

BSM #817 B

1-TYPE MESSAGE TICKETER REQUIREMENTS AND ADJUSTING PROCEDURES

1. GENERAL

1.01 This section covers the 1-type message ticketer.

1.02 This section is reissued to revise various requirements and adjusting procedures so that the 35-type test set may be used in place of the J34724A test set (SD-30844-01) which is no longer available. Detailed reasons for re-issue will be found at the end of the section.

1.03 Reference shall be made to Section 020-010-711 covering general requirements and definitions for additional information necessary for the proper application of the requirements listed herein.

1.04 **Asterisk (*)**: Requirements are marked with an asterisk when to check for them would necessitate dismantling or dismounting of apparatus, or would affect the adjustment involved, or other adjustments. No check need be made for these requirements unless the apparatus or part is made accessible for other reasons, or its performance indicates that such a check is advisable.

1.05 **One drop of oil** for the purpose of this section is the amount of oil released from the nozzle of the 486A oilcan when the sides of the oilcan are depressed until a drop is released.

1.06 **Electrically Operated**: A magnet is said to be electrically operated when its associated armature is in its fully operated position.

1.07 In checking and adjusting for the printing mechanism requirements, unless otherwise specified, remove the tape from around the mechanism as covered in Section 030-360-801.

2. REQUIREMENTS

2.01 *Cleaning*

- (a) Contacts shall be cleaned, when necessary, in accordance with approved procedures.

- (b) Other parts shall be cleaned, when necessary, in accordance with approved procedures.

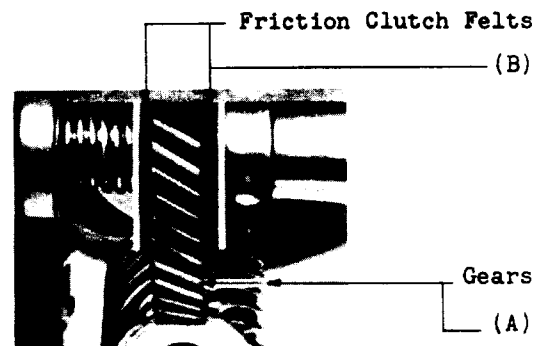


Fig. 1 - Driving and Driven Gears

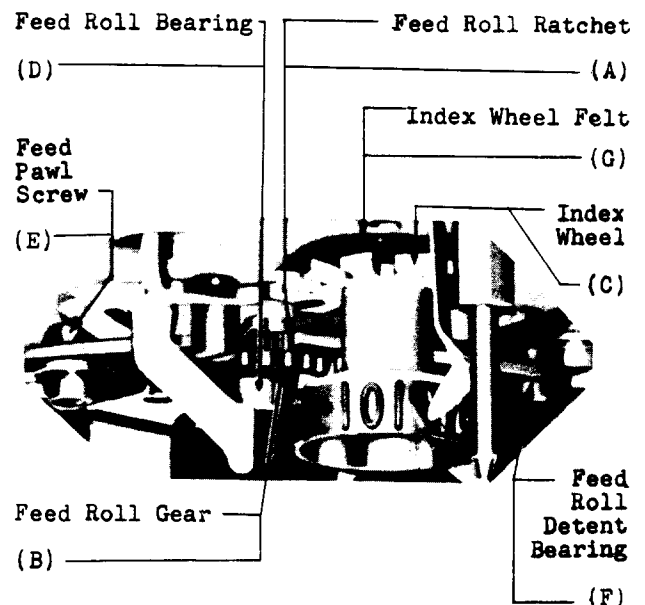


Fig. 2 - Printing Mechanism

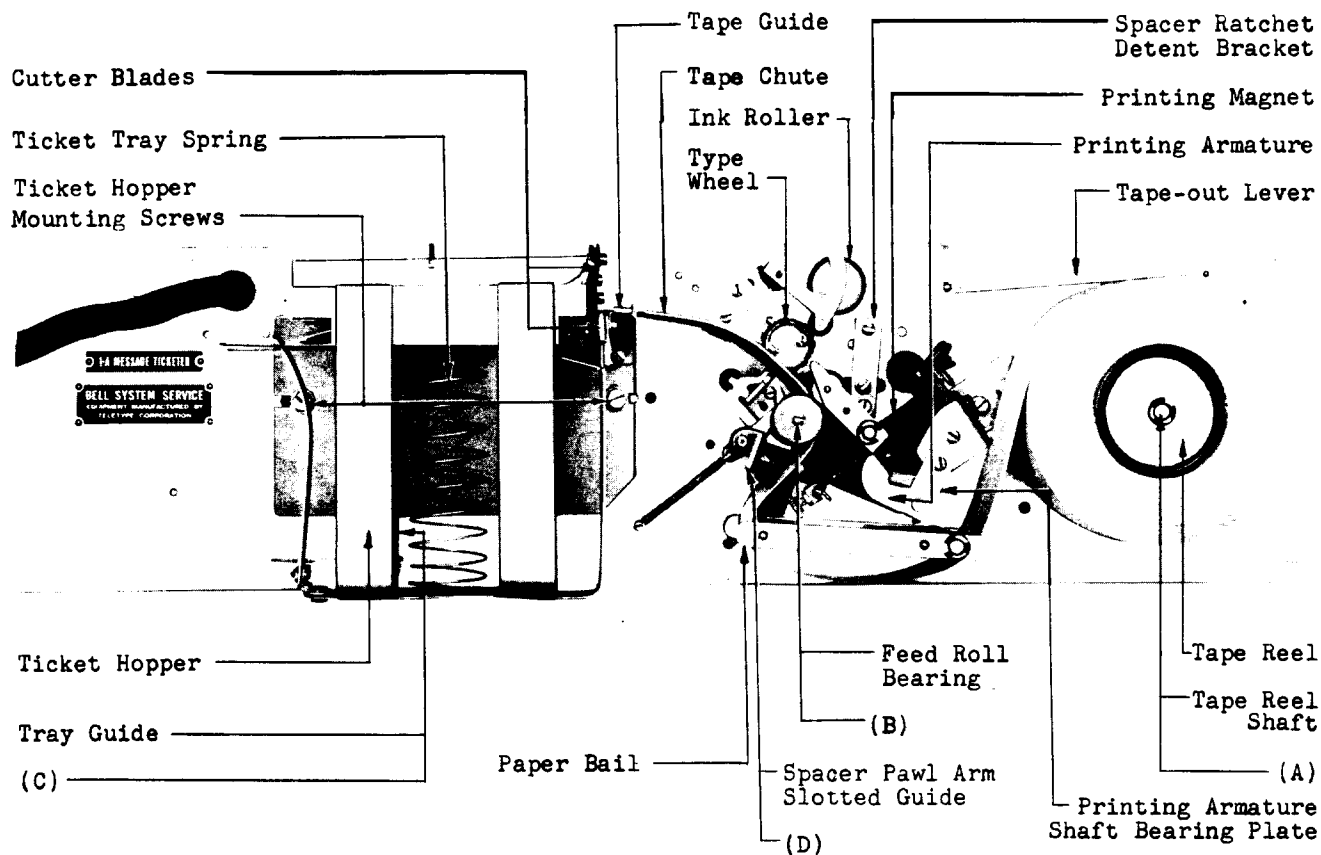


Fig. 3 - Front View of 1-Type Message Ticketer

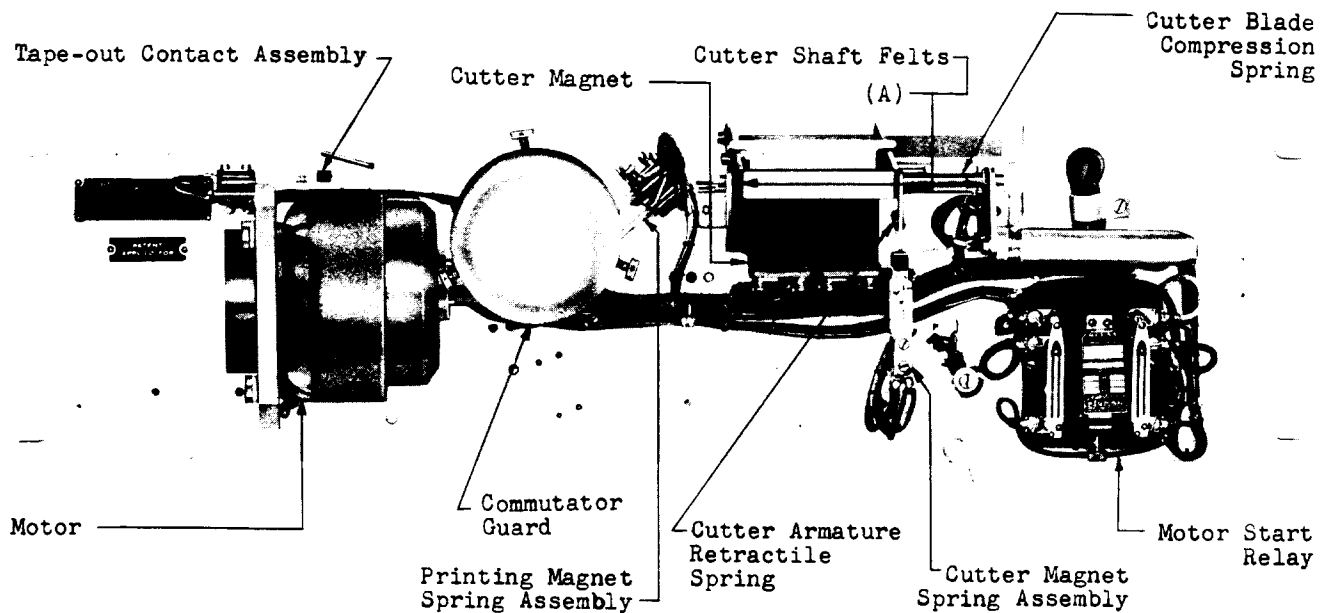


Fig. 4 - Rear View of 1-Type Message Ticketer

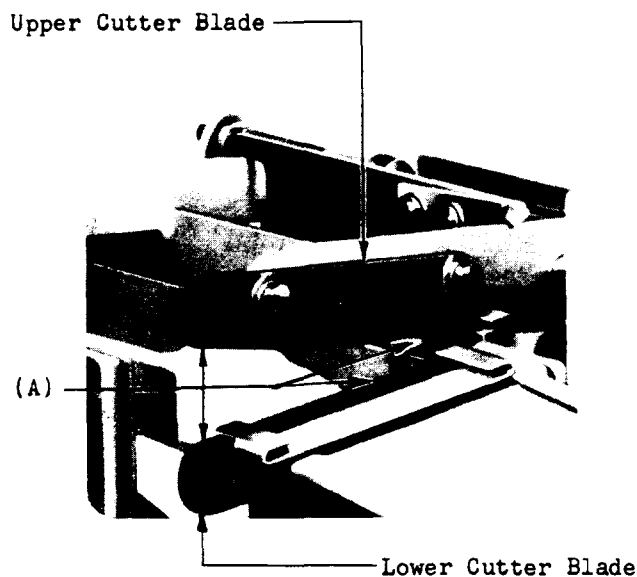


Fig. 5 - Cutter Blades

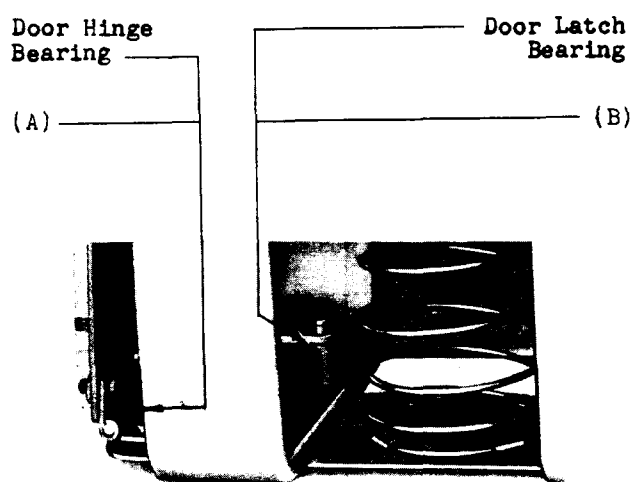


Fig. 6 - Door Hinge and Door Latch

2.02 Lubrication

(a) **Gear Teeth, Feed Roll Ratchet and Gears, Tape Reel Shaft, and Index Wheel:** The points listed below shall be lubricated with KS-7471 grease. When lubrication is necessary, the parts shall be coated with a film of grease.

Gear Teeth — Fig. 1(A)

Feed Roll Ratchet — Fig. 2(A)

Feed Roll Gears — Fig. 2(B)

Index Wheel — Fig. 2(C)

Tape Reel Shaft — Fig. 3(A)

(b) **Cutter Blades:** Fig. 5(A) — The cutter blades shall be adequately lubricated with KS-7470 oil. When lubrication is necessary, the extreme ends of the cutting edges shall be coated with a film of oil.

(c) **Other Parts:** The parts listed below shall be adequately lubricated with KS-7470 oil. When lubrication is necessary, the parts shall be lubricated as follows.

(1) One drop of oil to each of the following parts.

Feed Roll Bearings — Fig. 2(D) and 3(B)

Feed Pawl Screw — Fig. 2(E)

Feed Roll Detent Bearing — Fig. 2(F)

Tray Guide (Each Side) — Fig. 3(C)

Each Spring Loop — Fig. 6

Door Hinge Bearing — Fig. 6(A)

Door Latch Bearing — Fig. 6(B)

Ink Roller Bearing — Fig. 7(A)

Intermediate Ink Roller Bearing — Fig. 7(B)

Main Tape Pressure Roller Bearings — Fig. 7(C)

Tape Pressure Roller Bracket Bearings — Fig. 7(E)

(2) Two drops of oil to each of the following parts.

Each Motor Bearing — Motors Equipped With Oil Holes Only

Oilite Thrust Washer — Motors Equipped With External Thrust Bracket

Spacer Pawl Arm Slotted Guide — Fig. 3(D)

Cutter Shaft Felts — Fig. 4(A)

Printing Armature Felts — Fig. 7(G)

(3) Three drops of oil to each of the following parts.

Each Friction Clutch Felt — Fig. 1(B)

Index Wheel Felt — Fig. 2(G)

(4) Four drops of oil to the following part.

Type Wheel Shaft Bearing Oil Cup

(d) **Recommended Lubrication Intervals:** After turnover it is recommended that the parts listed in all requirements be lubricated at intervals of 3 months. This interval may be extended if periodic inspections have indicated that local conditions are such as to insure that the requirements will be met during the extended interval.

2.03 Record of Lubrication: During the period of installation, a record shall be kept of the lubrication of the ticketer and this record shall be turned over to the telephone company with the equipment. If no lubrication has been done, it shall be so stated.

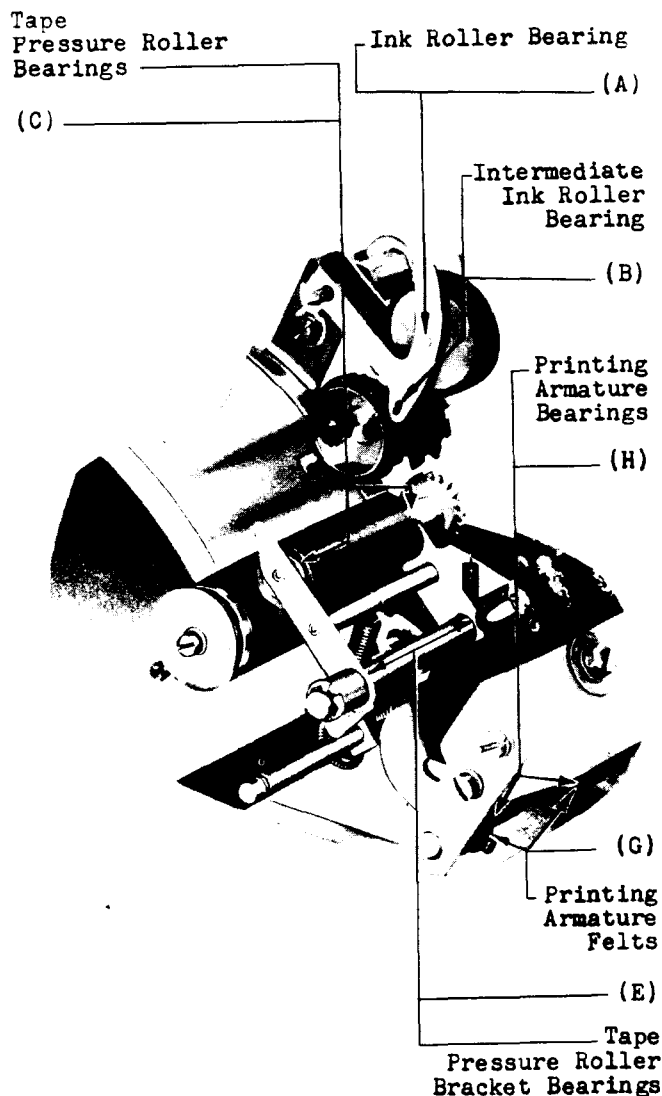


Fig. 7 - Pressure and Ink Roller

2.04 Contact Alignment: Fig. 8(A) — Contacts shall not be out of alignment more than 25 per cent of the diameter of the contacts. Gauge by eye.

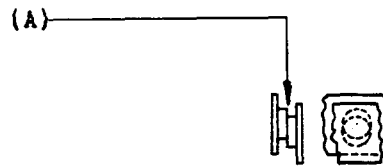


Fig. 8 - Contact Alignment

Distributor Requirements

2.05 Type Wheel Shaft End Play: There shall be perceptible end play of the type wheel shaft.

Gauge by eye and feel.

To check this requirement, proceed as follows. With the motor stopped, move the shaft toward and away from the distributor and note the end play.

2.06 Backlash Between Gears: The backlash between the driving and driven gears shall be kept as small as possible without causing the gears to bind in any position of rotation.

Gauge by eye and feel.

2.07 Distributor Surface: The surface of the distributor shall be clean and free from scoring, pitting, or other deformation of the surface or structure save that caused by normal wear.

Gauge by eye and feel.

2.08 Brush Position

(a) Fig. 9(A): The short leg (bent end) of the distributor brushes shall rest against the edge of the distributor brush arm.

Gauge by eye.

(b) The leading face of a distributor brush shall be flush with the trailing edge of a distributor segment when the stabber is fully engaged in the notch of the index wheel corresponding to the distributor segment and the play in the brush arm is taken up in the direction of rotation.

Gauge by eye.

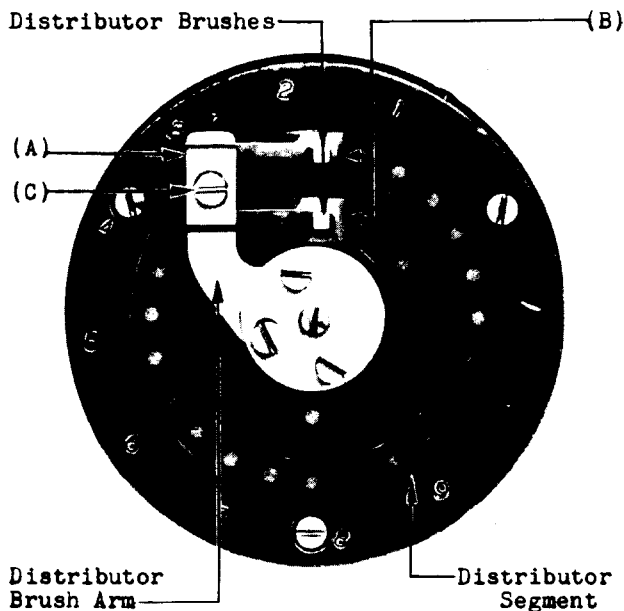


Fig. 9 — Position of Distributor Brushes

2.09 Brush Tension: Fig. 9(B) — Each distributor brush shall rest against its associated distributor segment with a pressure of

Test — Min 40 grams, Max 70 grams

Readjust — Min 50 grams, Max 70 grams

Use the 79C gauge.

To check this requirement, apply the gauge to the end of the brush spring and pull away from the segment.

2.10 Engagement of Distributor Brush and Distributor Segments: The engagement of the distributor brush and the distributor segments shall be such that a minimum of 3/4 of the contacting surface of each brush shall contact the distributor segments.

Gauge by eye.

To check this requirement, use the 510C test lamp.

2.11 Friction Clutch Torque: Fig. 9(C) — With the motor running, the torque required to hold the brush arm in position shall be

Min 140 grams

Max 170 grams

Use the 79C gauge.

To check this requirement, proceed as follows. Hook the tip of the gauge on the outer edge of the brush clamp screw and with the motor running, hold the brush arm in place.

Note: Outer edge of screw is nearest the outer edge of distributor segment.

Printing Mechanism Requirements

2.12 Type Wheel and Index Wheel Alignment:

The character 1 on the type wheel shall be aligned with the reference mark on the index wheel.

Gauge by eye and by a printed ticket.

2.13 Printing Armature Movement: Fig. 7(H)

— The printing armature shall have perceptible end play and shall not bind on its bearings.

To check this requirement, remove the printing armature spring and move the armature in and out and up and down on the shaft.

2.14 Printing Hammer and Type Wheel Separation:

With the printing armature against the armature front stop, there shall be a perceptible clearance between the printing hammer and the 0 character on the type wheel.

Gauge by eye.

To check this requirement, proceed as follows. Position the type wheel so that the 0 character is opposite the printing hammer and the stabber is opposite the notch of the index wheel. Electrically operate the printing magnet and note the separation between the printing hammer and the 0 character on the type wheel.

Note: With the ticketer plugged into its associated jack, the printing magnets may be electrically operated by connecting ground to the nearest winding terminal of the first printing magnet as seen from the tape side.

*2.15 Stabber and Index Wheel Separation:

Fig. 10(A) — With the printing armature against the armature backstop, the clearance between the stabber and index wheel shall be

Min 0.004 inch

Max 0.008 inch

Use the KS-6909 gauge, and check for one complete revolution of the index wheel.

To check this requirement, remove the tape chute and with the printing armature against its backstop insert the proper gauge between the stabber and the points on the index wheel teeth.

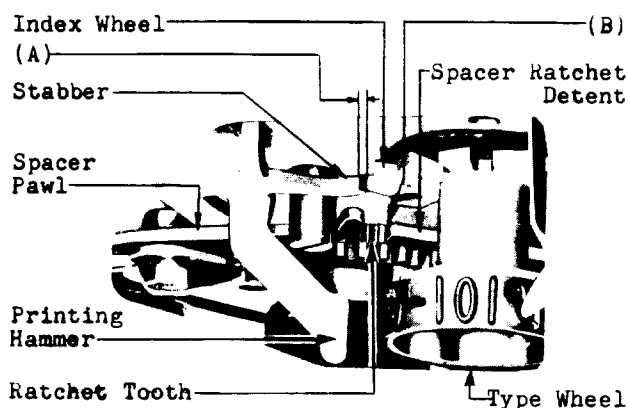


Fig. 10 - Stabber and Index Wheel Separation

2.16 Printing Armature and Backstop Separation: Fig. 11(A) — The separation between the printing armature and backstop shall be

- Min 0.015 inch
- Max 0.025 inch

when the printing armature engages the eccentric on the spacer pawl arm.

Use the 92-type gauge.

To check this requirement, operate the printing armature manually until the printing armature starts to pick up the spacer pawl arm. Then insert the proper 92-type gauge between the printing armature and its backstop.

***2.17 Printing Armature Spring Tension:**

Fig. 11(B) — The tension of the printing armature spring shall be

- Min 130 grams

after requirement 2.15 has been met.

Use the 79B gauge.

To check this requirement, hook the tip of the gauge over the printing armature eccentric and pull at right angles to the printing armature extension with the insulator of the long contact spring 1 shown in Fig. 12 held away from the armature lever.

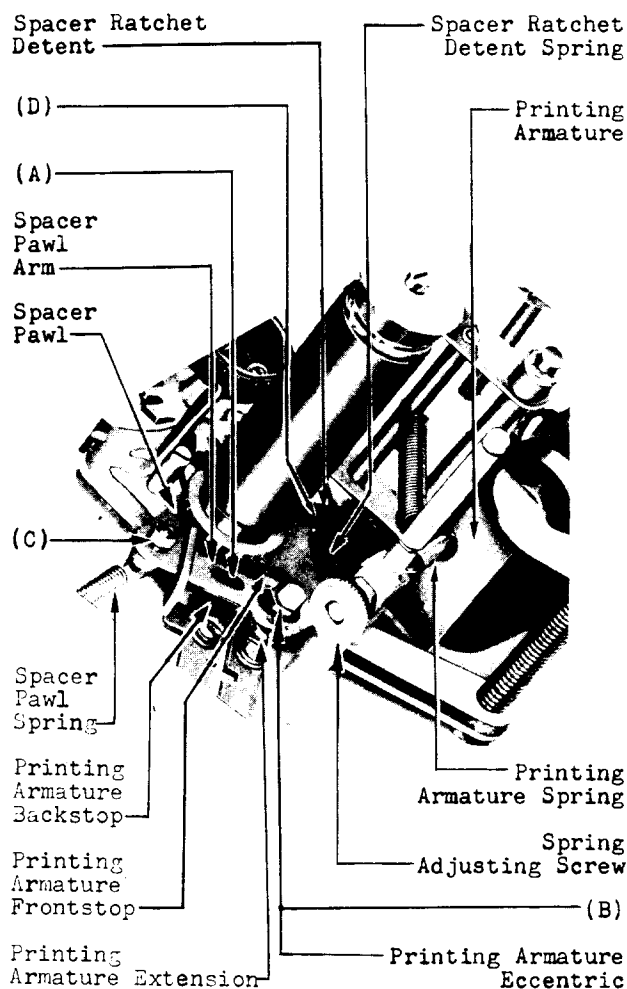


Fig. 11 - Printing Armature and Associated Parts

***2.18 Spacer Pawl Movement:** Fig. 11(C) — The spacer pawl shall not bind on its bearings.

Gauge by feel and eye.

To check this requirement, unhook the spacer pawl spring from the spacer pawl and partially operate the printing armature and move the pawl with the KS-6320 orange stick.

***2.19 Spacer Pawl Spring Tension:** The tension of the spacer pawl spring shall be

Test — Min 350 grams, Max 475 grams

Readjust — Min 375 grams, Max 450 grams

when the spacer pawl is held against the ratchet teeth and spacer stop.

Use the 79B gauge.

To check this requirement, remove the spring from its mounting post and insert the tip of the gauge in the free loop of the spring. Pull the spring to its position length (normally mounted position).

2.20 Operated Printing Armature Airgap: With the printing magnet electrically operated, there shall be a clearance between the armature stop pins and each core of

Max 0.004 inch

Use the 92P and 92T gauges.

The 92P gauge may enter but the 92T gauge shall not enter.

To check this requirement, position the index wheel so that the stabber is opposite a notch of the index wheel.

Note: With the ticketer plugged into its associated jack, the printing magnets may be electrically operated by connecting ground to the nearest winding terminal of the first printing magnet as seen from the tape side.

2.21 Printing Magnet Position: The pole faces of the printing magnet shall be approximately parallel to the face of the printing armature with the printing armature in the operated position.

Gauge by eye.

2.22 Spacer Ratchet Detent and Ratchet Tooth Separation: Fig. 10(B) — The clearance between the left edge of the detent and point of the tooth on the ratchet shall be perceptible when the spacer ratchet is fully engaging the ratchet teeth and is resting against its stop.

Gauge by eye.

This requirement is met if with the printing armature in its normal position, there is a slight backlash between the detent and the ratchet while the detent is held against the ratchet.

2.23 Spacer Ratchet Detent Spring Tension: Fig. 11(D) — The tension of the spacer pawl detent spring shall be

Test — Min 50 grams, Max 90 grams

Readjust — Min 55 grams, Max 85 grams

measured in line with the spring hole in the detent.

Use the 79C gauge.

To check this requirement, place the tip of the gauge under the detent at a point opposite the hole in the detent. Pull upward on the gauge and note the reading on the gauge as the detent starts to leave the ratchet.

2.24 Separation Between Springs 1 and 3: Fig. 12(C) — The separation between the inner insulators shall be

Min 11/64 inch

Max 3/16 inch

with the armature lever removed from both springs.

Use the R-8550 steel scale.

2.25 Contact Separation: Fig. 12(A)

(a) **Springs 1 and 2:** The separation between each pair of contacts of a twin set shall be

Min 0.010 inch

Max 0.020 inch

with the printing armature against its back-stop.

Use the KS-6909 gauge.

(b) **Springs 3 and 4:** The separation between each pair of contacts of a twin set shall be

Min 0.015 inch

Max 0.020 inch

with the printing armature against its back-stop.

Use the KS-6909 gauge.

(c) **Readjust Only:** The difference in separation between each pair of contacts of a twin set shall be

Max 0.003 inch

Use the KS-6909 gauge.

2.26 Spring Pressure

(a) **Springs 2 and 4:** Fig. 12(B) — The contact spring shall rest against the end of the stop spring with a pressure of

Min 35 grams

Max 50 grams

Use the 79C gauge.

This pressure shall be measured at a point adjacent to the contacts.

(b) **Spring 3:** The contact spring shall rest against the end of each of the stop springs with a pressure of

Min 10 grams
Max 20 grams

Use the 79C gauge.

This pressure shall be measured at a point near the center of the insulator on spring 3.

2.27 Contact Pressure — Springs 1 and 2:

Fig. 12 — The pressure between each pair of contacts shall be

Min 25 grams
Max 45 grams

with the printing armature against its frontstop.

Use the 79C gauge.

To check this requirement, apply the gauge to the end of the insulator of the long contact spring.

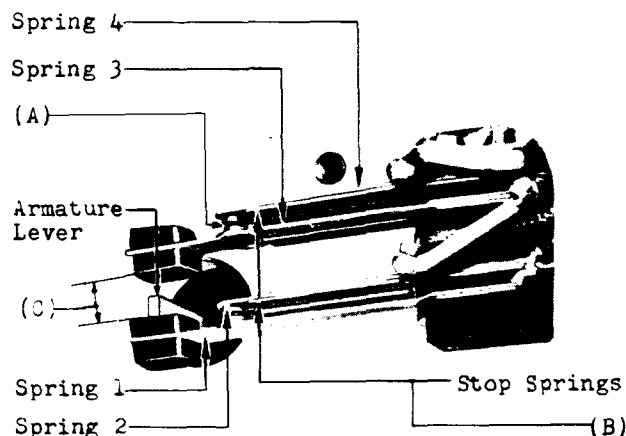


Fig. 12 — Printing Magnet Spring Assembly

2.28 Spring Separation: With the printing magnet electrically operated, there shall be a perceptible clearance between spring 4 and the end of its associated stop spring.

Gauge by eye.

Note: With the ticketer plugged into its associated jack, the printing magnets may be electrically operated by connecting ground to the nearest winding terminal of the first printing magnet as seen from the tape side.

2.29 Tape Pressure Bail Spring Tension:

Fig. 13(A) — The tension of the tape pressure bail spring shall be

Test — Min 475 grams, Max 575 grams
Readjust — Min 485 grams, Max 570 grams

Use the 79B gauge.

To check this requirement, unhook the spring from the bail shaft and stretch to position length. Rehook the spring.

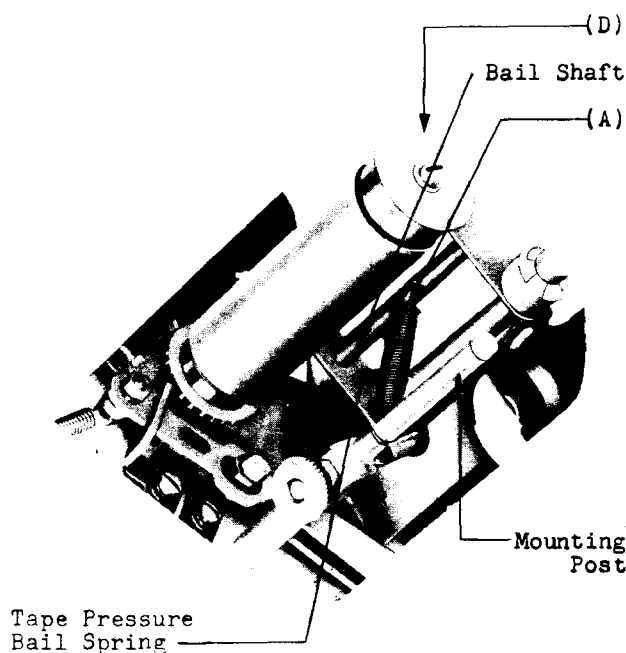


Fig. 13 — Spring and Associated Parts Controlling Pressure on Tickets

2.30 Type Wheel Ink Roller Retaining Spring Tension:

Fig. 14(A) — The retaining spring shall rest against the ink roller shaft with a pressure of

Min 30 grams
Max 60 grams

when the ink roller assembly is removed from the shaft.

Use the 70J gauge.

To check this requirement, apply the gauge to the outer end of the flat portion of the retaining spring.

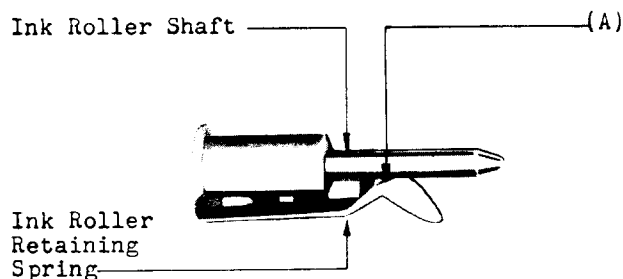


Fig. 14 - Position of Ink Roller Retaining Spring

2.31 Type Wheel Ink Roller Retaining Spring Position: Fig. 15(A) — The position of the type wheel ink roller retaining spring against the notch in the type wheel ink roller frame shall be such that a tension of

Min 30 grams

Max 70 grams

is required to start the ink roller frame moving. Use the 70J gauge.

To check this requirement, apply the tip of the gauge to the ink roller frame at the angle adjacent to the ink roller and note the reading on the gauge as the frame starts to move upward.

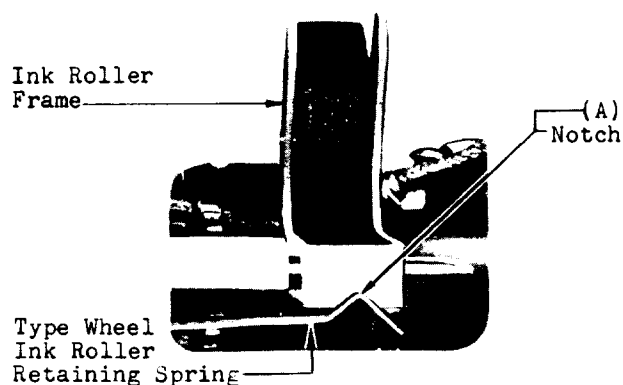


Fig. 15 - Clearance Between Type Wheel Retaining Spring and Ink Roller Frame

2.32 Clearance Between Outer Feed Roll Tape Guide Washer and Feed Roll: Fig. 13(D) — There shall be some clearance between the outer feed roll tape guide washer and the feed roll, but this clearance shall not exceed

0.010 inch

Gauge by eye.

2.33 Inking: There shall be sufficient ink on the roller to permit the type wheel to make distinct marks on the tape when the printing armature is operated electrically.

Gauge by eye and printed ticket.

2.34 Tape-Out Lever Position: Fig. 16(A) — The tape-out alarm contacts shall close with the tape-out lever positioned to clear the tape reel by

Min 3/16 inch

Max 1/4 inch

when the paper roll is removed from the tape reel.

Gauge by eye.

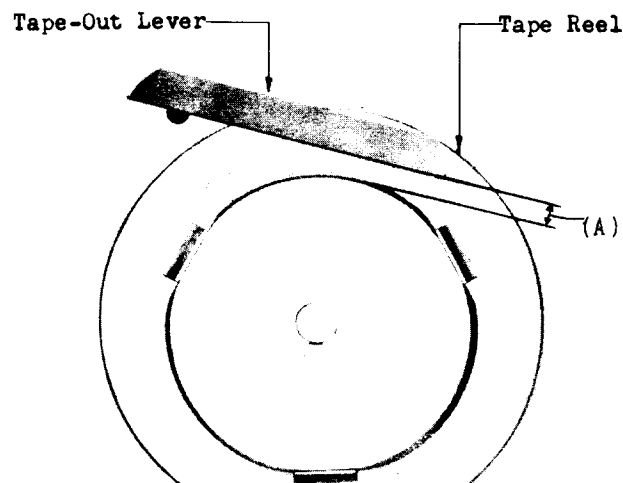


Fig. 16 - Relation Between Tape Reel and Tape-Out Lever

2.35 Tape-Out Contact Separation: Fig. 17(A)

(a) The separation between contacts of a twin set shall be

Min 0.010 inch

Max 0.020 inch

with the tape-out lever away from spring 2.

Use the KS-6909 gauge.

(b) **Readjust Only:** The difference in separation between each pair of contacts of a twin set shall be

Max 0.003 inch

Use the KS-6909 gauge.

2.36 Tape-Out Contact Spring Pressure:

Fig. 17(B) — The contact spring 1 shall rest against the end of the associated stop spring with a pressure of

Min 30 grams

Use the 79C gauge.

The pressure shall be measured at a point adjacent to the contact.

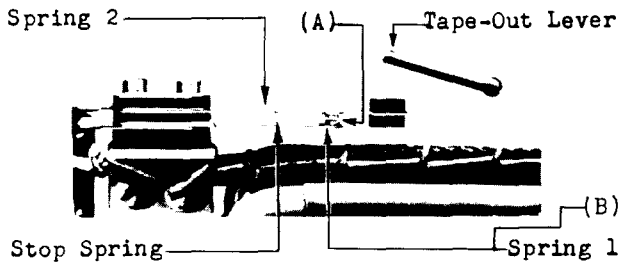


Fig. 17 - Tape-Out Spring Assembly

2.37 Tape Reel Spring Tension: Fig. 18(A) —

Each tape reel spring shall rest against the tape reel with a pressure of

Min 300 grams

Max 600 grams

Use the 79B gauge.

To check this requirement, apply the gauge as near as possible to the end of the spring.

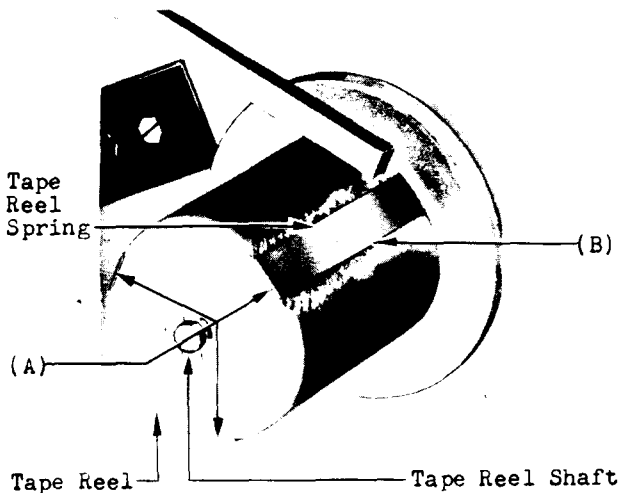


Fig. 18 - Tape Reel Spring Tension and Clearance

2.38 Tape Reel Spring Clearance: Fig. 18(B)

— The clearance between the tape reel spring and the tape reel at a distance of 1 inch from the front end of the reel shall be approximately 3/32 inch.

Use the R-8550 steel scale.

Cutter Mechanism Requirements

2.39 Separation Between Springs 1 and 3:

Fig. 19(E) — The separation between the inner insulators shall be

Min 3/16 inch

Max 13/64 inch

with the cutter bail lever removed from both springs.

Use the R-8550 steel scale.

2.40 Contact Separation: Fig. 19(A)

(a) **Springs 1 and 2:** The separation between each pair of contacts of a twin set shall be

Min 0.010 inch

Max 0.020 inch

with the cutter bail against its backstop.

Use the KS-6909 gauge.

(b) **Springs 3 and 4:** The separation between each pair of contacts of a twin set shall be

Min 0.015 inch

Max 0.020 inch

with the cutter bail against its backstop.

Use the KS-6909 gauge.

(c) **Readjust Only:** The difference in separation between each pair of contacts of a twin set shall be

Max 0.003 inch

Use the KS-6909 gauge.

2.41 Spring Pressure

(a) **Spring 2:** Fig. 19(B) — The contact spring shall rest against the end of the stop spring with a pressure of

Min 35 grams

Max 50 grams

Use the 79C gauge.

The pressure shall be measured at a point adjacent to the contact.

(b) **Spring 3:** Fig. 19(C) — The contact spring shall rest against the end of the stop spring with a pressure of

Min 10 grams

Max 20 grams

Use the 79C gauge.

The pressure shall be measured at a point near the center of the insulator on spring 3.

(c) **Spring 4:** Fig. 19(D) — The contact spring shall rest against the end of the stop spring with a pressure of

Min 45 grams

Max 60 grams

Use the 79C gauge.

The pressure shall be measured at a point adjacent to the contact.

2.42 Contact Pressure Between Springs 1 and 2: The pressure between each pair of contacts shall be

Min 25 grams

Max 35 grams

with the cutter magnet electrically operated.

Use the 79C gauge.

The pressure shall be checked by applying the gauge to the end of the insulator on the long contact spring.

2.43 Spring Separation: With the cutter magnet electrically operated, there shall be a perceptible clearance between spring 4 and the end of its associated stop spring.

Gauge by eye.

Note: With the ticketer plugged into its associated jack, the cutter magnets may be electrically operated by connecting ground to the cutter magnet winding terminal nearest the cutter magnet spring assembly.

2.44 Contact Closure of Springs 3 and 4: At least one contact of springs 3 and 4 shall just make when the cutter blades are approximately 1/4 inch from the front edge of a ticket. Gauge by eye.

2.45 Shaft Position

(a) Fig. 20(A): The cutter shaft shall extend approximately an equal distance beyond each cutter frame arm.

Gauge by eye.

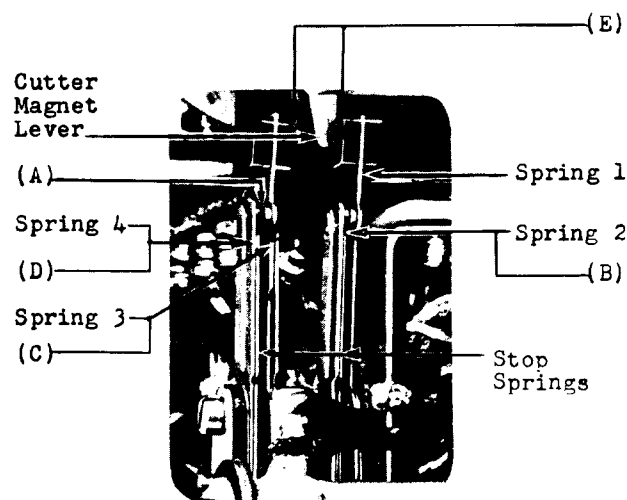


Fig. 19 - Cutter Magnet Spring Assembly

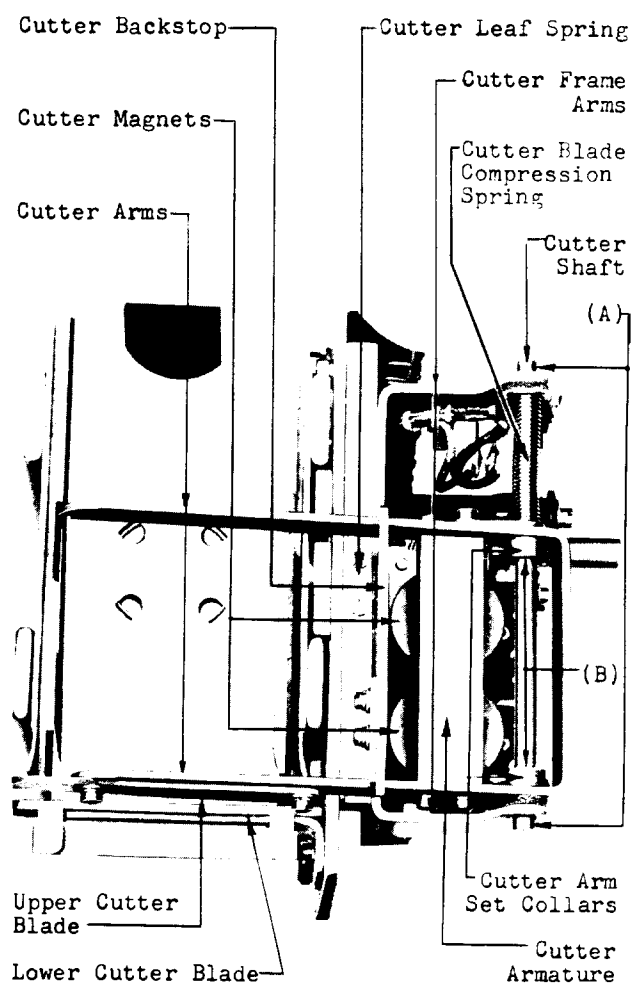


Fig. 20 - Cutter Magnet and Associated Parts

SECTION 030-360-701

(b) Fig. 20(B): The cutter arm set collars shall be securely tightened against the cutter arms.

Gauge by eye and feel.

2.46 Operated Cutter Armature Airgap: Clearance shall not exceed

0.008 inch

Use the KS-6909 gauge.

2.47 Cutter Magnet Position: The pole faces of the magnet shall be approximately parallel to the face of the armature with the armature in the operated position.

Gauge by eye.

2.48 Cutter Blade Position

(a) Fig. 21(A): The lower cutter blade shall be so located that it is in an approximately vertical position.

Gauge by eye.

(b) Fig. 21(B): The front ends of the cutter blades shall overlap each other approximately 1/16 inch when the cutter frame is against its frontstop.

Gauge by eye.

2.49 Cutter Blade Clearance: Fig. 22(A) — There shall be a clearance between the rear ends of the cutter blades of

Test — Min 0.015 inch, Max 0.025 inch

Readjust — Min 0.005 inch, Max 0.025 inch

with the front ends of the cutter blades just making contact.

Use the 92-type gauge.

To check this requirement, remove the cutter armature retractile spring. Insert the proper 92-type gauge between the cutter blades at a point behind the rear mounting screw of the cutter blade.

2.50 Cutter Arm Cam Clearance: With the cutter arm against its backstop, there shall be a perceptible clearance between the cutter arm and the cutter arm cam.

Gauge by eye.

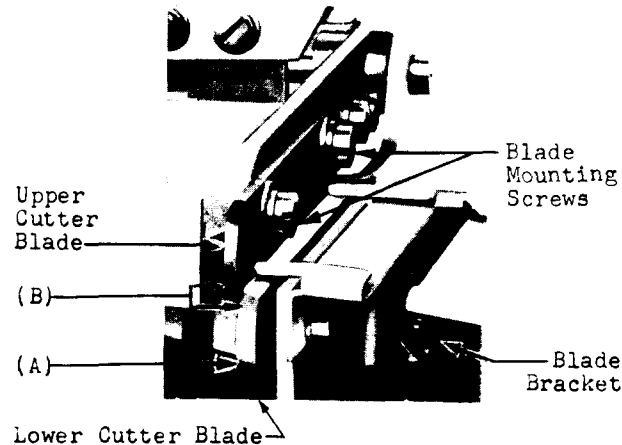


Fig. 21 - Cutter Blade Position

2.51 Cutter Blade Compression Spring Tension: The tension of the cutter blade compression spring shall be

Test — Min 100 grams, Max 180 grams

Readjust — Min 115 grams, Max 170 grams

to separate the cutter blades when the cutter magnet retractile spring is removed and the cutter magnet lever is disengaged from the cutter spring assembly.

Use the 79C gauge.

To check this requirement, hook the tip of the gauge over the cutter arm directly over the cutter shaft and pull in line with the shaft.

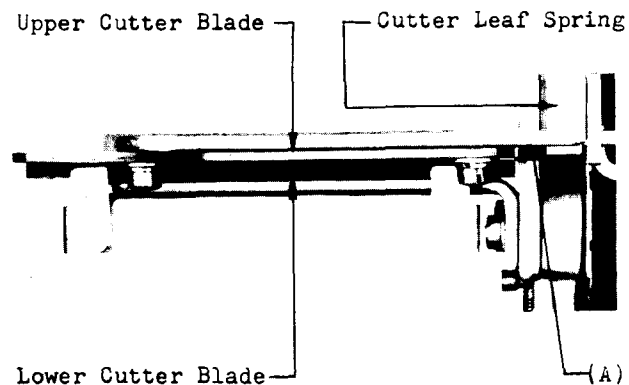


Fig. 22 - Relation Between Center Blades

2.52 Cutter Armature Retractable Spring Tension: The tension of the cutter armature retractile spring shall be

Min 625 grams
Max 900 grams

Use the 79B gauge.

To check this requirement, remove the spring from its mounting post and hold the cutter frame against its backstop. Insert the tip of the gauge in the free loop of the spring, pull the spring to its position length (normally mounted position), and note that the reading on the gauge is equal to or within the specified values.

2.53 Clearance Between Cutter Leaf Spring and Downstop: Fig. 23(A) — There shall be a clearance of

Min $3/32$ inch
Max $5/32$ inch

between the cutter leaf spring and the downstop when the cutter arm is not touching the cutter leaf spring.

Use the R-8550 steel scale.

2.54 Ticket Hopper Door Latch Spring Tension: Fig. 24(A) — The tension of the door latch spring shall be

Min 15 grams

Use the 79C gauge.

To check this requirement, unlatch the door and place the gauge at the notch in the door latch.

2.55 Ticket Tray Spring Tension: Fig. 24(B) — The tension of the ticket tray spring shall be

Min 15 grams
Max 85 grams

as the empty ticket tray starts to move downward.

Use the 79C gauge.

To check this requirement, apply the gauge in the center of the ticket tray between the four spring mounting tips and push downward on the gauge.

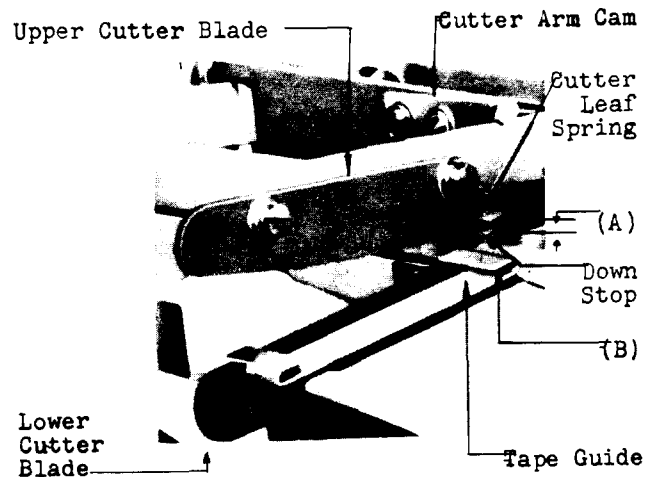


Fig. 23 — Clearance Between Cutter Leaf Spring and Downstop

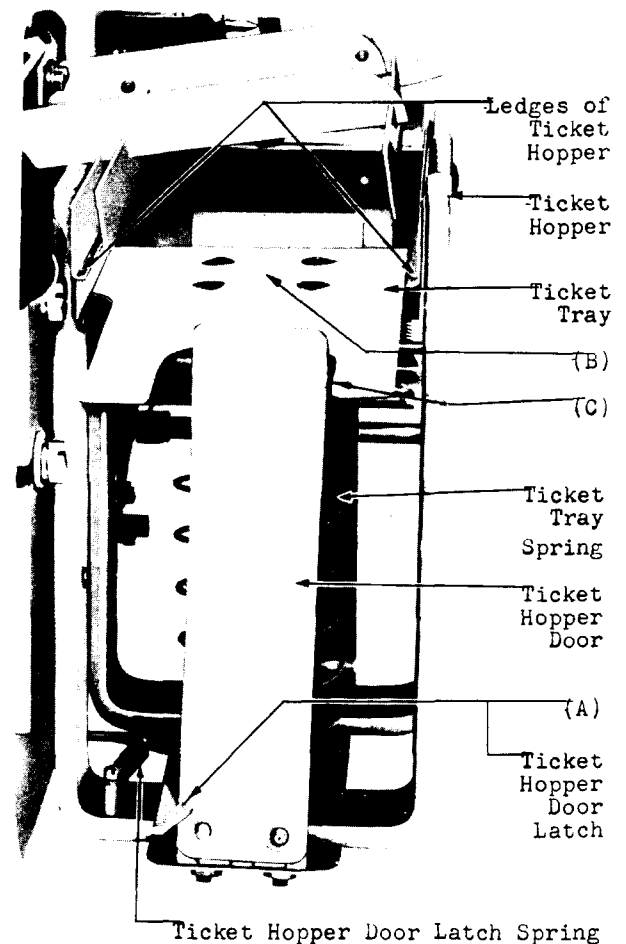


Fig. 24 — Ticket Hopper and Associated Parts

2.56 Ticket Tray Movement: The ticket tray shall not bind in the ticket tray slide as the tray is depressed.

Gauge by feel.

2.57 Tape Chute Position

(a) Fig. 25(A): The tape chute across its entire width shall be tangent to the paper feed roll for the first 1/2 inch nearest the paper feed roll.

Use the R-8550 steel scale.

To check this requirement, lift the pressure roll from the feed roll, place the scale on edge on the tape chute so that the scale rests on the first 1/2 inch of the chute, and check the relation between the chute and the periphery of the paper feed roll.

(b) Fig. 25(B): The clearance between the type wheel and a continuation of the surface of the tape chute measured directly above the center of the rectangular opening in the tape chute shall be

1/16 inch

Gauge by eye.

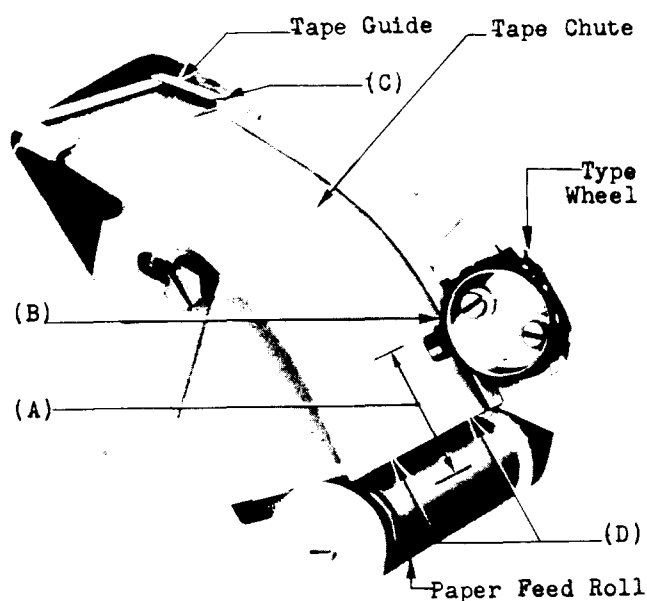


Fig. 25 — Relation Between Tape Chute and Paper Feed Roll

(c) Fig. 25(C): The guide edges of the tape chute and the extension chute shall be in line.

Gauge by eye.

(d) Fig. 25(D): The clearance between the end of the tape chute and the feed roll shall not vary more than 0.015 inch over the entire length of the roll.

Gauge by eye.

2.58 Tape Chute Lip Clearance: The tape shall slide freely between the lips of the tape chute.

Gauge by eye and feel.

2.59 Tape Guide Location: Fig. 23(B) — The tape guide shall be so located that it guides the ticket along the ledges of the ticket hopper.

Gauge by eye.

2.60 Ticket Hopper Location: The ticket hopper shall be so located that when a full tape roll is on the tape reel the tape is normally severed between the second and third asterisk in the series of four asterisks.

Gauge by eye.

Note: As the tape roll is decreased in size, the cutting position may shift toward the second asterisk.

2.61 Ticket Tray Clearance: Fig. 24(C) — The ticket tray shall not touch the ticket hopper door during the entire travel of the ticket tray.

Gauge by eye.

Motor Requirements

2.62 Motor: When the performance indicates that the motor is not functioning properly, a new or reconditioned motor shall be substituted and the defective one returned to the Western Electric Company for repair.

Electrical Requirements

2.63 Motor Start Relay: The motor start relay shall meet the requirements specified in the section covering KS- type relays. It shall operate on

Test — 0.035 ampere

Readjust — 0.033 ampere

Use the 35-type test set.

2.64 Printing Magnet Operation: The message ticketer shall print characters reliably when

Test — 0.420 ampere

Readjust — 0.400 ampere

is applied to the printing circuit.

Note: With the ticketer plugged into its associated jack, the printing magnets may be electrically operated under test conditions by using the 35-type test set. Using ground preparation, connect the test set to the nearest winding terminal of the first printing magnet as seen from the tape side. Operate the motor by connecting ground to the ground side of the motor start relay. Each time the printing magnet is operated, while the motor is operating, a random character will be printed and the tape advanced one space.

2.65 Cutter Magnet Operation: The cutter magnet shall operate the cutter blade and cut paper when

Test — 0.380 ampere

Readjust — 0.370 ampere

is applied to the cutter magnet.

Note: With the ticketer plugged into its associated jack, the cutter magnet may be electrically operated under test conditions by using the 35-type test set. Using ground preparation, connect the test set to the cutter magnet winding terminal nearest the cutter magnet spring assembly. The tape may be advanced by positioning the index wheel so that the stabber is opposite a notch in the index wheel, then connecting ground to the nearest winding terminal of the first printing magnet as seen from the tape side.

Plug and Socket Requirements

2.66 Howard B. Jones Plugs and Sockets: The plugs and sockets shall meet the requirements covered in Section 032-545-701.

3. ADJUSTING PROCEDURES**3.001 List of Tools, Gauges, Test Apparatus, and Materials**

CODE OR SPEC NO.	DESCRIPTION
TOOLS	
388A	3/16- and 1/4-Inch Open Double-End Offset Wrench
417A	1/4- and 3/8-Inch Open Double-End Flat Wrench
418A	5/16- and 7/32-Inch Open Double-End Flat Wrench
485A	Smooth-Jaw Pliers
486A	Oilcan
510C	Test Lamp
563A	90-Degree Offset Screwdriver
564A	45-Degree Offset Screwdriver
KS-6278 (2 reqd)	Connecting Clip (for use on the 893 cord)
KS-6320	Orange Stick
KS-6854	3-1/2 Inch Screwdriver
KS-7782	Parallel-Jaw Pliers
R-2119	3/16-Inch Brush
R-2969	Brush
—	Long-Nose Pliers
—	3-Inch C Screwdriver
—	4-Inch E Screwdriver
GAUGES	
70J	0-150 Gram Gauge
79B	0-1000 Gram Push-Pull Tension Gauge
79C	0-200 Gram Push-Pull Tension Gauge
92E	0.015-Inch Thickness Gauge
92G	0.020-Inch Thickness Gauge
92H	0.025-Inch Thickness Gauge
92K	0.035-Inch Thickness Gauge
92P	0.003-Inch Thickness Gauge
92T	0.005-Inch Thickness Gauge
KS-6909	Thickness Gauge Nest
R-8550	6-Inch Steel Scale

SECTION 030-360-701

CODE OR SPEC NO.	DESCRIPTION
TEST APPARATUS	
35 Type	Test Set
Γ—	893 Cord, 6 Feet Long, Equipped With Two 360A Tools (1W13B cord)
—	W2W Cord, 6 Feet Long, Equipped With One 310 Plug, One 360B Tool, and One 360C Tool (2W17A cord)
—	P3F Cord, 8 Feet Long, Equipped With One 309 Plug and One 310 Plug (3P12H cord)
L MATERIALS	
KS-2423	Cloth
KS-7187	Cleaning Paper
KS-7470	Oil
KS-7471	Grease
KS-7860	Petroleum Spirits
KS-9784	Ticket Paper
R-3419	No. 71 Ticketer Ink
TP84592 (as reqd)	Shims
TP101808 (as reqd)	Shims (0.004 inch thick)
TP108867 (as reqd)	Shims (0.002 inch thick)
—	Abasive Paper, Flint, Extra Fine
—	Cream Soap, Old Town Corp, 1206 Maple St, Los Angeles, California (or equivalent)
—	Ink Rollers (Teletype Corporation)
—	Toothpicks, Hardwood, Flat at One End, and Pointed at Other

3.002 When necessary to remove the ticketer to make the adjustments covered herein, remove the Jones plug from its socket, except when adjusting brush position as covered in 3.08, and proceed as follows. Where the ticketer is equipped with cable pins, remove the left-hand mounting screws with the 4-inch E screwdriver

and loosen the right-hand mounting screws. Slide the ticketer to the left from under the mounting screws, holding onto the cable pins. Where the ticketer is not equipped with cable pins, remove all mounting screws and remove the ticketer from the frame taking care not to damage the ticketer.

3.01 Cleaning (Reqt 2.01)

- (1) Clean the contacts in accordance with approved procedures.
- (2) Clean the type wheel with a dry type-writer brush.
- (3) Remove oil and dust from the exterior of the motor and other parts of the ticketer with the clean KS-2423 cloth moistened with KS-7860 petroleum spirits. In some cases, in order to gain access to a part, it may be necessary to wrap the cloth around the KS-6320 orange stick.

3.02 Lubrication (Reqt 2.02)

- (1) Before lubricating the parts, clean as covered in 3.01.
- (2) To lubricate the gear teeth, feed roll ratchet, feed roll gears, tape reel shaft, and index wheel, saturate the R-2119 brush with the KS-7471 grease and coat the parts as specified. To lubricate the tape reel shaft, remove the paper roll. Remove the pin that holds the paper reel in place with the long-nose pliers and remove the reel.
- (3) To lubricate the cutter blades, saturate the KS-2423 cloth with the KS-7470 oil and wipe the ends of the blades with the cloth.
- (4) Lubricate the other parts with the KS-7470 oil applied with the 486A oilcan.
- (5) The bearings and intermediate bearings of the type wheel ink roller shall be oiled sparingly. The excess oil shall be removed with a KS-2423 cloth.
- (6) After applying one drop of oil to each side of the tray guide, move the tray up and down several times so that the entire surface will be lubricated.

3.03 Record of Lubrication (Reqt 2.03) (No Procedure)

3.04 Contact Alignment (Reqt 2.04)

- (1) If the alignment of the contacts is not satisfactory, loosen the spring assembly mounting screws with the 3-inch C screwdriver and shift the springs as required. Tighten the screws securely in place.

Distributor Procedures**3.05 Type Wheel Shaft End Play** (Reqt 2.05)

- (1) If the end play of the type wheel shaft is not satisfactory, loosen the friction clutch front disc setscrews with the 3-inch C screwdriver and shift the entire friction clutch as required. Moving the clutch toward the mounting plate will decrease the end play and toward the distributor will increase the play. Tighten the setscrews securely.

3.06 Backlash Between Gears (Reqt 2.06)

- (1) To adjust for backlash between the driving and driven gears, loosen the motor mounting screws with the 4-inch E screwdriver and shift the motor as required. Then while holding the motor in position, tighten the mounting screws securely.

3.07 Distributor Surface (Reqt 2.07)

- (1) To clean the distributor, proceed as follows. Slightly rough distributor surfaces may be smoothed with the extra fine flint paper before being wiped with the KS-2423 cloth. Excessively rough surfaces will require the replacement of the part.

Note: A bronze-colored, highly-polished distributor is very desirable and it should not be mistaken for a burned distributor. If a distributor has this appearance, is smooth, and distribution is satisfactory, no action is required.

- (2) If the distributor becomes dirty, clean it with the KS-2423 cloth moistened with KS-7860 petroleum spirits.
- (3) Clean the slots between the segments with a double or triple thickness of KS-7187 cleaning paper.

3.08 Brush Position (Reqt 2.08)

- (1) If the distributor brushes are not satisfactorily located against the brush arm, loosen the brush clamping screw with the 3-inch C screwdriver. Shift the position of the brush as required. If a brush is broken or damaged, replace it. Tighten the clamping screw securely.
- (2) To align the distributor brushes with the distributor segments, proceed as follows. Move the index wheel until the printing hammer is opposite the 1 character on the type wheel. Then hold the printing arm operated so that the stabber fully engages the corresponding notch in the index wheel. Loosen the brush arm clamping screws with the 3-inch C screwdriver and with the motor running, shift the position of the brushes as required. Tighten the clamping screw securely.

Note: With the ticketer plugged into its associated jack, the motor may be electrically operated by connecting ground to the ground side of the motor start relay.

3.09 Brush Tension (Reqt 2.09)**3.10 Engagement of Distributor Brush and Distributor Segments** (Reqt 2.10)

- (1) If the tension is not satisfactory, loosen the brush clamping screw with the 3-inch C screwdriver and remove the spring. Hold the spring in the hands and increase or decrease the tension as required with the fingers. Increase the tension by adjusting the spring in the direction of the face of the brush or reduce the tension by adjusting the spring away from the face of the brush. Take care when doing this not to kink or sharply bend the spring as this tends to cause the spring to break. Remount the spring securely in position and check that requirement 2.08 is met.
- (2) To check the engagement of the distributor brushes and the distributor segments, hold the 510C test lamp so that the brush is between the light and the observer. Observe the amount of engagement. This is done by noting the light that shines around the edges of the contact area. If any change has been made in the brush tension or if a brush has been replaced, allow the brushes to rotate under power several minutes before checking the requirement.

(3) If the engagement between the distributor brush and segments is not satisfactory, proceed as follows. Place a flat piece of the extra fine flint paper, approximately 1 inch wide, abrasive side up on the distributor segments so that the brushes will pass over the 1 inch width. Rotate the shaft manually, allowing the carbon brushes to pass over the abrasive paper two or three times. Remove the abrasive paper and recheck the brush spring tension. Clean the distributor and brushes carefully with a dry, clean KS-2423 cloth to remove the sand and free carbon. If the engagement is still not satisfactory, repeat as required.

(4) If a squeaking of the brushes is noted, the trouble may be due to an improperly positioned brush or to a glazed brush surface. In these cases, proceed to adjust the brush as covered in (3).

3.11 Friction Clutch Torque (Reqt 2.11)

(1) If the torque is not satisfactory, loosen the rear set collar screws with the KS-6854 screwdriver and shift the rear set collar as required. Tighten the screws securely.

Printing Mechanism Procedures

3.12 Type Wheel and Index Wheel Alignment (Reqt 2.12)

(1) Loosen the type wheel mounting screws with the 3-inch C screwdriver and shift the wheel until the 1 character on the type wheel is in alignment with the reference mark on the index wheel. Tighten the mounting screws.

3.13 Printing Armature Movement (Reqt 2.13)

(1) If the armature binds on its bearings, it may be due to dirt collecting in the bearings or to insufficient side play.

(2) If the bearings are dirty, proceed as follows. Remove the printing armature shaft bearing plate mounting screws with the 3-inch C screwdriver and remove the bearing plate. Loosen the printing armature collar setscrews with the KS-6854 screwdriver and remove the collar. Clean the shaft bearings in the bearing

plate, collars, and the shaft as covered in 3.01. Move the compression spring toward the free end of the shaft and wipe the shaft bearing and spring with a KS-2423 cloth moistened with the KS-7860 petroleum spirits. Remount and position the printing armature collar and tighten the setscrews securely. Remount the bearing plate securely in position and check that requirement 2.21 is met. Lubricate the parts as covered in 3.02.

(3) If there is insufficient side play of the armature on the shaft, loosen the printing armature collar setscrews with the KS-6854 screwdriver and shift the collar toward the armature to decrease the play and away from the armature to increase the play. With the play satisfactory, securely tighten the setscrews.

3.14 Printing Hammer and Type Wheel Separation (Reqt 2.14)

(1) If the clearance between the printing hammer and the characters on the printing wheel is not satisfactory, loosen the frontstop mounting screws with the 3-inch C screwdriver and then shift the frontstop up or down as required. Then while holding the frontstop in position, tighten the mounting screws securely. After making this adjustment, check that requirement 2.20 is met.

(2) If the printing of all characters is not legible, the adjustment should be changed or the type wheel replaced.

3.15 Stabber and Index Wheel Separation (Reqt 2.15)

(1) Remove the tape chute mounting screws with the 3-inch C screwdriver and remove the tape chute. Loosen the backstop mounting screws with the 3-inch C screwdriver and shift the backstop up or down as required. Then tighten the mounting screws securely. Remount and check the location of the tape chute.

3.16 Printing Armature and Backstop Separation (Reqt 2.16)

(1) Hold the eccentric with the 417A wrench and loosen the eccentric lock screw with the 388A wrench. Operate the printing armature manually until the armature starts to

pick up the spacer through its engagement with the eccentric. If the adjustment is not satisfactory, adjust the position of the eccentric as required and lock it in position with the eccentric lock screw.

3.17 *Printing Armature Spring Tension* (Reqt 2.17)

- (1) If the tension of the printing armature spring is not satisfactory, loosen the adjusting screw locknut with the 418A wrench and increase or decrease the tension as required. Tighten the locknut securely.
- (2) If the electrical requirements or the minimum tension requirement cannot be met by adjusting the armature tension screw, replace the spring.

3.18 *Spacer Pawl Movement* (Reqt 2.18)

- (1) If the spacer pawl binds on its bearing, clean the spacer pawl bearing as covered in 3.01. After cleaning the bearing, allow the excess petroleum spirits to evaporate and then lubricate the bearing as covered in 3.02.

3.19 *Spacer Pawl Spring Tension* (Reqt 2.19)

- (1) If the tension of the spacer pawl is not satisfactory, unhook the spring from the spacer pawl and replace it with a new spring. Mount the new spring on the mounting post.

3.20 *Operated Printing Armature Airgap* (Reqt 2.20)

3.21 *Printing Magnet Position* (Reqt 2.21)

- (1) If the position of the printing magnet is such that the separation between the armature pole faces and the armature is too small or is excessive, loosen the armature bracket mounting screws with the 3-inch C screwdriver and shift the position of the bracket toward or away from the armature as required. Tighten the mounting screws securely. If the gap is excessive opposite only one pole piece, remove the magnet mounting screw associated with that magnet with the 3-inch C screwdriver and insert the TP108867 shims as required between the magnet and the mounting bracket. Then mount the magnet securely in position. In repositioning the armature it may also be necessary to

loosen the printing armature shaft bearing plate mounting screws and to shift the bearing plate to prevent binding of the armature. After doing this, tighten the mounting screws securely.

- (2) If the pole faces and armature are not approximately parallel, loosen the armature bracket mounting screws with the 3-inch C screwdriver and shift the armature with a rotary motion. Tighten the mounting screws securely and check that requirement 2.13 is met.

3.22 *Spacer Ratchet Detent and Ratchet Tooth Separation* (Reqt 2.22)

- (1) If the position of the spacer detent is not satisfactory, loosen the spacer ratchet detent bracket mounting screws with the 3-inch C screwdriver and shift the position of the bracket to the right or left as required. Shifting the bracket to the right will increase the separation and shifting to the left will decrease the separation. Tighten the mounting screws securely.

3.23 *Spacer Ratchet Detent Spring Tension* (Reqt 2.23)

- (1) If the tension of the spring is unsatisfactory, remove it from the spacer ratchet detent and replace it. Connect the new spring to both the spacer ratchet detent and to the spring mounting post.

3.24 *Separation Between Springs 1 and 3* (Reqt 2.24)

3.25 *Contact Separation* (Reqt 2.25)

3.26 *Spring Pressure* (Reqt 2.26)

3.27 *Contact Pressure — Springs 1 and 2* (Reqt 2.27)

3.28 *Spring Separation* (Reqt 2.28)

- (1) **General:** Where the parts are inaccessible for adjustment on the mounting plate, remove the printing magnet contact bracket mounting screws with the 3-inch C screwdriver and remove the bracket and adjust as follows. After making the necessary adjustments, remount the bracket and shift the position of the bracket as required. Then tighten the mounting screws securely.

(2) **Separation Between Springs 1 and 3:** To adjust these springs, place the KS-7782 pliers on the spring to be adjusted near the clamping plate and insulators and adjust the spring toward or away from the other spring. Take care in adjusting the springs that when the armature lever engages the insulators other requirements are met.

(3) **Contact Separation, Spring Pressure, and Contact Pressure:** Foreign matter wedged between the springs may prevent the springs from making contact when the printing armature is operated. Remove the foreign matter with a clean toothpick which has been dipped in KS-7860 petroleum spirits. If sticking of a contact spring on a stop spring is observed, clean the springs by inserting a piece of KS-7187 cleaning paper between the springs and withdrawing the paper. If the requirements are still not met, proceed as follows. Place the KS-7782 pliers on the spring just below the contact and slide it down to where the spring leaves the clamping plates and insulators and adjust the spring to the right or left as required, exercising care not to disturb adjacent springs.

(4) If the desired pressure cannot be obtained by adjusting as covered in (3) without bowing the spring beyond its permissible limit, place the pliers on the spring just back of the contact, and slide them back to where the spring leaves the clamping plates and insulators. Draw the pliers upward the length of the spring, meanwhile applying pressure as required so that the spring is formed into a slight gradual bow with the concave surface facing the associated spring. The magnitude of the bow to be formed in the spring must be learned by experience and should be such that when the final tension adjustment is made at the base, the spring will be approximately straight. Move the adjuster to the base of the spring and adjust as covered in (3).

(5) Do not straighten kinked springs unless the kink interferes with proper adjustment of the spring assembly. Removing kinks tends to weaken the spring and to shorten its life. Normally straight springs that have been adjusted should have no sharp bends due to adjustment. A gradual bow, however, is permissible.

(6) If after the above adjustments have been made it is necessary to change the contact separation, place the 485A pliers just below the contact and adjust the spring toward or away from the associated spring as required. In no case should the bend be enough to make a visible kink in the spring. In making this adjustment it may be necessary to readjust the tension as covered in (4).

(7) **Spring Separation:** If the position of the printing magnet contact bracket is such that the separation between spring 4 and the stop spring is not satisfactory, loosen the printing magnet contact bracket mounting screws with the 3-inch C screwdriver and shift the position of the bracket as required. Tighten the mounting screws and recheck the requirement.

3.29 Tape Pressure Bail Spring Tension (Reqt 2.29)

(1) If the tension of the spring is unsatisfactory, remove the spring from the roller shaft and spring mounting post and replace the spring.

3.30 Type Wheel Ink Roller Retaining Spring Tension (Reqt 2.30)

3.31 Type Wheel Ink Roller Retaining Spring Position (Reqt 2.31)

(1) If the tension of the ink roller retaining spring is not satisfactory, remove the roller shaft with the 417A wrench and remove the shaft and spring. Adjust the spring as required with the fingers and remount it on the shaft. Remount the shaft securely in position, recheck the tension of the spring and proceed as covered in (2).

(2) If the position of the retaining spring is not satisfactory, loosen the shaft as covered in (1) and shift the position of the spring in a rotary direction as required. Tighten the shaft, taking care that the spring is not shifted. Remount the ink roller bracket.

3.32 Clearance Between Outer Feed Roll Tape Guide Washer and Feed Roll (Reqt 2.32)

(1) If the clearance is not satisfactory, the trouble may be due to a bent washer. To correct, remove the feed roll mounting screw

with the 3-inch C screwdriver and remove the feed roll washer. Straighten the washer as required. Add or remove the TP84592 shims as required.

3.33 *Inking* (Reqt 2.33)

(1) If the marking on the tape indicates an excessive amount of ink on the ink roller, proceed as follows. If the rollers have been inked excessively, remove the excess by rotating the roller on the clean sheet of paper. Occasionally, the ink on a properly inked roller that has been standing idle for some time will collect on the lowest point of the roller and be transferred to the type wheel. In this case, remove the excess with a clean KS-2423 cloth.

(2) If the marks on the tape from the type wheel are indistinct, the trouble is probably due to insufficient ink on the ink roll. To correct, remove the ink roll and substitute one that has been freshly inked. To re-ink the ink roll, proceed as follows.

(a) Into a small tray or trough (1 to 2 inches wide) pour the R-3419 ink to a depth of approximately 1/4 inch.

(b) Place the felt ink roll in the tray so that the felt roll is resting on its edge in the ink.

(c) After about 15 to 30 minutes, rotate the roll to immerse a second section of the felt.

(d) Repeat (c) until the roll is thoroughly saturated.

(e) Remove the roll from the tray and remove excess ink by rolling the felt roller on a sheet of paper.

Note: Ink which has adhered to the hands during these operations can be removed with Old Town Corporation Cream Soap. Care should be taken to avoid getting ink on clothing since it is extremely difficult to remove.

3.34 *Tape-Out Lever Position* (Reqt 2.34)

(1) To change the position of the tape-out lever, loosen the tape-out lever setscrew with the 3-inch C screwdriver and reposition

the lever as required. Hold the lever in this position and tighten the screw securely.

3.35 *Tape-Out Contact Separation* (Reqt 2.35)

3.36 *Tape-Out Contact Spring Pressure* (Reqt 2.36)

(1) **General:** Where the parts are inaccessible for adjustment on the mounting plate, remove the tape-out contact bracket mounting screws with the 3-inch C screwdriver, remove the bracket and adjust as follows. After making the necessary adjustments, remount the bracket and shift the position of the bracket as required. Then tighten the mounting screws securely.

(2) Foreign matter wedged between the contact springs may prevent the springs from making contact when the tape-out lever is operated. Remove the foreign matter with a clean toothpick which has been dipped in KS-7860 petroleum spirits. If the requirement is still not met, proceed as follows. Place the KS-7782 pliers on the spring just below the contact and slide it down to where the spring leaves the clamping plates and insulators and adjust the spring to the right or left as required, exercising care not to disturb adjacent springs.

(3) If the desired spring pressure cannot be obtained by adjusting as covered in (2) without bowing the spring beyond its permissible limit, place the pliers on the spring just back of the contact and slide them back to where the spring leaves the clamping plates and insulators. Draw the pliers upward the length of the spring, meanwhile applying pressure as required so that the spring is formed into a slight gradual bow with the concave surface facing the associated spring. The magnitude of the bow to be formed in the spring must be learned by experience and should be such that when the final tension adjustment is made at the base, the spring will be approximately straight. Move the adjuster to the base of the spring and adjust as covered in (2).

(4) Do not straighten kinked springs unless the kink interferes with proper adjustment of the spring assembly. Removing kinks tends to weaken the spring and to shorten its life. Normally straight springs that have been

adjusted should have no sharp bends due to adjustment. A gradual bow, however, is permissible.

(5) If after the above adjustments have been made it is necessary to change the contact separation, place the 485A pliers just below the contact and adjust the spring toward or away from the associated spring as required. In no case should the bend be enough to make a visible kink in the spring. In making this adjustment it may be necessary to readjust the tension as covered in (3).

3.37 Tape Reel Spring Tension (Reqt 2.37)

3.38 Tape Reel Spring Clearance (Reqt 2.38)

(1) To adjust a tape reel spring, remove the associated spring mounting screw with the 3-inch C screwdriver and remove the spring. Adjust the spring as required with the 485A pliers. Remount the spring securely in place and recheck the requirement.

Cutter Mechanism Procedures

3.39 Separation Between Springs 1 and 3
(Reqt 2.39)

3.40 Contact Separation (Reqt 2.40)

3.41 Spring Pressure (Reqt 2.41)

3.42 Contact Pressure Between Springs 1 and 2
(Reqt 2.42)

3.43 Spring Separation (Reqt 2.43)

(1) **General:** Where the parts are inaccessible for adjustment on the mounting plate, remove the cutter bail contact magnet bracket mounting screws with the 3-inch C screwdriver and remove the bracket and adjust as follows. After making the necessary adjustments, remount the bracket in place and shift the position of the bracket as required. Then tighten the mounting screws securely.

(2) **Separation Between Springs 1 and 3:** To adjust these springs, place the KS-7782 pliers on the spring to be adjusted near the clamping plate and insulators and adjust the spring toward or away from the other spring. Take care in adjusting the springs that when the operating lever engages the insulators the other requirements are met.

(3) **Contact Separation, Spring Pressure, and Contact Pressure:** Foreign matter wedged between the springs may prevent the springs

from making contact when the cutter armature lever is operated. Remove the foreign matter with a clean toothpick which has been dipped in KS-7860 petroleum spirits. If the requirement is still not met, proceed as follows. Place the KS-7782 pliers on the spring just below the contact and slide it down to where the spring leaves the clamping plates and insulators and adjust the spring to the right or left as required, exercising care not to disturb adjacent springs.

(4) If the desired pressure cannot be obtained by adjusting as covered in (3) without bowing the spring beyond its permissible limit, place the pliers on the spring just back of the contact and slide them back to where the spring leaves the clamping plates and insulators. Draw the pliers upward the length of the spring, meanwhile applying pressure as required so that the spring is formed into a slight gradual bow with the concave surface facing the associated spring. The magnitude of the bow to be formed in the spring must be learned by experience and should be such that when the final tension adjustment is made at the base, the spring will be approximately straight. Move the adjuster to the base of the spring and adjust as covered in (3).

(5) Do not straighten kinked springs unless the kink interferes with proper adjustment of the spring assembly. Removing kinks tends to weaken the spring and to shorten its life. Normally straight springs that have been adjusted should have no sharp bends due to adjustment. A gradual bow, however, is permissible.

(6) If after the above adjustments have been made it is necessary to change the contact separation, place the 485A pliers just below the contact and adjust the spring toward or away from the associated spring as required. In no case should the bend be enough to make a visible kink in the spring. In making this adjustment it may be necessary to readjust the tension as covered in (4).

(7) **Spring Separation:** If the separation between spring 4 and its stop spring is not satisfactory, loosen the cutter bail contact bracket mounting screws with the 3-inch C screwdriver and shift the position of the

bracket as required. Tighten the mounting screws and recheck the requirement. Make sure that requirements 2.40 through 2.42 are met.

3.44 Contact Closure of Springs 3 and 4
(Reqt 2.44)

(1) If the relation between the cutter blade and springs 3 and 4 is not satisfactory, the trouble may be due either to an improperly positioned upper cutter blade or that the contacts 3 and 4 are improperly adjusted. If the cutter blade is improperly adjusted, proceed as covered in 3.48 or adjust the springs as covered in 3.39.

3.45 Shaft Position (Reqt 2.45)

(1) If the position of the cutter shaft or cutter frame collars is not satisfactory, loosen the cutter arm set collar screws in both collars with the 3-inch C screwdriver, shift the position of the shaft or collar as required, and tighten the setscrews securely.

3.46 Operated Cutter Armature Airgap
(Reqt 2.46)

3.47 Cutter Magnet Position (Reqt 2.47)

(1) If the position of the cutter magnet armature is not satisfactory, loosen the armature mounting screws with the 3-inch C screwdriver or the 563A or 564A screwdriver and shift the position of the armature as required. If the clearance is too large, remove the magnet core mounting screws with the 3-inch C screwdriver and remove the magnet core or cores at fault. Insert the TP101808 shims as required between the magnet bracket and the core and remount and securely tighten the parts that were removed.

3.48 Cutter Blade Position (Reqt 2.48)

(1) If the position of the lower cutter blade is not satisfactory, loosen the lower blade bracket mounting screws with the 3-inch C screwdriver and shift the position of the bracket as required. Tighten the mounting screws securely.

Note: In order to improve the cutting action of the knife, the lower cutter blade should be tilted slightly in a counterclockwise direction, as seen from the front of the unit.

(2) If the position of the upper cutter blade is not satisfactory, loosen the upper blade mounting screws with the 3-inch C screwdriver, shift the position of the blade up or down as required, and tighten the mounting screws securely.

3.49 Cutter Blade Clearance (Reqt 2.49)

(1) If the relationship between the cutter blades is not satisfactory, adjust the upper blade mounting arm as required with the long-nose pliers.

3.50 Cutter Arm Cam Clearance (Reqt 2.50)

(1) If the clearance between the cutter arm cam and cutter arm is not satisfactory, loosen the cam mounting screws with the 3-inch C screwdriver and shift the cam as required. Then tighten the mounting screws securely.

3.51 Cutter Blade Compression Spring Tension
(Reqt 2.51)

(1) If the tension is not satisfactory, loosen the cutter arm set collar screws in both collars with the 3-inch C screwdriver. Remove the shaft by sliding it through the bearing arms and remove the compression spring. Substitute the new part and remount the shaft. Remount the collars and position them on the shaft as covered in 3.34.

3.52 Cutter Armature Retractable Spring Tension (Reqt 2.52)

(1) If the tension is not satisfactory, remove the spring from the frame, substitute a new spring, and recheck the requirement.

3.53 Clearance Between Cutter Leaf Spring and Downstop (Reqt 2.53)

(1) If the clearance between the cutter leaf spring and the downstop is not satisfactory, remove the cutter leaf spring mounting screws with the 3-inch C screwdriver and remove the spring. Adjust the spring as required with the KS-7782 pliers and remount the spring securely in position.

3.54 Ticket Hopper Door Latch Spring Tension (Reqt 2.54)

- (1) If the tension of the ticket hopper door latch spring is such that the door latch does not operate satisfactorily, it may be due to a dirty door latch bearing or to insufficient or excessive spring tension.
- (2) If the door latch bearing appears dirty, remove the spring with the long-nose pliers, and the latch mounting screw with the 3-inch C screwdriver. Then clean the bearing and screw as covered in 3.01. Remove the excess spirits, remount and secure the latch in place, and remount the spring.
- (3) If the tension of the spring is unsatisfactory, remove the spring and substitute a new one.

3.55 Ticket Tray Spring Tension (Reqt 2.55)

- (1) If the tension of the ticket tray spring is not satisfactory, remove the spring with the long-nose pliers. Substitute the new part.

3.56 Ticket Tray Movement (Reqt 2.56)

- (1) If, when the ticket tray is empty, it does not restore to its uppermost position when it is released after being depressed part of the way, the trouble may be due to dirt collecting in the tray guides. To correct, clean the guides with the KS-2423 cloth moistened with KS-7860 petroleum spirits and lubricate as covered in 3.02.

3.57 Tape Chute Position (Reqt 2.57)

- (1) If the position of the tape chute is not satisfactory, the trouble may be due to the tape chute being improperly positioned or distorted. If it is improperly positioned, loosen the tape chute mounting screws with the 3-inch C screwdriver and adjust the position of the tape chute as required. Tighten the mounting screws securely in position. If the tape chute appears to be distorted, remove the mounting screws and remove the tape chute. Recondition the chute as required and remount it loosely on the frame. Position it as required and securely tighten the mounting screws.

3.58 Tape Chute Lip Clearance (Reqt 2.58)

- (1) If the clearance between the lips of the tape chute is such that the tape becomes stuck, adjust the lips of the tape chute as required by inserting the blade of the 3-inch C screwdriver between the lips and the chute and twist the screwdriver to obtain the proper clearance. Make sure that after the adjustment is made the lips are not distorted as distortion may also interfere with the movement of the tape.

3.59 Tape Guide Location (Reqt 2.59)

- (1) If the position of the tape guide is unsatisfactory, loosen the tape guide mounting screws with the 3-inch C screwdriver and shift the position of the guide as required. Tighten the mounting screws securely.

3.60 Ticket Hopper Location (Reqt 2.60)

- (1) If the location of the ticket hopper is not satisfactory when a full tape roll is mounted on the tape reel, loosen the ticket hopper mounting screws with the 4-inch E screwdriver and shift the position of the ticket hopper as required. Tighten the mounting screws securely.

3.61 Ticket Tray Clearance (Reqt 2.61)

- (1) If the ticket tray touches the ticket hopper door, loosen the door mounting nuts with the 417A wrench and the screws with the 3-inch C screwdriver. Shift the position of the door as required. Tighten the screws and nuts securely in place. If, however, the door cannot be shifted enough in this manner to obtain the necessary clearance, loosen the hinge mounting screws as covered above for the door mounting screws and shift the hinge and door to obtain the clearance. Then tighten the screws securely.

Motor Procedures

3.62 Motor (Reqt 2.62)

- (1) Remove the motor and substitute another motor as covered in Section 030-360-801, making sure that requirement 2.06 is met.

Electrical Procedures**3.63 Motor Start Relay** (Reqt 2.63)

- (1) To adjust the motor start relay, proceed as covered in the section covering KS-type relays.

3.64 Printing Magnet Operation (Reqt 2.64)

- (1) To adjust for satisfactory operation of the printing magnet, increase the tension of the printing armature spring as covered in 3.17 until the ticketer fails to operate satisfactorily, then back off the adjusting screw 1/2 turn and check requirement 2.17.

3.65 Cutter Magnet Operation (Reqt 2.65)

- (1) If the operation of the cutter blades fails to cut the paper satisfactorily the trouble may be due to dull cutter blades. In this case, replace the cutter blades.

Plug and Socket Procedures**3.66 Howard B. Jones Plugs and Sockets** (Reqt 2.66)

- (1) To adjust the plug and socket, proceed as covered in Section 032-545-701.

REASONS FOR REISSUE

1. To omit the information covering the J34724A test set and to add to Part 1 the information previously covered in Part 3 (1.07).
2. To revise the check method (2.14, 2.20, 2.28, and 2.43).
3. To revise the motor requirements and procedures (2.62 and 3.62).
4. To revise the requirement covering printing magnet operation (2.64).
5. To revise the requirement covering cutter magnet operation (2.65).
6. To revise the list of tools, gauges, test apparatus, and materials (3.001).
7. To add the note (3.08).
8. To omit Part 4.