COMBINED JACKS AND SIGNALS
NOS. 23C, 52C, AND 55C
REQUIREMENTS AND ADJUSTING PROCEDURES

1. GENERAL

1.01 This section covers Nos. 23C, 52C and 55C combined jacks and signals.

1.02 This section is reissued to incorporate material from the addendum in its proper location. In this process marginal arrows have been omitted.

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 Part 1, "General" and Part 2, "Requirements" form part of the Western Electric Co. Inc. Installation Department handbook.

1.05 Requirements are marked with an asterisk (*) when to check for them would necessitate the 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.

1.06 Operate means that when the operate current is applied, the armature shall move toward the core until the tripping latch releases the shutter.

1.07 Release means that when the operating current is reduced to the release value (or open circuit) the tripping latch shall rest on the shell at the end nearer the mounting plate.

2. REQUIREMENTS

2.01 Cleaning

(a) The night alarm and jack contacts shall be cleaned when necessary in accordance with the section covering cleaning of key contacts and parts.

(b) Other parts shall be cleaned in accordance with approved procedures.

2.02 Mounting

(a) Fig. 1 (A) - The combined jack and signal shall be fastened securely to the mounting plate. Gauge by feel.

(b) Fig. 1 (B) - The hinge plate shall be fastened securely to the mounting plate and signal shell. Gauge by feel.

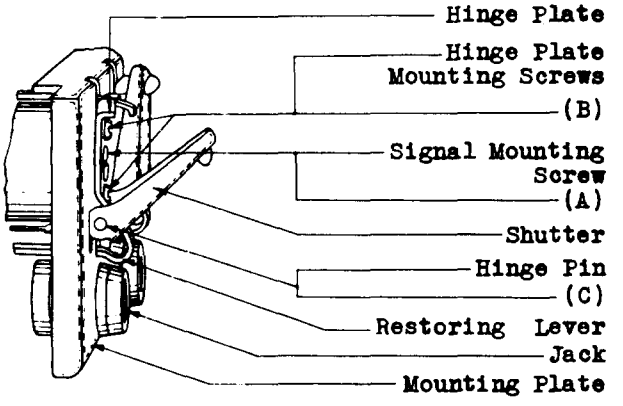

Fig. 1

2.03 Armature Movement - Fig. 2 (A) - The armature shall not bind and shall not have excessive end play measured in line with the axis of the pivots. Excessive shall be interpreted to mean more than .005". Gauge by eye and feel.

*2.04 Tightness of Pivot Screw Lock Nuts - Fig. 2 (B) - The pivot screw lock nuts shall be sufficiently tight to hold the pivot screws in their proper positions. Gauge by feel.

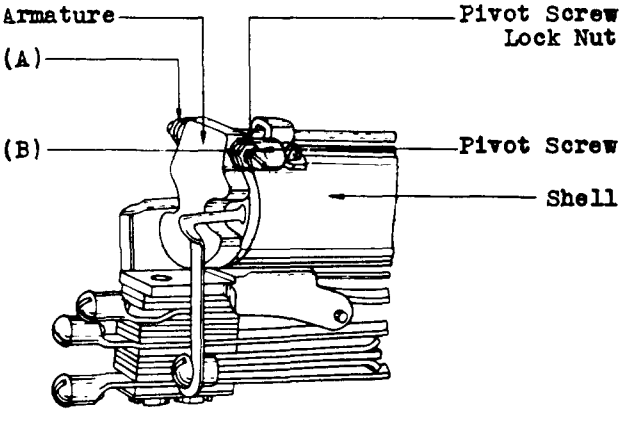

Fig. 2

2.05 Shutter Movement - Fig. 1 (C) - The shutter shall move freely on its hinge pin. Gauge by feel.

2.06 Tripping Latch Position

*(a) Fig. 3 (A) - The tripping latch shall not touch the sides of the armature mounting bracket when the armature side play is taken up. Gauge by feel.

(b) Fig. 3 (B) - The tripping latch shall not touch the sides of the slot in the mounting plate when the armature side play is taken up. Gauge by feel.

(c) Fig. 3 (C) - When the signal is in the unoperated position the tripping latch shall touch the shell at the point nearest the mounting plate but shall not touch the shell at any other position. Gauge by eye.

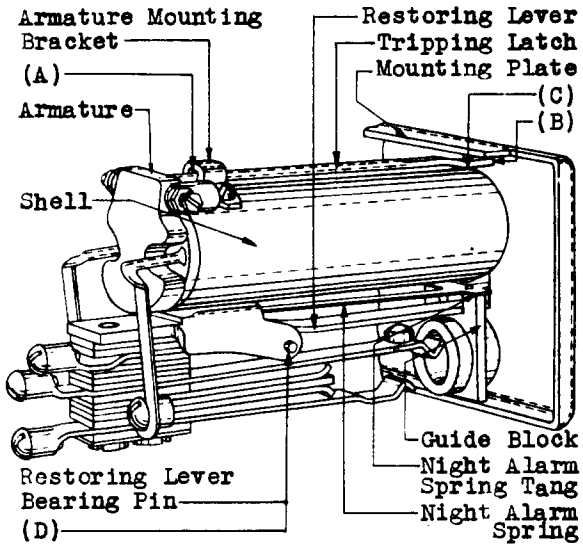

Fig. 3

(d) The tripping latch shall create an audible signal caused by striking the lower surface of the flange on the mounting plate when the signal is electrically operated. Gauge by eye.

*2.07 Straightness of Springs All springs shall be free of sharp bends or kinks due to adjustments. A gradual bow in a spring is permissible. Gauge by eye.

2.08 Restoring Lever Movement and Position

(a) Fig. 3 (D) - The restoring lever shall move freely on its bearing pin. Gauge by feel.

(b) The restoring lever shall restore the shutter from its operated to its normal position when a 47 type plug or its equivalent is inserted slowly in the associated jack with an upward pressure being applied at the end of the plug just sufficient to take up the play. Gauge by eye.

*2.09 Contact Alignment - Fig. 4 (A) - The point of contact shall fall wholly within the boundary of the opposing contact. Gauge by eye.

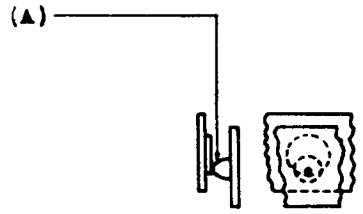

Fig. 4

*2.10 Tightness of Spring Assembly All springs in an assembly shall be held securely in their relative position one to another and to the signal shell. Gauge by feel.

2.11 Shutter and Night Alarm Spring Engagement When the signal is operated the shutter shall rest entirely on the night alarm spring and shall not touch the restoring lever. Gauge by eye.

*2.12 Clearance Between Night Alarm Spring and Shutter Tail With the signal in the unoperated position, there shall be a clearance between the end of the night alarm spring and the shutter tail of
Min. .020"
Gauge by eye.

2.13 Contact Separation of Night Alarm Contact With the signal in the normal position, there shall be a separation between the night alarm contact of
Min. .005".
Gauge by eye and feel.

2.14 Position of Night Alarm Spring The night alarm spring tangs shall rest on the guide block when the signal is in the normal position. Gauge by eye.

2.15 Cut-Out With a used 47 type plug inserted into the jack and a pressure of approximately 1/2 pound applied to the end of the plug, there shall be no indication of a cut-out when the plug is slowly rotated a complete revolution. The pressure shall be applied in a downward direction when checking for tip cut-outs and in an upward direction when checking for sleeve cut-outs.

2.16 Butt It shall be possible to fully insert a 47 type plug which has not had much usage into the jack. It will be satisfactory to rotate the plug in an effort to insert it into the jack but the pressure applied shall not exceed that which can be exerted with the plug held between the thumb and index finger.

2.17 Electrical Requirements

(a) The signal shall meet the electrical requirements specified on the circuit.

(b) When the signal is electrically operated the night alarm contacts shall make reliably.

3. ADJUSTING PROCEDURES

3.001 List of Tools and Materials

Code No.	Description
Tools	
74	Wrench - 5/32" and 7/32" Hex. Open Double-end Flat
206	Screw-driver - Double-End Offset
207	Screw-driver - Double-End Offset
363	Spring Adjuster
KS-6015	Duck-bill Pliers
-	Bell System Cabinet Screwdriver - 3-1/2" per A.T.&T. Co. Drawing 46-X-40
-	Bell System P-Long Nose Pliers - 6-1/2" per A.T.&T. Co. Drawing 46-X-56
Materials	
KS-7860	Petroleum Spirits
-	Toothpicks, Hardwood, Flat at One End and Pointed at Other.

3.002 In order to adjust a signal to meet any requirement except those covering mounting, armature movement, shutter movement, tightness of pivot screw lock nuts, and clearance between the night alarm spring and the shutter tail, it will be necessary to remove the mounting plate from the switchboard. To do this, remove the mounting plate mounting screws with the 3-1/2" cabinet screw-driver and remove the mounting plate by drawing the plate through the front of the switchboard. Take care in doing this not to break the wires. In order to make any adjustments except for cleaning, tripping latch movement and tightness of assembly, remove the signal at fault from the mounting plate. To do this, unsolder the necessary wires, remove the hinge plate mounting screws with the Nos. 206 and 207 offset screw drivers and the signal mounting screw with the 3-1/2" cabinet screwdriver and remove the signal and hinge plate from the mounting plate. After the adjustments are satisfactorily made, remount the signals and parts. Take care when remounting the hinge plate to insert the short screw into the top mounting hole. Remount the mounting plate, and resolder any wires which were removed.

3.01 Cleaning (Rq.2.01)

(1) Clean the contacts when necessary in accordance with the section covering cleaning of key contacts and parts.

(2) To clean the shutter or the restoring lever bearings, apply petroleum spirits to the bearings with a clean toothpick and then work the part back and forth or up and down as required to loosen the matter. After the matter is loosened, flush the bearings with petroleum spirits applied with another clean toothpick.

(3) Clean other parts when necessary in accordance with the section covering cleaning of relay contacts and parts. To gain access to the armature pivots proceed as outlined in procedure 3.03(2).

3.02 Mounting (Rq.2.02)

(1) If the hinge plate is not mounted securely, tighten the upper mounting screw with the 3-1/2" cabinet screwdriver and the lower mounting screw with the Nos. 206 and 207 offset screw-drivers.

(2) If the signal is not mounted securely, tighten the signal mounting screw with the 3-1/2" cabinet screwdriver, or if necessary, tighten the hinge plate mounting screw as outlined above. Exercise care in doing this not to force the shutter out of position.

3.03 Armature Movement (Rq.2.03)
3.04 Tightness of Pivot Screw Lock Nuts (Rq.2.04)

(1) If the armature fails to operate freely, move it from side to side in line with the axis of the pivot screws and observe whether or not there is sufficient side play.

(2) If the side play is satisfactory but the signal fails to operate satisfactorily, back off the pivot screw lock nuts with the No. 74 wrench and back off the pivot screws several turns with the Nos. 206 and 207 offset screwdrivers. Then remove the armature by sliding it away from the shell so that the tripping latch which is attached to the armature can be removed through the armature mounting bracket. With the armature removed, clean the pivot screws, bearings, and bearing holes as outlined in procedure 3.01 (2).

(3) After the parts have been satisfactorily cleaned, remount the armature inserting the tripping latch through the mounting bracket and sliding the

3.03-3.04 (Continued)

armature into place between the bracket arms. Adjust the pivot screws so that the armature will move freely. One quarter of a turn from finger tight provides approximately .005" side play. Exercise care not to turn in one screw more than the other since otherwise the position of the tripping latch will not be satisfactory.

(4) If bind still exists, back off the pivot screw lock nuts with the No. 74 wrench and back off the pivot screws slightly with the Nos. 206 and 207 offset screw-drivers. Then tighten the lock nuts securely.

(5) If the side play of the armature is excessive back off the lock nuts as outlined above with the No. 74 wrench and turn in the pivot screws as required with the Nos. 206 and 207 offset screwdrivers.

(6) After the pivot screws are satisfactorily adjusted, tighten the lock nuts securely with the No. 74 wrench.

3.05 Shutter Movement (Rq.2.05)

(1) If the shutter does not move freely on the hinge pin, clean the bearings as outlined in procedure 3.01.

(2) If the bind still exists, it may be due to a bearing yoke rubbing against the sides of a slot in the mounting plate or the shutter binding on the hinge pin.

(3) If a bearing yoke rubs against the sides of a slot in the mounting plate, remove the hinge plate mounting screws with the Nos. 206 and 207 offset screw-drivers and remove the hinge plate. Adjust the yoke at fault with the long-nose pliers as required. In doing this see that both yokes are adjusted to approximately the same position. Remount the hinge plate and shutter on the mounting plate.

(4) If the shutter binds on the hinge pin and it is apparently due to the hinge pin being bent, remove the shutter and hinge plate as outlined above. Remove the hinge plate from the shutter. In some cases where it is necessary to bend the yokes of the shutter with the long-nose pliers in order to effect this removal due to the length of the bearing pins exercise care not to bend the yoke any more than necessary. After the hinge plate is removed, straighten the hinge pin as required with the long-nose pliers. Assemble the hinge plate and the shutter. If a yoke was bent to effect the removal of the plate, adjust it to its original position. Take care in doing this that the yokes do not bind on the mounting plate. Remount the parts.

3.06 Tripping Latch Position (Rq.2.06)

(1) If the tripping latch does not release the shutter when the signal is operated, it may be due to improper engagement of the tripping latch and shutter, or improper forming of the tripping latch. Examine the tripping latch to determine whether the form of the latch is approximately the same as those of the adjacent signals which operate properly. If the bend in the tripping latch directly beneath the flange in the mounting plate is too great, it will prevent sufficient movement of the latch to release the shutter. If necessary, remove the armature as outlined in procedure 3.03 and reduce the bend in the latch using the long-nose pliers applied on the flat portion of the latch on both sides of the bend.

(2) If the form of the latch is satisfactory and the latch fails to strike the flange on the mounting plate and release the shutter when the armature is manually operated, the unoperated armature air-gap is insufficient. Loosen the armature mounting bracket mounting screws with the 3-1/2" cabinet screw-driver and move the armature away from the core sufficiently to provide the necessary movement of the tripping latch. Tighten the screws securely. Apply the operate current and see that the armature operates properly.

(3) If the latch still fails to release properly, it is due to improper engagement of the latch and shutter. Grasp the tripping latch near the tip end with the long-nose pliers and adjust the latch up or down as required.

(4) If the tripping latch touches either side of the mounting bracket or the sides of the slot in the mounting plate and if this condition is not due to a bent tripping latch, back off the pivot screw lock nuts with the No. 74 wrench, position the pivot screws using the Nos. 206 and 207 offset screw-drivers so that the tripping latch clears the mounting plate and armature mounting bracket. Then tighten the lock nuts securely. After doing this check that the armature movement is satisfactory.

(5) If the tripping latch is bent, remove the armature as outlined in procedure 3.03 and straighten the latch by adjusting it with the long-nose pliers. Then remount the armature as outlined in the procedure mentioned above.

(6) If any part of the rounded portion of the tripping latch touches the shell, remove the armature as outlined in procedure 3.03. Grasp the latch with

3.06 (Continued)

the long-nose pliers close to the point where the latch strikes the shell and adjust it to provide a clearance. Do not introduce a kink in the latch when making this adjustment.

(7) If the latch does not rest on the end of the shell when the signal is in the unoperated position, grasp the latch with the long-nose pliers applied at a point about 1/2" from the front end of the latch. Then, while holding the latch with the pliers, grasp the latch with another pair of long-nose pliers applied at the end of the flat portion of the latch nearest the armature and adjust the latch as required. In each case, examine the adjacent tripping latches to determine the approximate form of the latch.

(8) After the latch has been satisfactorily adjusted, remount the parts.

(9) If the signal fails to cause an audible signal, as it is operated, increase the unoperated armature air-gap as outlined in (2). Exercise care, however, not to destroy any other adjustments.

(10) If an audible signal cannot be obtained by changing the unoperated armature air-gap, increase the bend in the latch as outlined in (1). After making this adjustment, recheck all previous adjustments.

3.07 Straightness of Springs (Rq.2.07)

(1) Do not straighten kinked springs unless the kink interferes with the proper adjustment of the signal. Removing kinks tends to weaken the spring and shorten the life of the signal. Adjust the springs so that there will be satisfactory clearances between parts designed never to make contact. Adjust the night alarm spring with the No. 363 spring adjuster on the straight portion of the spring near the bend in the spring and adjust the spring up or down as required. Use the KS-6015 duck-bill pliers to adjust other springs.

3.08 Restoring Lever Movement and Position (Rq.2.08)

(1) If the restoring lever binds on its bearing pin, it is probably due to dirt collecting in the bearings. To clean the bearings, proceed as outlined in procedure 3.01.

(2) If the restoring lever does not restore the shutter when a 47 type plug is inserted in the associated jack, it may be due to the stud of the jack spring being loose or missing, or to the adjustment of the tip of the restoring lever.

(3) If the stud of the jack spring is missing, refer the matter to the supervisor.

(4) If the tip of the restoring lever does not strike the shutter satisfactorily, grasp the rounded portion of the lever with the long-nose pliers at a point immediately in front of the mounting plate as shown in Fig. 5 and adjust the lever toward or away from the mounting plate as required. The form of the tip of the restoring lever should be about the same as those of the adjacent combined jacks and signals. After making this adjustment see that the lever strikes the shutter tail approximately flat.

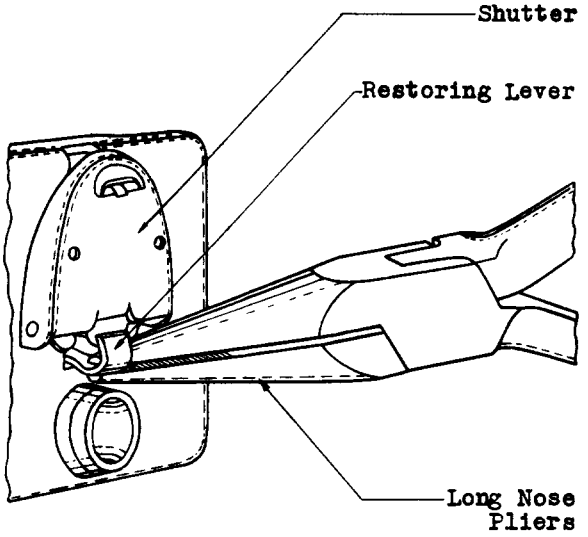

Fig. 5 - Method of Adjusting Rounded Portion of the Restoring Lever

3.09 Contact Alignment (Rq.2.09)
3.10 Tightness of Spring Assembly (Rq.2.10)

(1) If the contacts do not line up properly, loosen the spring assembly mounting screws with the 3-1/2" cabinet screw-driver and shift the contact springs as required. Then tighten the mounting screws securely. Take care when aligning either the night alarm contacts or jack contacts not to change the position of the other contacts if they are satisfactory.

(2) If the spring assembly is loose, tighten the spring assembly mounting screws with the 3-1/2" cabinet screwdriver. Exercise care while tightening the screws not to shift the springs.

3.11 Shutter and Night Alarm Spring Engagement (Rq.2.11)

(1) Operate the armature manually and note closely whether the shutter rests entirely on the night alarm spring. If it does not it is probably due to the position of the shutter tail or to the shape of the bend at the end of the restoring lever.

(2) If the position of the shutter tail is not satisfactory, remove the hinge plate mounting screws with the Nos. 206 and 207 offset screw-drivers and remove the hinge plate. Grasp the tip of the shutter tail with the long-nose pliers as shown in Fig. 6 and adjust it away from the front of the shutter as required. Remount the shutter and check the adjustment.

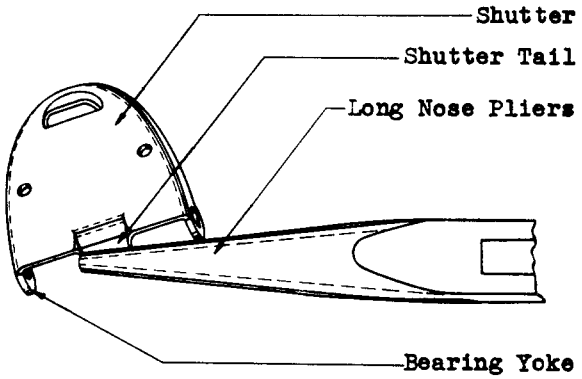

Fig. 6 - Method of Adjusting Shutter Tail

(3) Operate the adjacent signals and compare the positions of the released shutters with that of the signal under adjustment. If the shutter of the signal under adjustment does not drop to approximately the same position as the others it is an indication that the restoring lever requires adjustment. Compare the shape and position of the restoring lever with those adjacent levers on signals which operate properly, and, if necessary, adjust the restoring lever as outlined in procedure 3.08.

(4) If the shape of the rounded portion of the restoring lever is satisfactory, but the contacts still fail to close, it is probably due to the position of the jack spring assembly. Check the position of the assembly and, if necessary, adjust as outlined in procedure 3.14.

3.12 Clearance Between Night Alarm Spring and Shutter Tail (Rq.2.12)

(1) If the clearance between the night alarm spring and the shutter tail is not satisfactory, loosen the spring assembly mounting screws with the 3-1/2" cabinet screw-driver and attempt to shift the night alarm spring away from the mounting plate. To do this grasp the spring firmly with the long-nose pliers, but do not exercise enough force to bend the spring.

(2) If this does not provide a satisfactory clearance, remove the shutter from the mounting plate as outlined in paragraph 3.002 and adjust the shutter tail as outlined in procedure 3.11. After the adjustment is made, remount and secure the shutter on the mounting plate and see that when the shutter releases it causes the night alarm contacts to make reliably.

3.13 Contact Separation of Night Alarm Contact (Rq.2.13)

3.14 Position of Night Alarm Spring (Rq.2.14)

(1) Check the separation between night alarm contacts by gauging the movement of the night alarm spring as the spring is lifted with a toothpick. In order to do this, insert the toothpick in the opening in the mounting plate through which the restoring lever projects.

(2) If the separation is not satisfactory, remove the signal from the mounting plate. Grasp the spring near the tangs with the duck-bill pliers and adjust the ends of the tangs upward with the No. 363 spring adjuster. After making this adjustment see that the contacts make reliably when the signal is operated.

(3) If both spring tangs do not rest on the guide block when the signal is in the normal position, proceed as follows. Note the position of the spring tangs and then remove the signal from the mounting plate. Place the No. 363 spring adjuster on the spring close to the offset and adjust the spring downward as required. After doing this, mount the signal and recheck the position of the spring tangs.

(4) If one tang rests on the guide block when the signal is in the normal position, adjust the tang at fault as outlined in (2). Take care in doing this that the separation between the night alarm contacts is satisfactory.

(5) After the adjustments are satisfactorily made, check that the signal meets the electrical requirements.

3.15 Cut-Out (Rq.2.15)

(1) If there is an indication of cut-out, remove the signal from the mounting plate as outlined in paragraph

3.15 (Continued)

3.002 and adjust the springs at fault with the KS-6015 duck-bill pliers.

3.16 Butt (Rq.2.16)

(1) If a plug butts against the sleeve spring, it is an indication that the spring is positioned too low. Adjust all the springs of the jack assembly as required with the KS-6015 duck-bill pliers. Take care in doing this not to position the springs too high or it will interfere with the movement of the shutter.

(2) If a plug butts against the tip spring, it is an indication that the spring assembly is positioned too high. In this case, adjust the springs of the assembly slightly downward. This will also permit a greater movement of the shutter. After making this adjustment check the jack for cut-out.

3.17 Electrical Requirements (Rq.2.17)

(1) If the signal fails to meet its electrical requirements specified on the circuit requirement table, it may be due to improper position of the tripping latch and, if necessary, adjust as outlined in procedure 3.06.

(2) If the failure still exists, loosen the armature bracket mounting screws with the 3-1/2" cabinet screw-driver and shift the bracket slightly toward the front of the signal. Then securely tighten the screws. After making this adjustment, check that the requirement covering tripping latch movement is met.

(3) If the night alarm contacts do not make reliably, check the operation of the shutter as outlined in procedure 3.11 to see that the shutter rests entirely on the end of the night alarm spring. If necessary, adjust as outlined in that procedure. Failure of the contacts to make reliably may also be due to the tip of the spring being misformed or to the jack spring assembly being positioned too close to the shell. If necessary, adjust the spring with the No. 363 spring adjuster. If the position of the jack assembly is not satisfactory, adjust as outlined in procedures 3.13 and 3.14.