). At the end of the cycle the cam roller rotates the answer-back feed lever (43)

The follower + hence the feed lever is allowed to rotate

counter-clockwise causing the feed pawl (60) to rotate the answer-back drum one step. During this first step, a cam (69) on the answer-back drum blocks the answer-back control lever (52) in the clockwise position. It is held in this position thru the 20th character holding the clutch "open". On the 21st character feeding, the control lever (52) is allowed to fall into the indention in the cam allowing the clutch stop bail (61) to rotate counter-clockwise stopping the clutch. The "blank" character in the stop position is not retransmitted.

III. Operation from function mechanism. When the answer-back character is set up in the code bars the answer-back function lever (18) latches on the answer back pawl (20). When the function lever and pawl are driven downward by the function bail the bottom of the pawl rotates the answer-back trip bail (24) to move the answer-back trip link (34) toward the front of the unit. This will trip the answer-back mechanism as described in section II.

IV. Preventing local printer from tripping on answer-back character. The local answer-back is prevented from being tripped when calling a remote answer-back by blocking the answer-back function lever (18) during every cycle of locally generated characters or functions as follows: During the distributor cycle, whether initiated from the keyboard or the answer-back itself, the blocking cam (44) rotates the blocking follower (51) counter-clockwise pulling the blocking link (35) to the right. The blocking link (35) thus rotates the blocking lever (25) counter-clockwise until the blocking latch (23) is released and allowed to move upward until it rests against the underside of the function drive bail blade (76). During the initial phase of the function sensing cycle, the bail blade and the blocking latch move upward causing the blocking lever to rotate further into its counter-clockwise position. In this position, a bent under ear (67) on the blocking lever extends in the way of a tab (68) on the answer-back function lever (18) and prevents the function lever (18) from moving high enough during the sensing portion of the function cycle to allow the answer-back pawl (20) to be engaged and selected. Local answer-back operation is thus inhibited. During the work stroke of the function cycle, when the function levers are moved downward, the blocking latch (23) is also moved downward by the function bail to the point where the blocking lever (25) is released and allowed to reset clockwise to its initial position. Information is thus stored from the distributor cycle through the function sensing cycle and then stripped. The source, local or remote, of any character being sensed by the answer-back funtion lever (18) is thus

recognized. That is, if any character is locally generated, the blocking mechanism is operated by the distributor and the function lever is blocked by the blocking lever (25). If any character is generated remotely, the blocking mechanism is not operated and the function lever is not blocked from sensing. Hence, the answer-back function lever (18) is blocked on all characters or functions generated locally. It is, therefore, incapable of operation should the answer-back call character be generated locally. This procedure is repeated each cycle of transmission from the keyboard or the answer-back.