

38 TAPE PUNCH

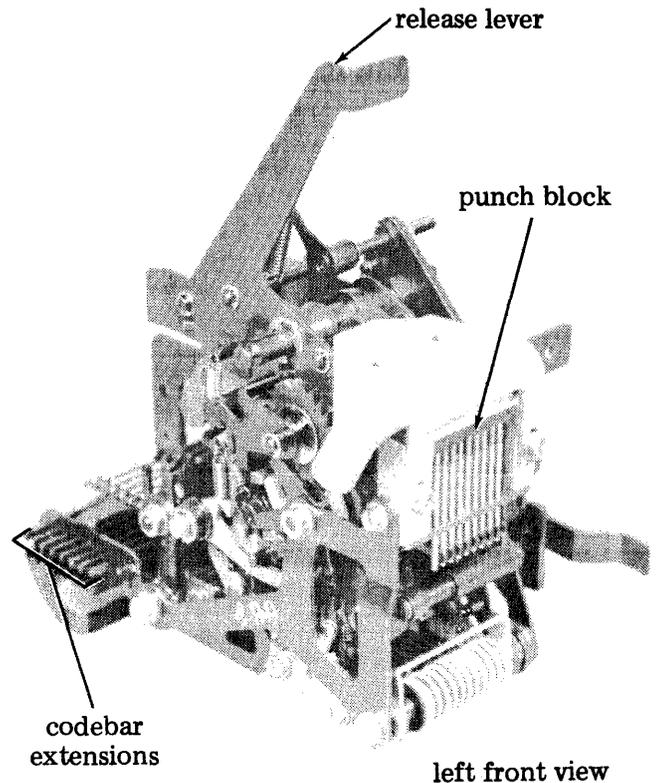
DESCRIPTION AND PRINCIPLES OF OPERATION

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1. GENERAL	

ing to ASCII (American National Standard Code for Information Interchange).

1.02 The tape punch mounts to the left side of the 38 typing unit, and uses the typing unit's function shaft, selector, and codebars for its drive power and intelligence input.

1.03 The 38 tape punch is capable of operating either manually or automatically (programmable). The manual tape punch is controlled by manually operating the control lever. When switched to the ON position, the punch operates in conjunction with the associated typing unit, and will remain on, despite any on-line signal to turn it off. When manually switched to the OFF position, the punch discontinues punching tape, and remains off despite any on-line signal to turn it on.



1.01 This section provides the description and principles of operation for the 38 tape punch (Figure 1). The 38 tape punch is an 8-level device which perforates paper tape accord-

Figure 1 - 38 Tape Punch

1.04 The automatic tape punch operates both manually, with the control lever, and automatically, with on-line signals. While the punch is on, it can be turned off with either the control lever, or from an on-line signal. Likewise, if the punch is off, it can be turned on with either the control lever, or from an on-line signal.

1.05 References to right or left, front or rear, consider the tape punch as viewed by the operator with the punch block in the front.

1.06 In the illustrations, fixed pivot points are shown solid black, and those mounted on parts that move are shown cross-hatched.

## 2. TECHNICAL DATA

2.01 Some of the data that follows is approximate. The dimensions and weight given for the tape punch are for the unit removed from the associated typing unit.

2.02 This equipment is intended to be operated in a room environment within the temperature range of 40°F to 110°F. Serious damage to it could result if this range is exceeded. In this connection, particular caution should be exercised in using acoustical or other enclosures.

## DIMENSIONS AND WEIGHT

2.03 The physical dimensions and weight of the 38 tape punch are as follows:

Width . . . . .	4 inches
Depth . . . . .	5-1/2 inches
Height . . . . .	5-1/2 inches
Weight . . . . .	21 ounces

## TAPE SPECIFICATIONS

2.04 The 38 tape punch perforates oiled paper tape with specifications as follows:

Level . . . . .	8-level
Width . . . . .	1 inch
Character spacing . . . . .	10/inch
Feed hole diameter . . . . .	0.046 inch

## CHAD BOX

2.05 The dimensions of the chad box used with the tape punch are as follows:

Width . . . . .	2-1/2 inches
Length . . . . .	7 inches
Height . . . . .	7-1/2 inches

## SPEED OF OPERATION

2.06 The 38 tape punch is capable of operating at speeds up to 100 words per minute.

## 3. DESCRIPTION AND PRINCIPLES OF OPERATION

3.01 The following paragraphs give detailed information on the major mechanisms of the tape punch (Figure 2). Also, the information applies to both the manual punch and the automatic punch. Control features peculiar to each punch are discussed in Part 4.

## DRIVE MECHANISM

3.02 The rocking motion of the typing unit function rocker shaft is transferred to the tape punch through a sleeve on the rocker shaft, to a drive link and a plate with shaft on the punch (Figure 3). The drive link, attached to the plate with shaft, connects to the drive post and simultaneously drives the nudger, feed pawl, and stripper bail. The drive link also supplies the downward force to the sensing lever bail which pulls the selected pawls.

## INTELLIGENCE TRANSFER MECHANISM

3.03 There is a codebar extension for the number 1, 2, 3, 4, 5, 6, 7, and 8 codebars in the typing unit (Figure 4). Motion is imparted to the codebar extensions by the codebars through the typing unit reset bail. A bracket and a plate mounted to the tape punch base provide support and guide for the codebar extensions.

3.04 The typing unit selector blocking levers control the mark or space position of the typing unit codebars which, in turn, transfer this position to the codebar extensions. A blocked codebar represents a space, and an unblocked codebar represents a mark. Each codebar extension has a tab on its underside which aligns with its respective sensing lever, pawl, lever, and punch pin combination.

3.05 During the drive mechanism's counterclockwise travel, the sensing levers, under spring tension, move up and sense the codebar extensions. Each sensing lever, except the feed lever, has a tab on its top side which aligns with its respective codebar extension.

3.06 When a codebar extension is spacing, the tab, located on its underside, aligns with the tab on the sensing lever. The tabs engage each other, and the sensing lever is blocked from pivoting to its most counterclockwise position.

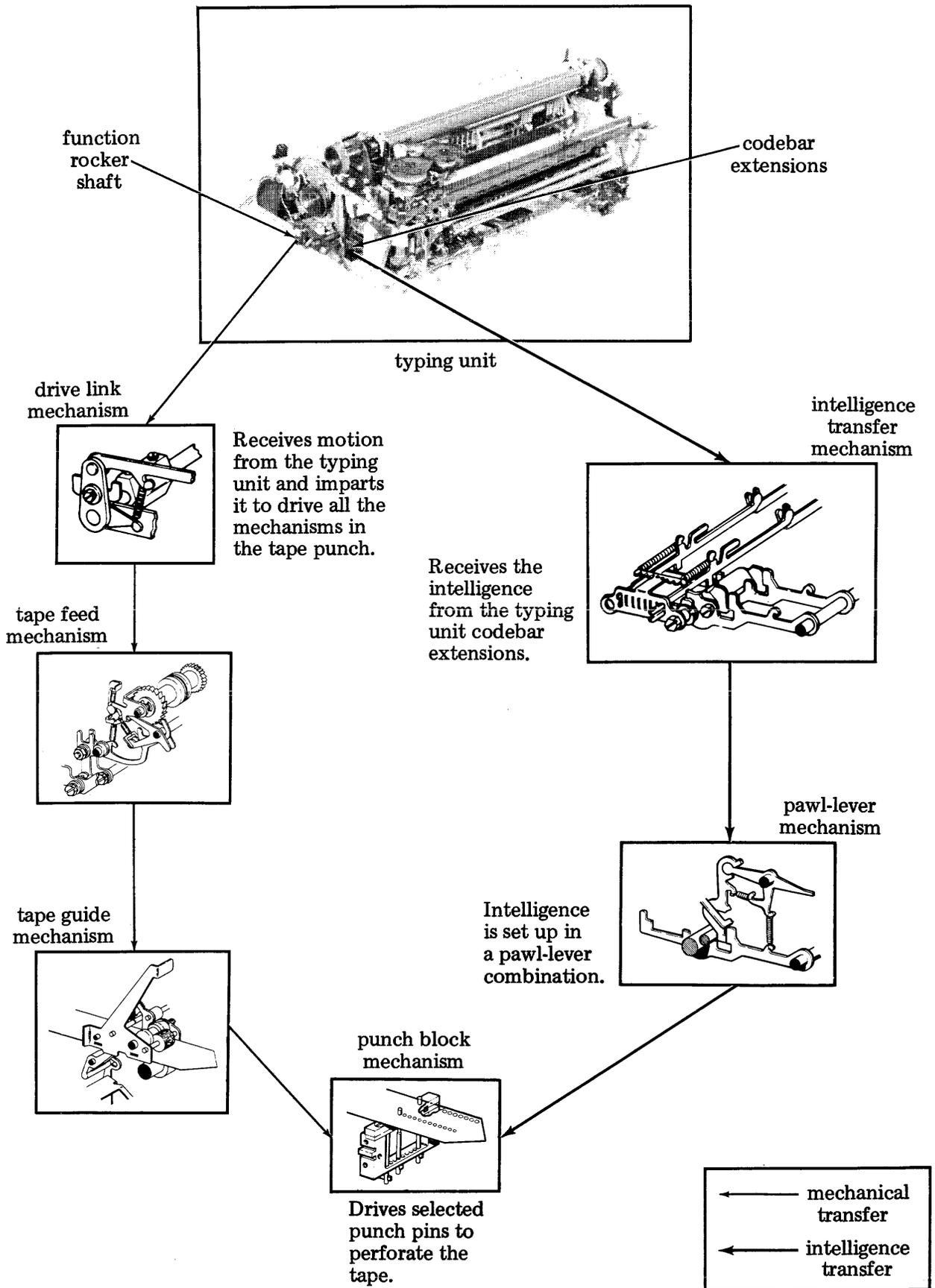


Figure 2 - Functional Diagram of Tape Punch Mechanisms

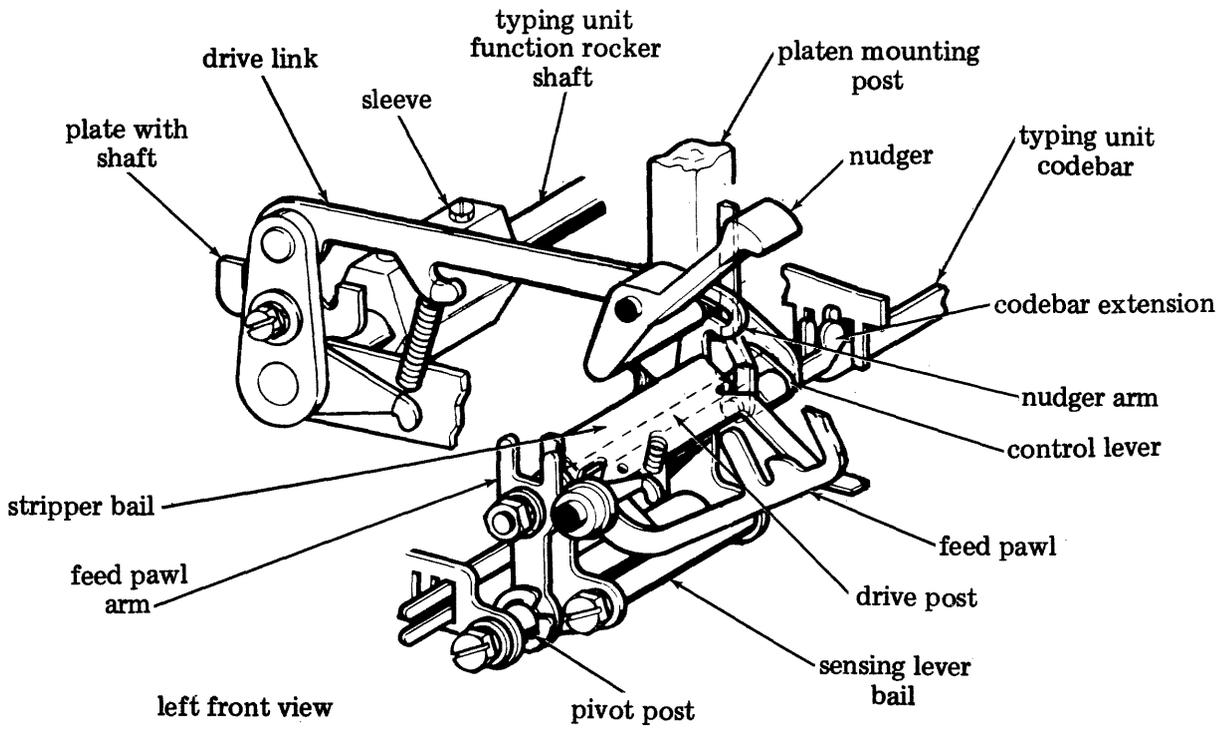


Figure 3 - Drive Mechanism

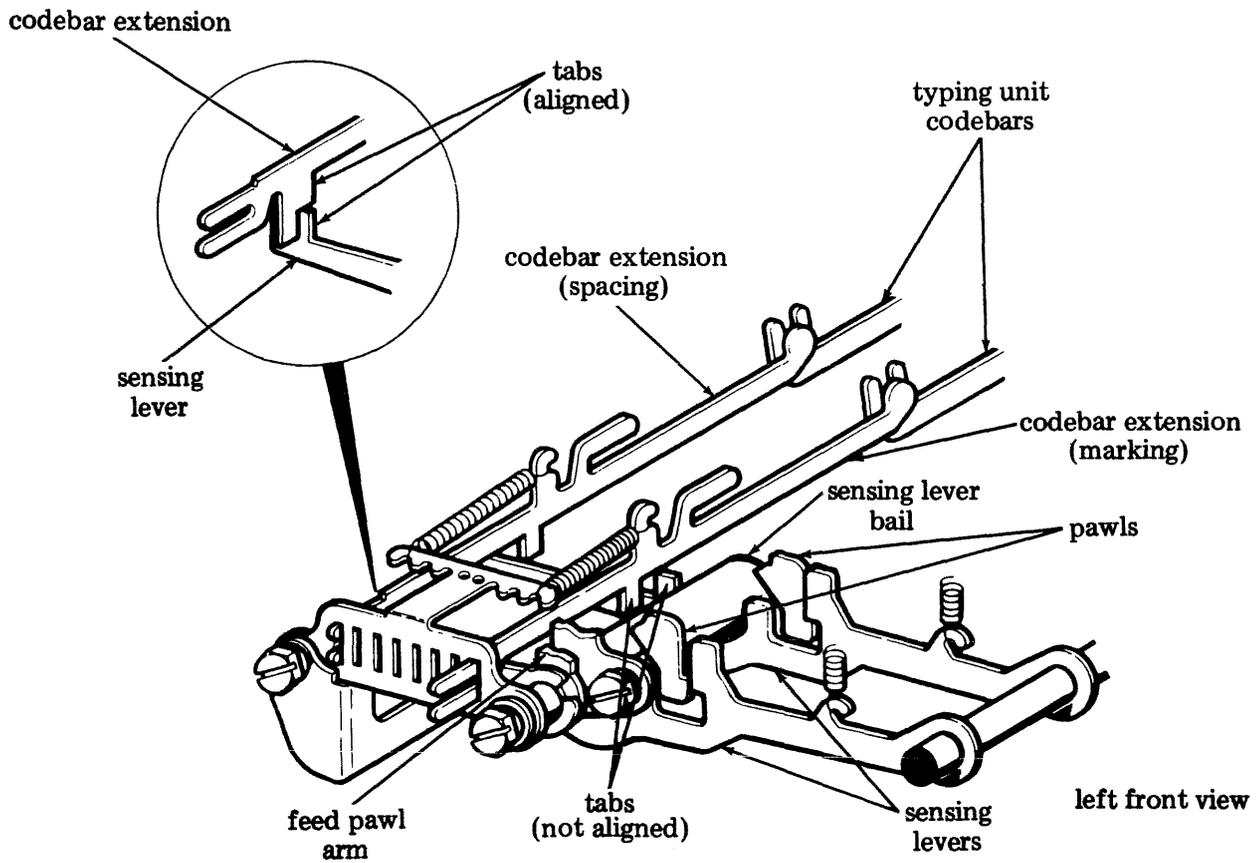


Figure 4 - Intelligence Transfer Mechanism

3.07 When a codebar extension is marking, its tab is not in line with the sensing lever tab. As a result the sensing lever pivots to its most clockwise position.

3.08 The feed sensing lever always travels to its most clockwise position, since it has no tabs. This motion is presented to the pawl, lever, and feed-punch pin combination through a latching surface on the pawl.

3.09 When the tape punch is off, each pawl is in its highest vertical position, each lever in its most clockwise position, and each code-punch pin in its most downward position — below the surface of the tape.

3.10 When a sensing lever is in the spacing position, its latching surface is prevented from engaging with its associated pawl latching surface. As a result the pawl is not selected.

3.11 When a sensing lever is in the marking position, its latching surface engages the latching surface on its associated pawl. When the two latching surfaces engage, the pawl is in the selected position.

3.12 As the drive mechanism (Figure 3) rotates clockwise, the feed pawl slides along the inclined surface of the adjacent ratchet tooth, drops behind it, and is cammed away from the feed wheel ratchet. Occurring simultaneously, the sensing levers in the marking position rotate counterclockwise and transfer their motion to the selected pawl, lever, and code-punch pin combination. At the same time, the drive mechanism transfers its motion to the sensing levers which are spacing. Since the pawl, lever, and code-punch pin combinations are in the nonselected position, no motion is transferred to them. This results in no perforation of the tape, since the code-punch pins remain in their most downward position below the tape's surface. As the drive mechanism continues and reaches its most clockwise position, the code-punch pin of a selected pawl, lever, and code-punch pin combination travels upwards, perforates a hole in the tape, and continues to its most vertical position. The feed hole is always perforated in the tape since its pawl and lever are always selected.

3.13 Just prior to the end of the drive mechanism's most clockwise travel, the stripper bail, through its bias spring, engages a

latching surface located under the spring hook(s) of the selected pawl(s). As the drive mechanism rotates counterclockwise to its stop position, the stripper bail strips the selected pawls from their sensing levers. The selected pawl, lever, and code-punch pin combinations return to their stop positions through their bias springs and the retractor mechanism. The lever bail of the drive mechanism also acts as a part of the retractor mechanism. As the stripper bail strips the pawls, a cam surface on the pawl, which acts as the other member of the retractor mechanism, engages the sensing lever bail post and cams the pawl upwards to the stop position. During this portion of the drive mechanism's travel, the codebar extensions are reset by the codebar reset bail.

3.14 During the drive mechanism's clockwise motion, the nudger (Figure 3) performs its function. Motion is transferred from a cam profile, located on the nudger arm, through a post molded as an integral part of the nudger. The nudger rotates counterclockwise, engages, and nudges the tape gently when the selected code-punch pins are engaged with the tape. This enables the tape to be advanced a small amount without affecting tape feed spacing, since only the weight of the paper between the tape roll is reflected to the feed wheel when the tape is being advanced.

#### TAPE FEED MECHANISM

3.15 As the stripper bail moves to the rear, the feed pawl engages a tooth on the feed wheel ratchet (Figure 5). When the stripper bail completes its travel to the rear, the feed wheel ratchet has indexed one full tooth and the tape is advanced 0.100 inch by the feed wheel.

#### TAPE GUIDE MECHANISM

3.16 The tape guide mechanism (Figure 6) consists of two plates, a bracket, two rollers, three posts, a sleeve, and a compression spring held together by retainers. A tension spring biases the tape guide mechanism in a clockwise direction.

3.17 The knurled roller settles against the knurled feed wheel with a predetermined force. It is the combination of force and knurled wheels that provide for adequate tape spacing. The tape guide assembly is shaped in the form of a funnel to provide easy tape threading. A release lever (Figure 6), when pushed back, rotates the tape guide mechanism in a counterclockwise direction and disengages the roller from the feed wheel, thereby providing easy tape removal and feeding.

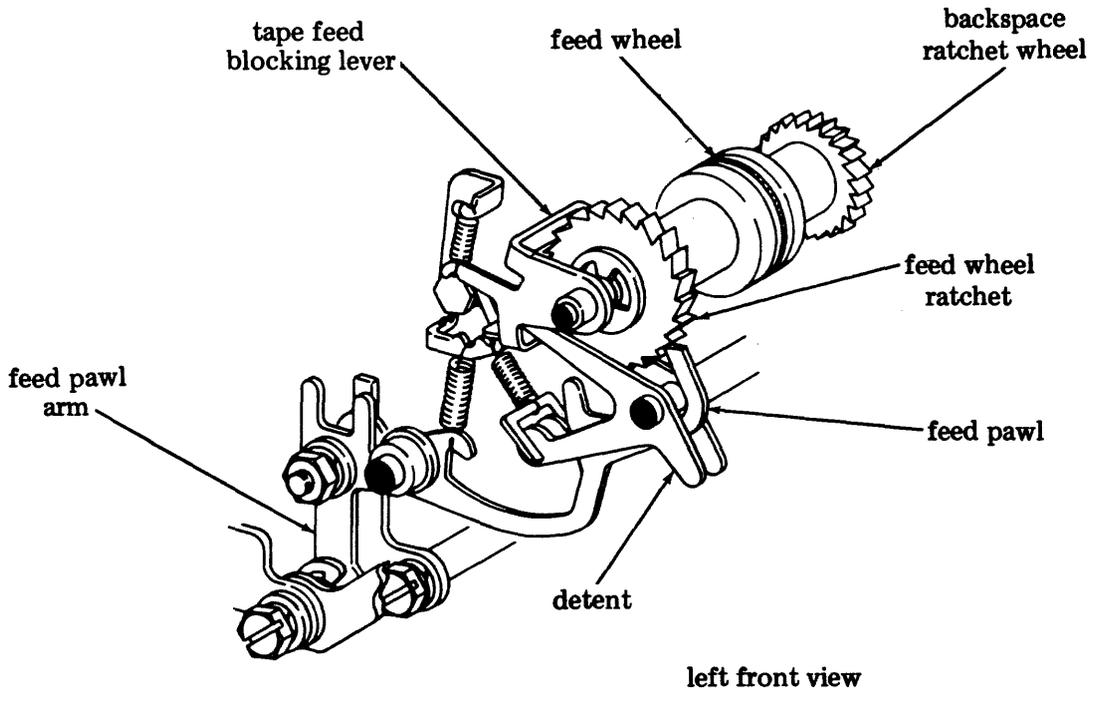


Figure 5 - Tape Feed Mechanism

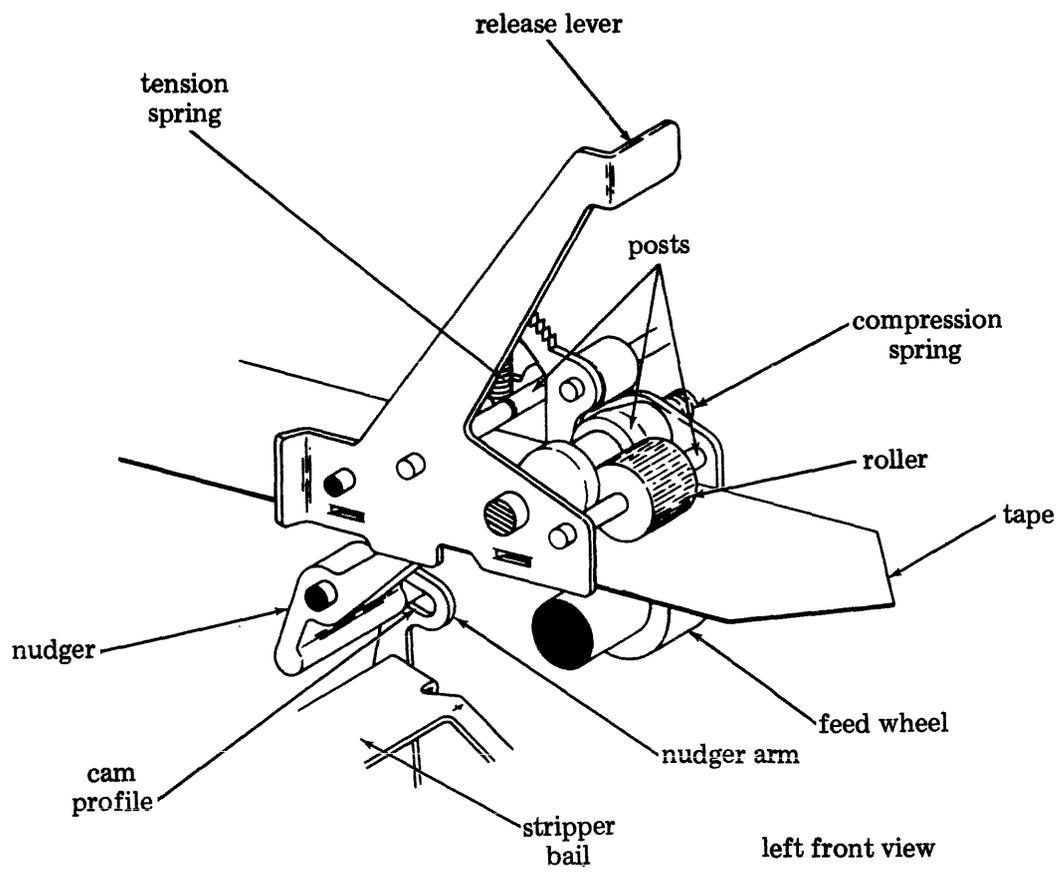


Figure 6 - Tape Guide Mechanism

## PUNCH BLOCK MECHANISM

3.18 The punch block mechanism consists of code-punch pins, a feed-punch pin, holder, die plate, and a tape bias spring (Figure 7). The code-punch pins and feed-punch pin are oriented to the die plate through slots which engage levers in their respective code level. The tape bias spring always biases the tape against one edge of the holder. This results in the code hole and feed hole relation to the tape edge to be held constant.

## BACKSPACE MECHANISM

3.19 The backspace lever, when moved by the control lever, backspaces the ratchet one tooth (Figure 8). This results in the tape being backspaced one full character. The

backspace lever, through the tape feed blocking lever, cams the feed pawl clear of the feed wheel teeth before the backspace pawl engages the teeth on the backspace ratchet wheel.

## 4. CONTROL FEATURES

### MANUAL PUNCH

4.01 The manual tape punch is controlled only by the punch control lever (Figure 9). The controls for manual operation are listed in Table A.

### AUTOMATIC PUNCH

4.02 The automatic tape punch (programmable, see Part 5), responds to ASCII control codes. The controls for automatic operation are listed in Table B.

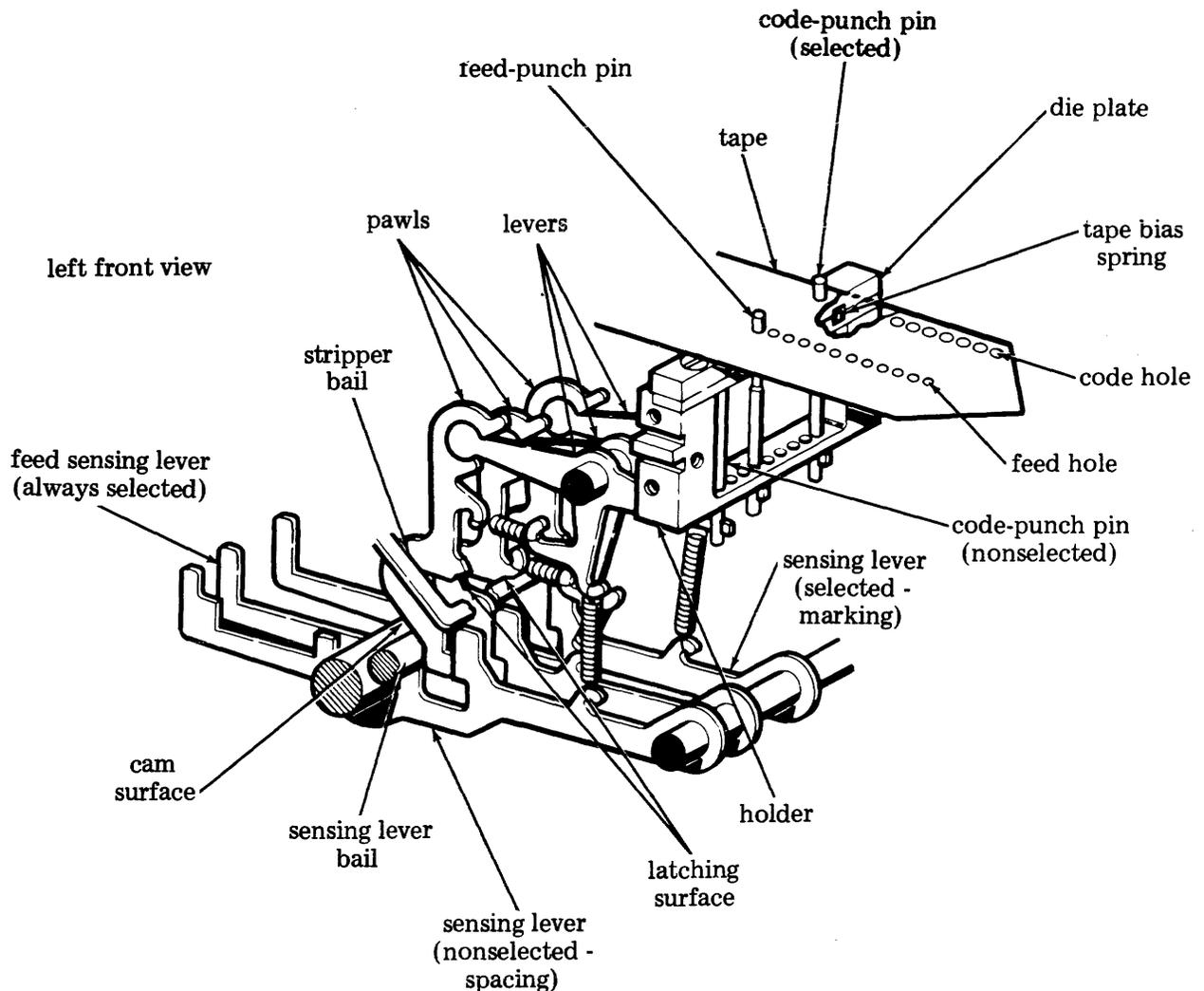


Figure 7 - Punch Block Mechanism

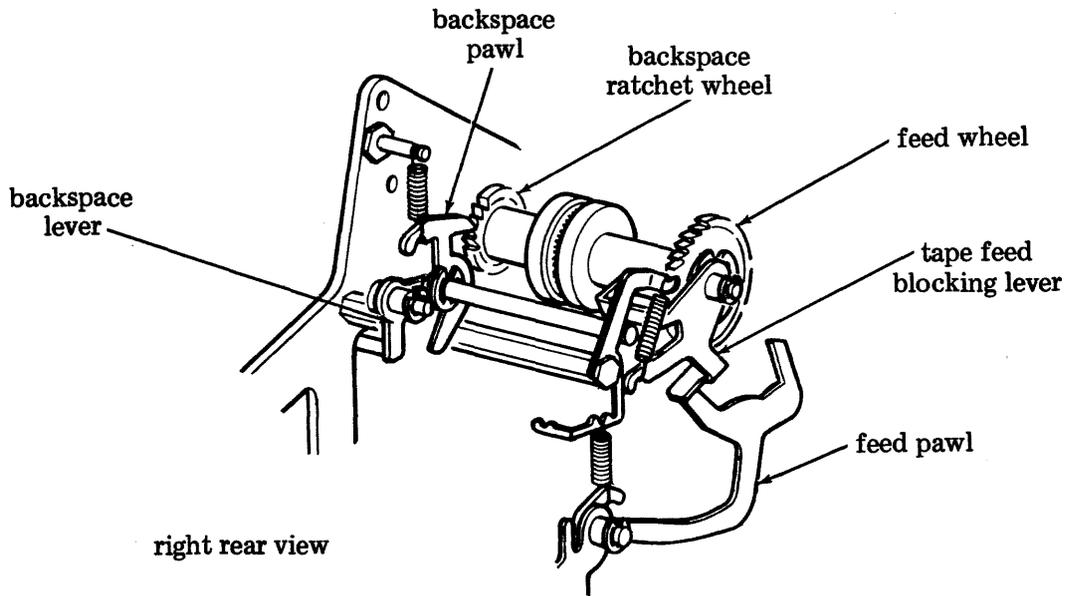


Figure 8 - Tape Backspace Mechanism

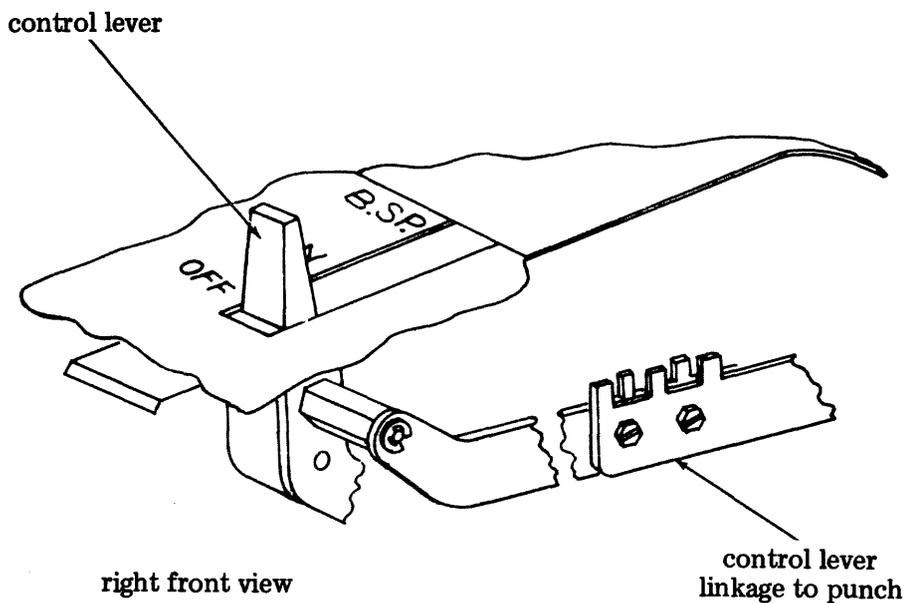


Figure 9 - Tape Punch Control Lever

## 5. VARIABLE FEATURE

5.01 The only variable feature on the 38 tape punch is the option to use the punch automatically. As shipped from the factory, the punch has two clips installed in slots

A-0 and A-8 of the sensing lever guide (Figure 10), which render it for manual operation.

5.02 To program the punch for automatic operation, remove the two clips. The clips can be replaced to return the punch to manual operation.

**TABLE A**  
**MANUAL PUNCH CONTROLS**

CONTROL	OPERATION
B.SP.	Primarily used for tape correction. Each time the control lever (Figure 9) is moved to this position, the tape backspaces one full character.
ON	In this position, the tape punch operates and permits characters received by the typing unit to be punched in the tape. The tape punch will remain on despite any on-line signal to turn it off.
OFF	With the control lever in this position, the tape punch is inactive, and will remain so despite any on-line signal to turn it on.

**TABLE B**  
**AUTOMATIC PUNCH CONTROLS**

CONTROL	OPERATION
B.SP.	Same as manual operation.
ON	The automatic tape punch can be turned on by either moving the control lever (Figure 9) to the ON position, or by the receipt of the DC <sub>2</sub> ASCII signal from the associated keyboard, or a remote terminal via the signal line.
OFF	Once on, the automatic tape punch can be turned off by either moving the control lever to the OFF position, or by the receipt of the DC <sub>4</sub> ASCII signal from the associated keyboard, or a remote terminal via the signal line.

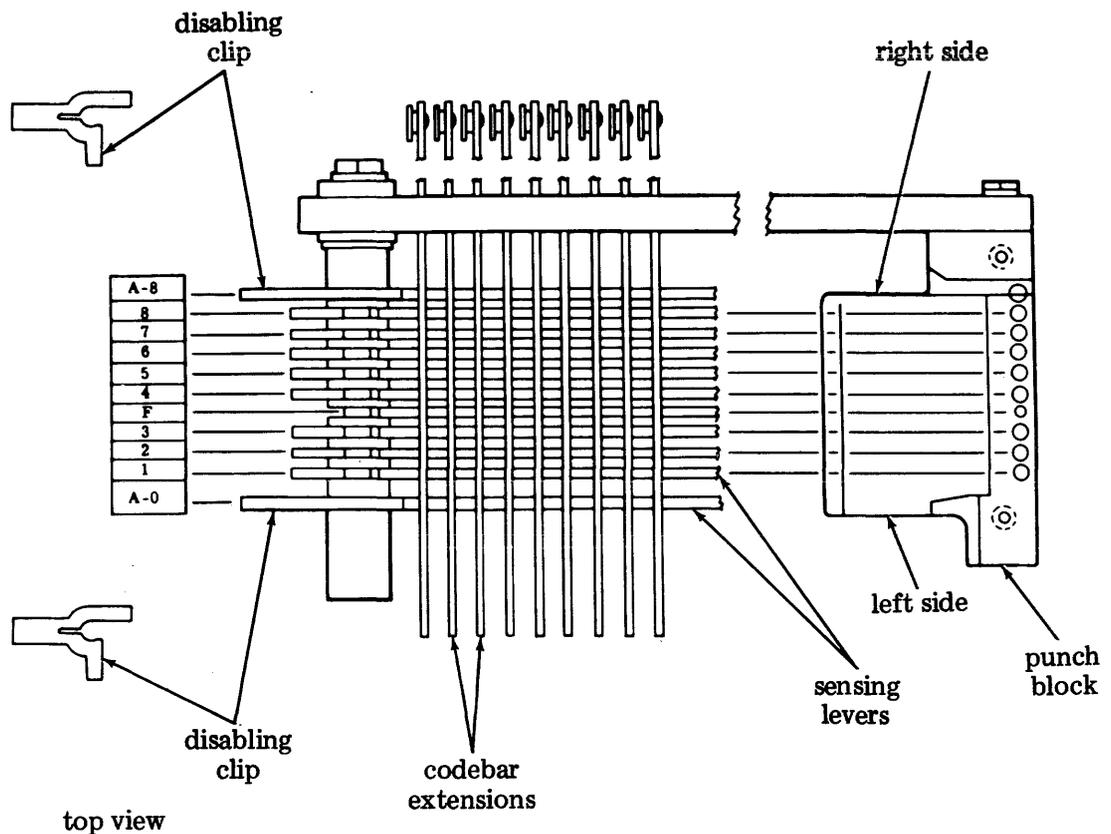


Figure 10 - Sensing Levers and Disabling Clips Slot Assignment