

35 "CARDATA"\* FEEDER (EPCF)

DESCRIPTION AND PRINCIPLES OF OPERATION

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3. PRINCIPLES OF OPERATION . . . . .	3	"CARDATA" feeder (edge punched card feeder)	
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CARD FEATURES . . . . .	4	1.02 The feeder unit is a basic unit capable of	
SEPARATOR STONES . . . . .	4	separating a single edge punched card	
FEED ROLLER SPINDLE		from a supply of individual cards and inserting	
ASSEMBLY . . . . .	4	the card into the edge punched card reader.	
A. Operation . . . . .	4	1.03 In its present form, the feeder unit is	
B. Spring Clutch . . . . .	5	limited to handling cards with widths of	
C. Brake Spring . . . . .	5	3 inches to 3-1/2 inches, and lengths of 7 inches	
D. Spring Clutch Engagement . . . . .	5	to 8-1/2 inches inclusively. Cards of different	
EJECTOR MECHANISMS . . . . .	5	lengths should not be intermixed.	
A. Ejector Spindle . . . . .	5	1.04 References in the text to the left, right,	
B. Auxiliary Ejector Rollers . . . . .	5	front, or rear apply to the unit in its normal	
CIRCUIT ELEMENTS . . . . .	6	upright position as viewed from the front or	
ELECTRICAL COMPONENTS . . . . .	6	operator's position.	
A. External Controls . . . . .	6	1.05 If necessary, refer to the appropriate	
B. Internal Controls . . . . .	6	disassembly and reassembly section for	
C. Circuit Description . . . . .	7	removal of cover and any internal mechanisms	
		associated with the feeder. For any further in-	
		formation regarding location of parts, refer to	
		the exploded views in the appropriate parts	
		section.	
		1.06 The card feeder, including the associated	
		reader, can be used as a table mounted	
		unit.	
		1.07 The card feeder has a capacity of 250	
		edge punched cards. The speed of	
		the motor is reduced by means of gears, so	

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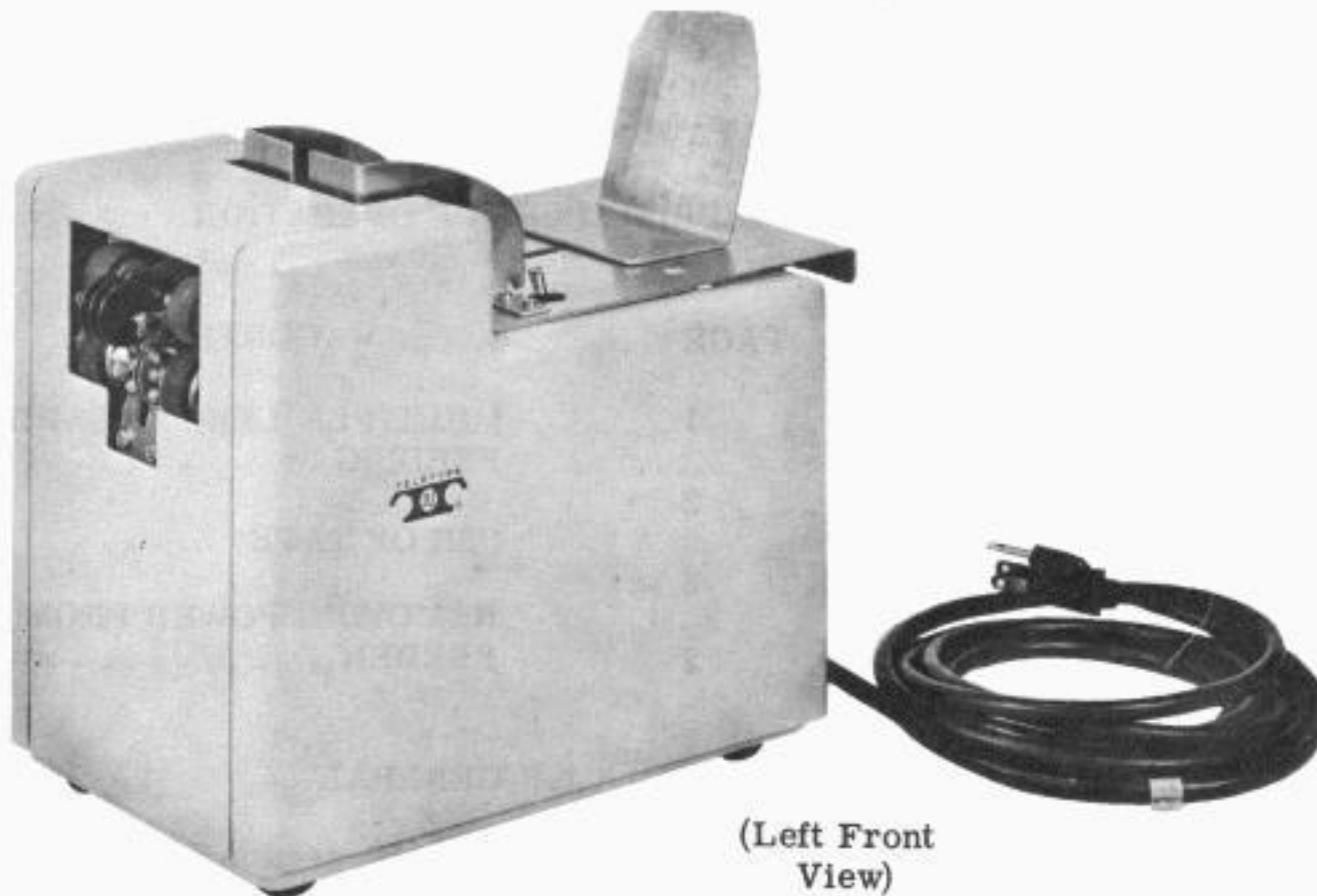


Figure 1 - 35 Edge Punched Card Feeder

that the insertion speed of the edge punched card is approximately 12 inches per second.

1.08 The unit is able to operate in temperatures of 40 to 110 degrees Fahrenheit when supplied with 115 volts ac,  $\pm 10\%$ , 60 hertz.

## 2. DESCRIPTION

### MECHANICAL CHARACTERISTICS

2.01 The size of the card feeder is 11 inches wide, 7-1/2 inches deep and 11-1/4 inches high. The weight is approximately 20 pounds. A cover supplied as part of the feeder is used to house the unit.

2.02 The adjustable side guides, mounted on the top plate, locate the cards with respect to the separator stones in the feed mechanism. An adjustable card support plate is positioned to place the cards into the proper angular attitude with the separator stones (Figure 2).

2.03 Two alignment brackets mounted to the base of the feeder unit facilitate the alignment of the feeder and the card reader. A single alignment bracket attaches to the card reader base plate and mates with the alignment brackets on the feeder.

### ELECTRICAL CHARACTERISTICS

#### A. Overload Protection

2.04 The feeder motor is protected with a thermal cutout device (Figure 5) which can be reset. The thermal cutout is located directly above the motor assembly and is accessible when the top plate is removed.

#### B. Connector

2.05 A 25-point connector J-1 is mounted on the right side of the feeder and is accessible through an opening in the cover. Power is supplied to the feeder motor and control circuits through a separate line cord (Figure 2).

#### C. External Controls

2.06 The two manual controls provided for the use of the operator are the POWER ON switch and the FEED CARDS - STOP/TAPE switch (Figure 2).

#### D. Internal Controls

2.07 A number of internal circuit elements control the starting and stopping of the feed mechanism as well as the detection of double

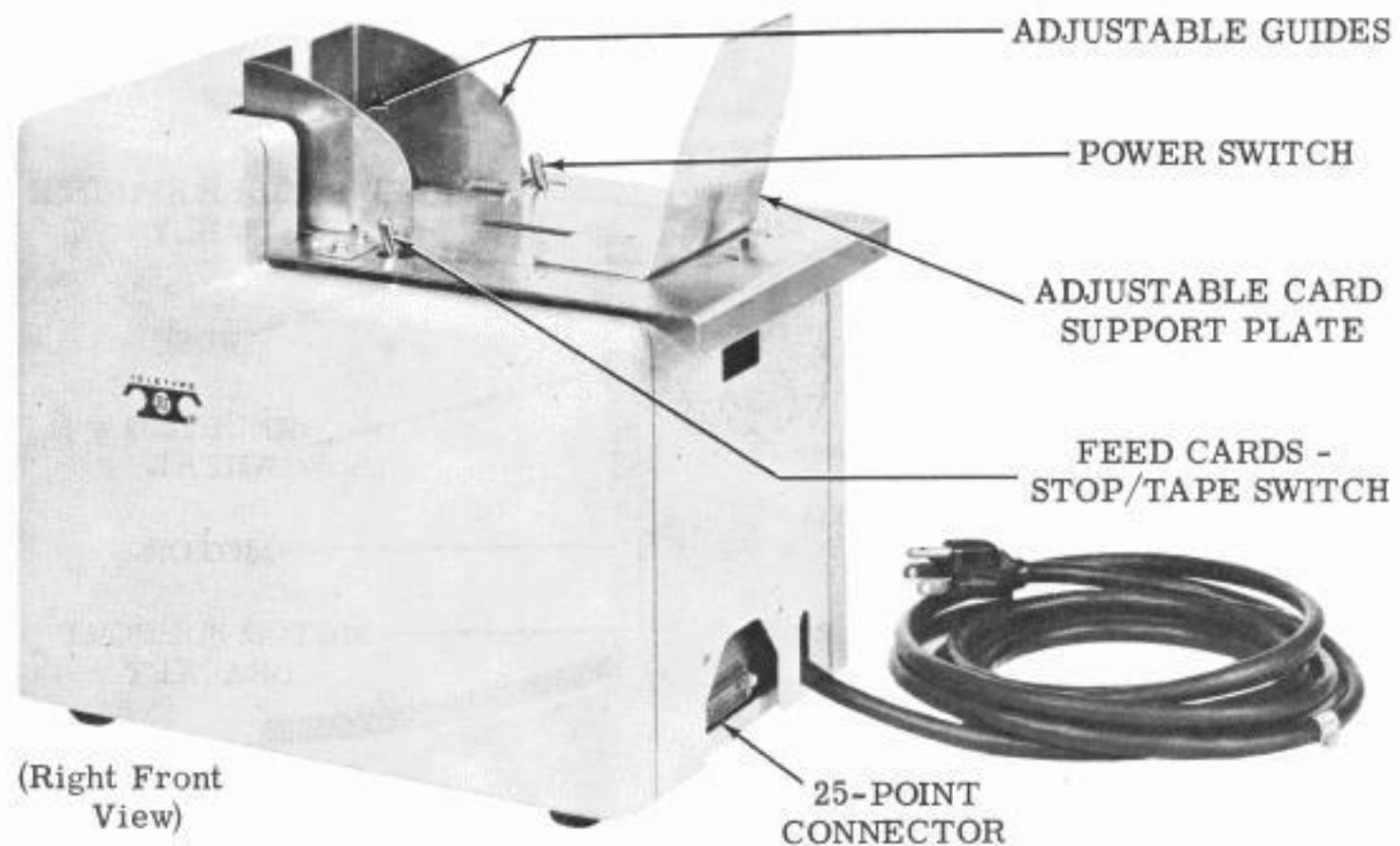


Figure 2 - 35 Edge Punched Card Feeder

cards. These controls are fully described in the PRINCIPLES OF OPERATION portion of this section.

#### E. Technical Data

##### 2.08 Operating Speed

- (a) The card insertion speed is approximately 12 inches per second.
- (b) The motor speed is 1725/1425 revolutions per minute, 60/50 hertz.

##### 2.09 Physical Characteristics

- (a) Feeder dimensions and weight:

Height	11-1/4 inches
Width	11 inches
Depth	7-1/2 inches
Weight	20 pounds

- (b) In its present form the feeder is limited to handling cards of:

Widths	3 inches to 3-1/2 inches
Lengths	7 inches to 8-1/2 inches
Multiple length cards	

##### 2.10 Electrical Requirements

- (a) AC Power

115 Volts AC  $\pm 10\%$   
60 Hertz  $\pm .45$

- (b) Control circuits

48 Volts DC  $\pm 10\%$  supplied from the reader unit or externally

##### 2.11 Motor Data

Motor - TP319392  
Volts - 115 AC  
Hertz - 60/50  
Phase - Single  
Revolutions per minute - 1725/1425  
Amperes - 0.85/1.0  
Millihorsepower - 25  
Rotation - Counterclockwise (Viewed from end opposite pinion end)  
Time Rating - Continuous  
Maximum ambient temperature - 130 degrees centigrade  
Main Winding - 25.4 ohms  $\pm 10\%$   
Start Winding - 25.4 ohms  $\pm 10\%$

### 3. PRINCIPLES OF OPERATION

- 3.01 The feeder unit is composed of both mechanisms and electrical control circuits.

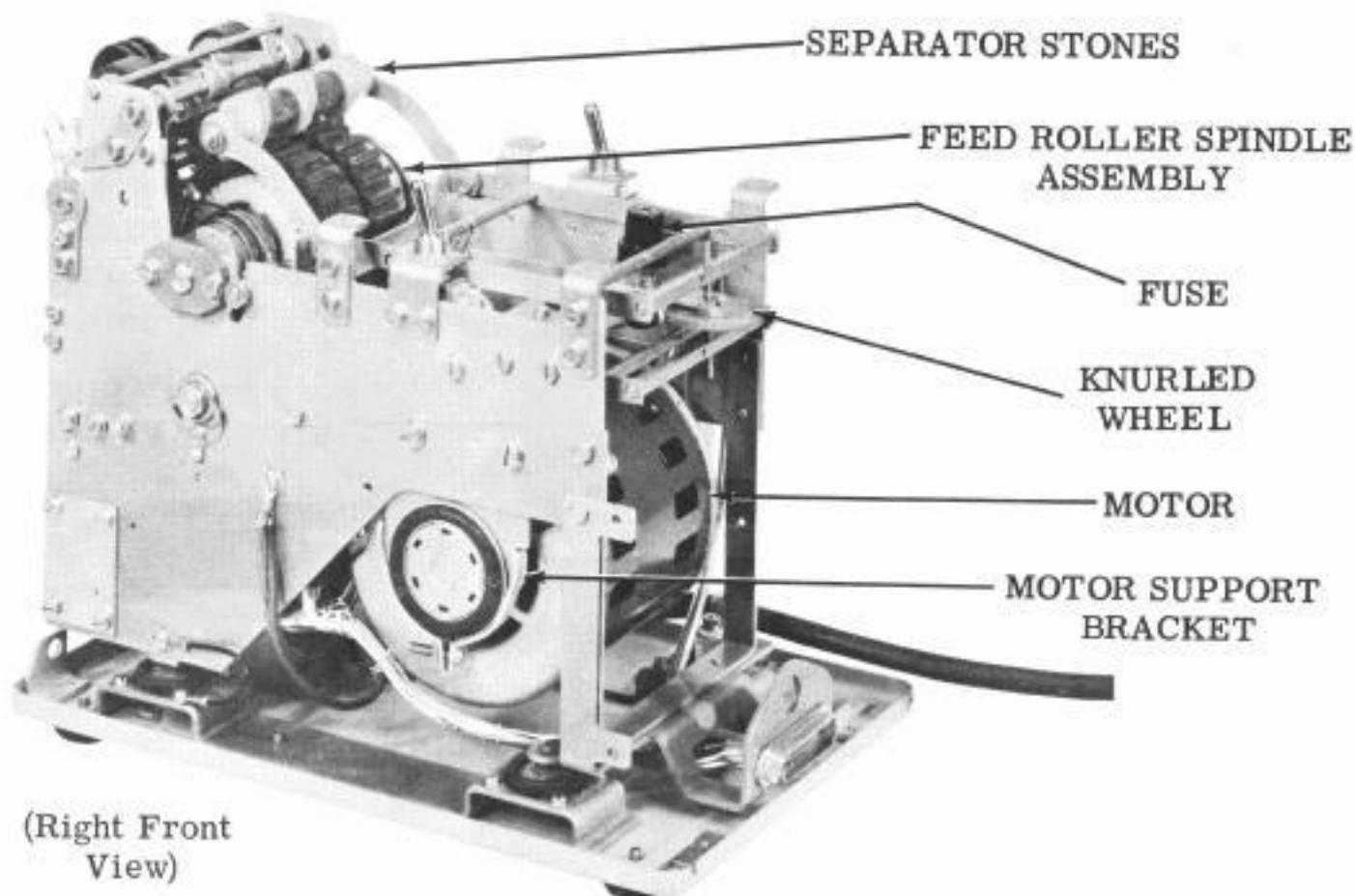


Figure 3 - 35 Edge Punched Card Feeder (Without Cover and Top Plate)

#### MOTOR

3.02 A 25 millihorsepower motor furnishes the driving force for the feeder. This motor is a nonsynchronous type with a speed of 1725/1425 revolutions per minute. Brackets supporting the motor are attached to the side frames of the unit (Figure 3).

#### CARD FEATURES

3.03 The speed of the feed rollers is reduced by means of gears (Figure 4), so that the insertion speed of the card is approximately 12 inches per second.

3.04 Cards are placed into the feeder on the top plate. Adjustable guides locate the cards centrally with respect to the separator stones. These three stones contact the forward end of the card stack.

3.05 An adjustable plate attached to the top plate is the adjustable card support plate (Figure 2). The trailing edge of the card stack contacts this plate. Thus, the cards are kept in contact with the separator stones and the rubber tire on the feed roller spindle assembly (Figure 3).

#### SEPARATOR STONES

3.06 The separator stones (Figure 3) are shaped with flats which effect a separation between the card on the bottom and the rest of the stack. These stones are set at an angle of 10 degrees, relative to the top plate, to assure the most efficient separation.

3.07 The height of the stones, above the top plate is controlled by the rotation of a knurled wheel (Figure 3) accessible through the cover at the right of the unit. Revolving this wheel causes a frame, which mounts the separator stones, to move at right angles to the top plate. This perpendicular travel preserves the 10 degree angle of the separator stones.

#### FEED ROLLER SPINDLE ASSEMBLY

##### A. Operation

3.08 The purpose of the feed roller is to pull the bottom card out of the stack and to drive it between the separator stones and the feed roller. The roller is equipped with a soft

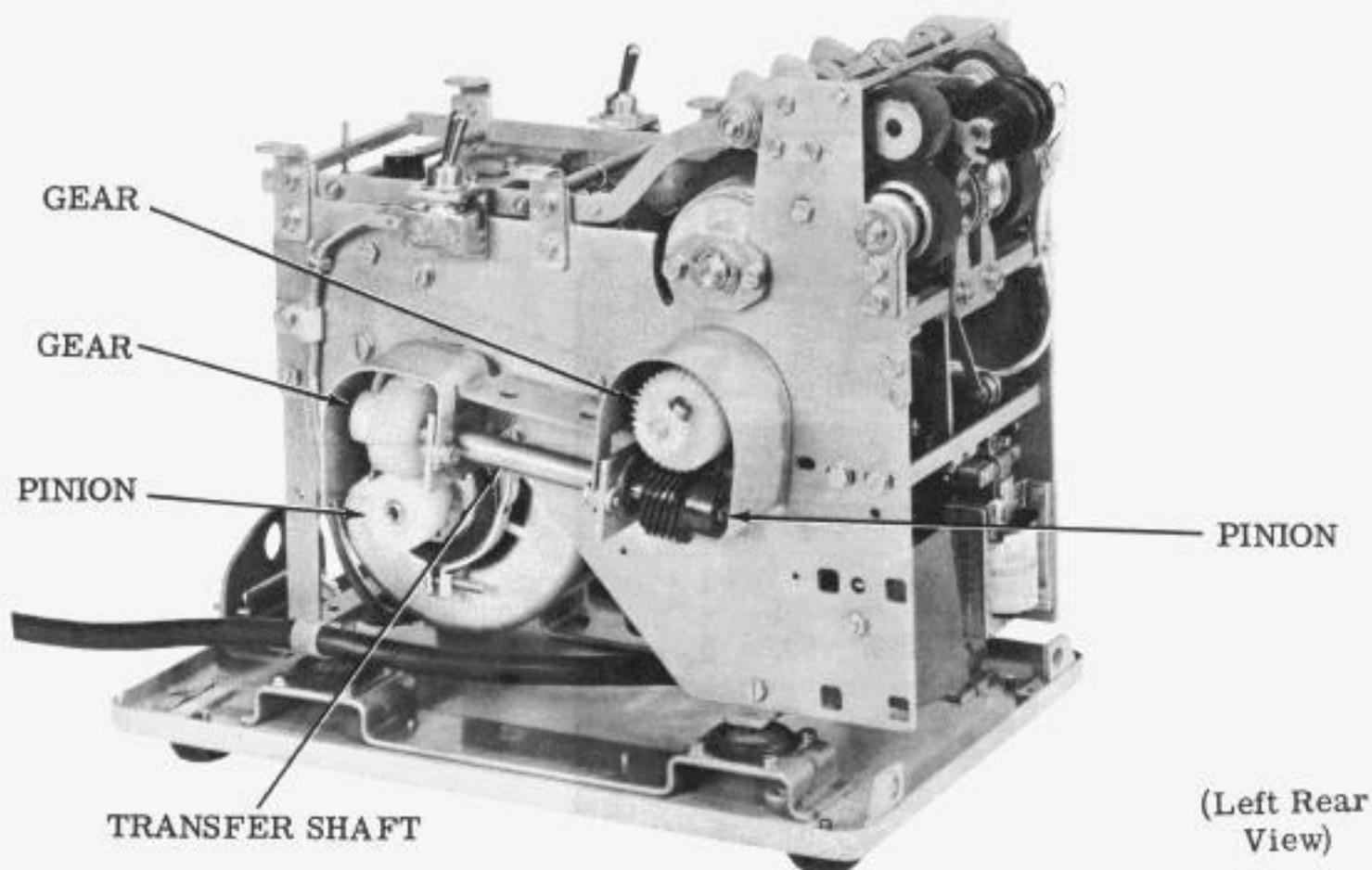


Figure 4 - 35 Edge Punched Card Feeder (Without Cover and Top Plate)

rubber tire to provide good gripping of the edge punched card.

#### B. Spring Clutch

3.09 The feed roller spindle assembly may be considered the heart of the feeder. A spring clutch (Figure 5) is located at the end of the spindle and imparts motion to the feed roller. Surrounding the clutch spring is a sleeve which acts as a confiner for the spring, and as the braking surface for stopping the clutch.

#### C. Brake Spring

3.10 The braking force for stopping the feed is supplied by a solenoid actuated brake spring (Figure 5). Actuating the clutch stop solenoid (Figure 6) causes the brake spring to tighten around the clutch spring confiner. By braking the confiner, the clutch spring is expanded and the drive gear arbor at the front of the clutch rides inside the spring causing the feed to stop.

#### D. Spring Clutch Engagement

3.11 When the spring clutch is engaged, the feed roller drives the edge punched card into the ejector roller spindle.

### EJECTOR MECHANISMS

#### A. Ejector Spindle

3.12 The purpose of the ejector spindle (Figure 6) is to effect full insertion of the card into the reader. The ejector spindle is driven by the feed roller through an 80-tooth timing belt. The drive sprockets are arranged so that the ejector spindle rotates at a speed which is slightly faster than the feed roller. This speed difference produces a desirable spacing between the card being inserted and the card being separated from the card stack.

#### B. Auxiliary Ejector Rollers

3.13 The auxiliary (upper) ejector rollers slide against the driven lower ejector rollers (Figure 6). Pressure against the auxiliary rollers is provided by a flat spring (Figure 6). An additional roller, mounted on the same arm and connected to the auxiliary rollers by means of drive belts, assures that 7-inch cards are fully inserted into the card reader. A bail (Figure 5) and bell crank (Figure 6) connected to the clutch stop solenoid lifts the auxiliary rollers at the same time the feed roller clutch is being disengaged. Lifting the auxiliary rollers frees

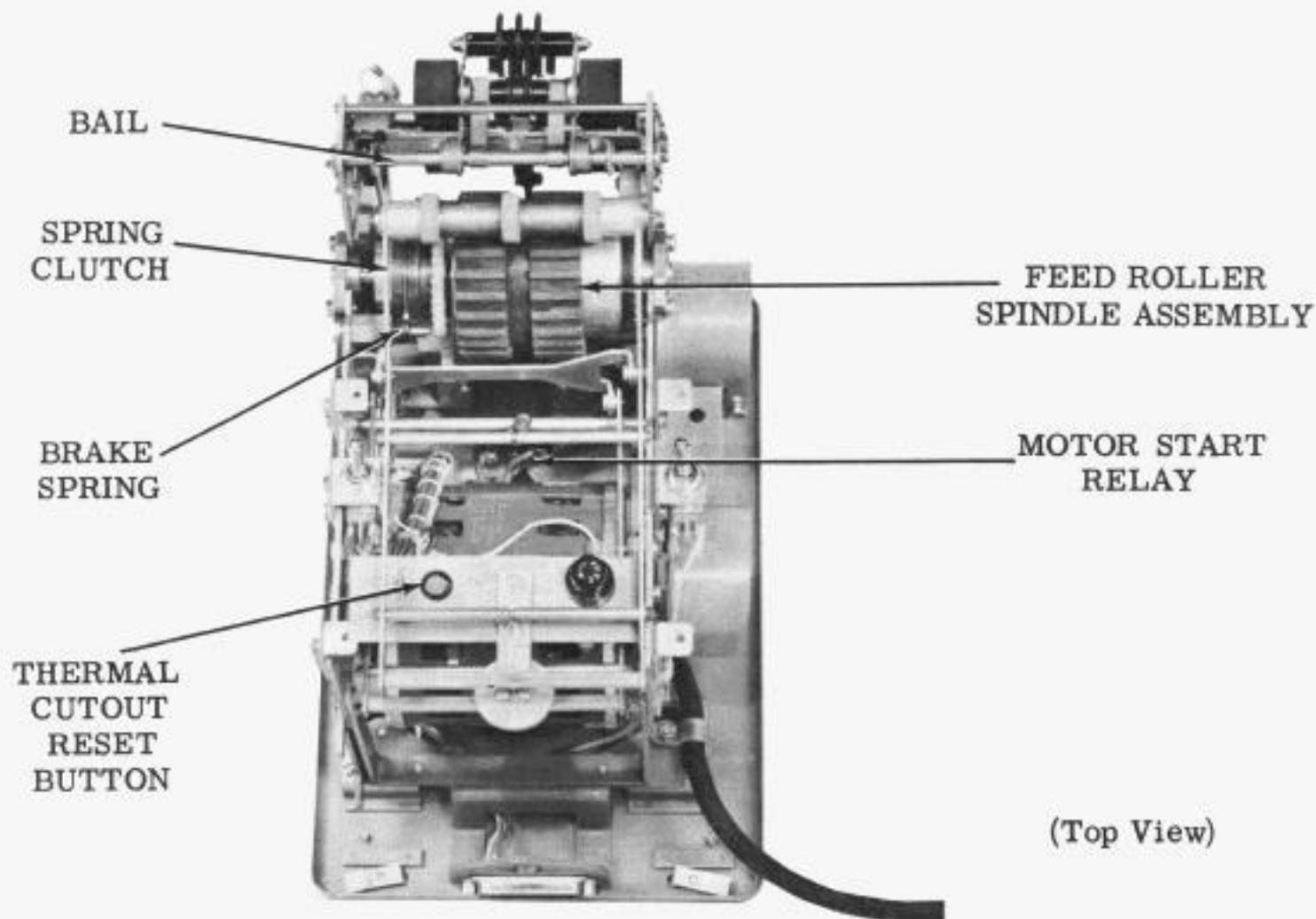


Figure 5 - 35 Edge Punched Card Feeder (Without Cover and Top Plate)

the card of any pressure or drag from the feeder. This allows the card reader to feed the card without placing undue strain on the feed holes.

#### CIRCUIT ELEMENTS

3.14 The remainder of this section deals with the electrical circuitry and typical operation of the feeder.

3.15 The manual controls consist of POWER ON switch and FEED CARDS - STOP/TAPE switch (Figure 2).

3.16 The internal controls consist of the double card detector switch, the feed roller contact Q, the control relay R and the clutch stop solenoid (Figure 6).

#### ELECTRICAL COMPONENTS

##### A. External Controls

3.17 The external controls extend through the top plate and are intended for use by the operator. Both manual controls are toggle type switches.

3.18 The POWER ON switch energizes the motor and the clutch stop solenoid.

3.19 The FEED CARDS - STOP/TAPE switch provides two modes of operation. To feed cards normally, the toggle is placed in the FEED CARDS position. To disable the feed mechanism so that the operator may clear a card jam, or read a standard tape in the reader unit, the toggle is placed in the STOP/TAPE position.

##### B. Internal Controls

3.20 The internal controls are located within the feeder and operate automatically.

3.21 The double card detector switch is intended to detect the feeding of two or more cards simultaneously. Its operation will interrupt the feed cycle and prevent the insertion of multiple cards into the reader unit.

3.22 A roller contact operated by the auxiliary ejector roller bail prevents the lid on the card reader from placing the card on the feed wheel before complete insertion is accomplished by the feeder.

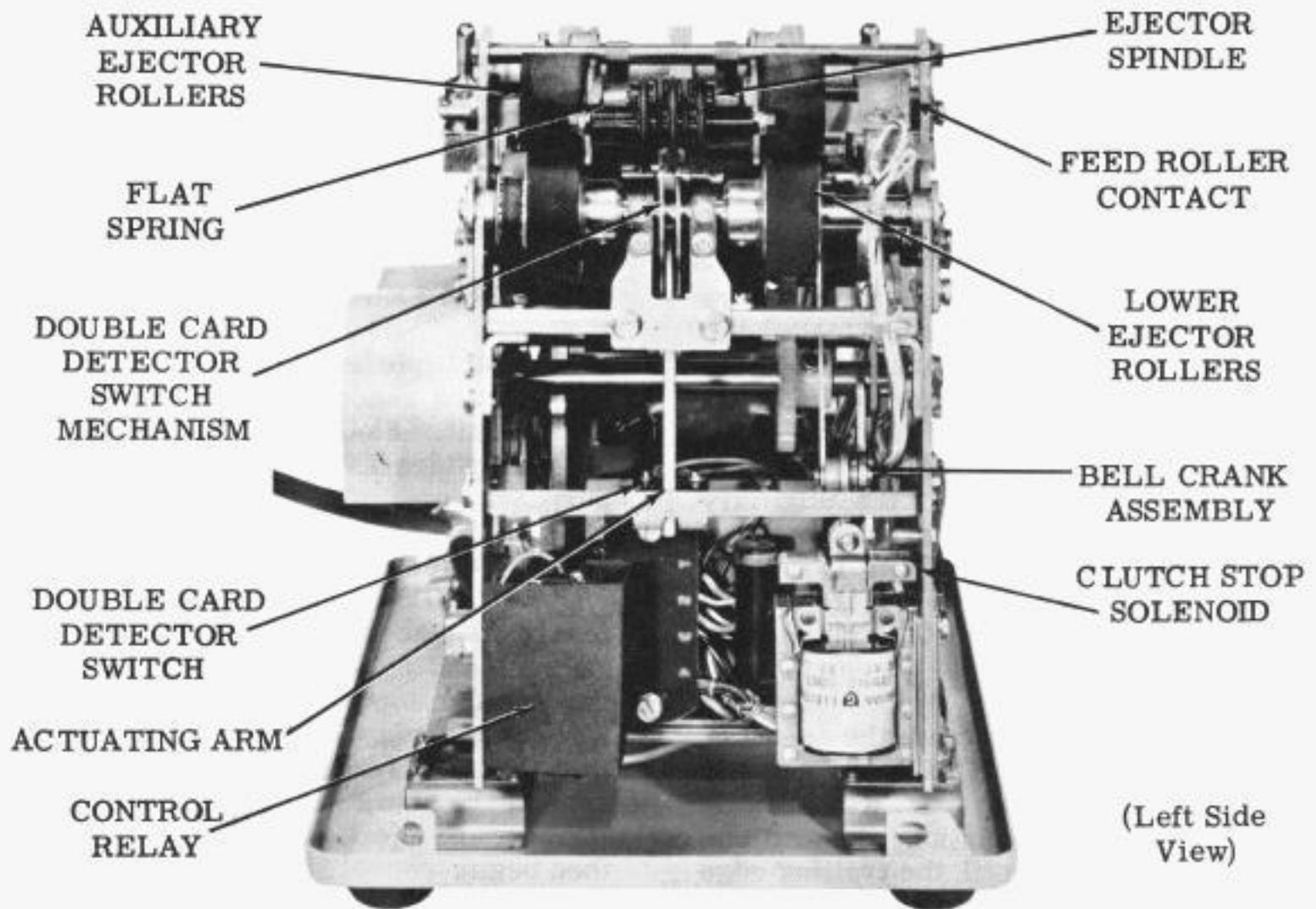


Figure 6 - 35 Edge Punched Card Feed (Without Cover and Top Plate)

3.23 Control relay R in the feeder responds to a signal from the card reader and initiates the feeding as well as the stopping of the card. The FEED CARDS - STOP/TAPE switch and the double card detector switch are also in series with the coil of control relay R.

3.24 The clutch stop solenoid has a 115 volt ac coil which is operated through the contacts of control relay R. The function of this solenoid is to stop the feed roller as well as to lift the auxiliary ejector rollers.

#### C. Circuit Description

3.25 Refer to appropriate section containing wiring diagrams for the card feeder.

3.26 The card reader and the feeder are joined by a four-conductor cable. At the card reader end of the cable these wires are attached to the 50-pin connector designated B. Two of the wires are connected to position B37 (positive) and B38 (negative). These wires supply a path

for control relay R. The remaining two wires are connected into the B connector at B17 and B49. This places the normally open feed roller contact Q in series with the energizing path for relay K1 in the card reader.

3.27 With no card in the card reader, the card-in contact V-1 is closed. With the V-1 contact closed, a path is completed for control relay R to energize. The current path is from the -48 volts dc supply in the card reader, through the A double card detector switch, the F FEED CARDS - STOP/TAPE switch, connector point B37, and contact V-1 to positive dc voltage.

3.28 The now energized feeder relay R has opened its contact in series with the clutch stop solenoid. De-energizing the clutch stop solenoid allows the feed roller spring clutch to engage. The auxiliary ejector rollers drop down and ride on the ejector rollers. The revolving feed roller separates a card from the stack and drives it into the ejector rollers. The ejector rollers propel the card into the card reader.

3.29 As the card advances into the reader, the leading edge operates the V card-in switch, de-energizing feeder control relay R. The feeder control relay R contact in series with the clutch stop solenoid closes and attracts the clutch stop solenoid. The feed roller spring clutch disengages and the auxiliary eject rollers lift. Feeding of the card is now complete.

3.30 It is necessary that the card be transported fully into the reading area before the reader lid brings the card onto the feedwheel. This is insured by placing a contact, Q, in series with the K1 relay in the card reader. This contact is located in the feeder and is operated by the auxiliary ejector roller bail. When the clutch stop solenoid attracts, the auxiliary ejector roller bail revolves and causes the Q feed roller contact to close. With Q contact closed, the K1 relay may pick up and the lid will be drawn down through contact K1-4 placing the card onto the feedwheel.

3.31 While a card is being read, the de-energized feeder control relay R prevents additional cards from being fed. If a card is completely filled with information, the next one will not enter the reader until the trailing edge of the card being read allows the V card-in switch to transfer. The feeder control relay R will then energize and the next card will feed.

3.32 If the card is only partially filled with information, it may be ejected from the reader by means of a code in the card. The feeder is signaled as soon as the eject code is sensed by the card reader. The eject code energizes relay K2 and closes its hold contact. The feeder control relay R then energizes through the diode CR1 to contact K2-1 and the eject contact. The feeder then delivers the next card.

3.33 In the event that the feed rollers mechanism strips more than one card at a time, the detector switch actuating arm (Figure 6) will pivot and operate the double card detector switch A. Switch A provides a normally closed contact in series with the coil of feeder control relay R. When the feeder control relay R disengages, the clutch stop solenoid will disengage the feed roller clutch and feeding will stop. The FEED CARDS - STOP/TAPE switch F should

then be placed in the STOP/TAPE position by the operator to keep the feeder control relay R energized until the double card condition can be corrected.

3.34 Connected across the coil of relay R is a diode (CR7) which slows the drop out of this relay. The delay generated assures the full insertion of the card before the feed roller stops.

#### MULTIPLE LENGTH CARDS — FEEDING

3.35 Multiple length cards may be fed into the card reader while it is attached to the feeder unit. Slots are provided in the feeder adaptor guides TP320099 and TP320100 for this purpose.

3.36 To feed a multiple length card, the FEED CARDS - STOP/TAPE switch on the feeder is placed in the STOP/TAPE position. Depress and hold the stop switch button on the card reader top plate. Insert the card into the slots on the adaptor guides. Push the card fully into the card reader against the card stop and release the stop switch button on the card reader. Reading and ejection of the multiple cards will then begin.

3.37 Upon completion of the above operation, returning the FEED CARDS - STOP/TAPE toggle to the FEED CARDS position will cause single card feeding to resume.

#### USE OF TAPE

3.38 Paper tape may be read in a card reader while it is attached to the feeder unit by placing the FEED CARDS - STOP/TAPE toggle switch on the feeder top plate into the STOP/TAPE position. Place the tape card lever on the card reader top plate in the tape position. Tape may then be threaded into the card reader. The reader then becomes conditioned to read the tape.

#### REMOVING POWER FROM THE FEEDER

3.39 If the power to the feeder unit is removed, insertion of a card occurs as the feeder comes to a stop. Before the power to the feeder is turned off, all cards should be removed from the feeder unit.