REPLACING CONTACTS
USING THE NO. 1004A, 1004B, AND 1013A TOOL KITS
GENERAL

1. GENERAL

1.01 This section covers general information on contact welding with the No. 1004A, 1004B, and 1013A tool kits. It describes the tools and materials used in welding contacts and covers information necessary for the maintenance and preparation of the tools. This section also covers information necessary for ordering replacement contacts and guides, electrodes, and parts used in the maintenance of the No. 577A, 577B, and 636A welding pliers.

1.02 This section is reissued to revise the table listing contacts for replacement purposes, the lists of tools in the 1004A and 1004B tool kits, to add maintenance and piece-part information for the No. 577D welding pliers, and to add information on tools required for replacing contents on 229- and 230-type relays. Detailed reasons for reissue will be found at the end of the section.

1.03 The No. 1004A tool kit may be used for welding contacts on all apparatus listed herein except wire-spring-type relays. In this tool kit, the welding plier leads are permanently attached to the No. 102A current supply set. The No. 1004B tool kit is similar to the No. 1004A tool kit, except that the No. 102B current supply set in this kit is provided with terminals to which welding plier leads are connected. This feature permits the use of the No. 1004B tool kit with different types of welding pliers. Thus, the No. 1004B tool kit is suitable for all applications of the No. 1004A and, in addition, can be used in conjunction with the No. 1013A tool kit for welding contacts on wire-spring-type relays.

1.04 The procedures for replacing contacts on various types of appartus are covered in separate sections as follows:

SECTION NUMBER	SUBJECT	NOTES
A504.101.1	Replacing Contacts — Using the No. 1004A, 1004B, and 1013A Tool Kits — General	Includes general figures, description, preparation and maintenance of tools, and ordering information on parts which can be replaced in the field.
A504.101.2	Replacing Contacts Relays (Nonwire Spring Type), 197-type Switches, Crossbar Switches, and KS-13835 (AMA) Reader	Includes E-, EA-, H-, R-, T-, U-, UA-, UB-, Y-, 245-, 254-, 263-, 264-, and step-by-step-type relays, 197-type step-by-step switches, crossbar switches, and the KS-13835 reader.
A504.101.3	Replacing Contacts Relays (Wire Spring Type)	Includes AF-, AG-, AJ-, AK-, 286-, 287-, and 288-type relays.
A504.101.4	Repairing Feeder Brush Tips — 10-, 11-, 26-, 27-, and 32-type Banks Associated With Rotary Selectors	The 10- and 26-type banks are associated with 200-, 206-, and 209-type selectors; the 32-type bank with 211-type selectors; and the 11- and 27-type banks with 202-, 207-, 208-, and 1202-type power-driven rotary selectors.
A504.101.5	Replacing Contacts — Relays (Nonwire Spring Type), 197-type Switches, and KS-13835 (AMA) Reader—Having Unusual Contact Conditions	Covers cases where silver replacement contacts are recommended for use on certain apparatus. It also covers cases where No. 1 metal contacts are recommended where frequent contact opens occur.

1.05 Six types of contacts are used for contact replacement purposes as covered in these sections. Three of them are bar contacts, two are channel-shaped contacts, and the sixth is furnished as contact tape. Individual contacts (except contact tape) are furnished on plastic holders, the contacts being inserted in slits in the holder. These contacts should be kept on the plastic holders. Contact tape is furnished in corrugated wrappings. The tape should be removed from the wrapping and kept in the container provided for this purpose. The piece-part number, type, and thickness of each contact and the apparatus on which the contact is used are listed in Table A.

1.06 Before replacing contacts on the apparatus herein, remove the circuit from service in accordance with approved procedures. In order to prevent adverse service reactions, in some cases it may be necessary to remove associated circuits from service or to isolate the springs on which contacts are to be replaced.

1.07 ***Caution: Before attempting to weld contacts on working apparatus, it may be advantageous to practice doing the work on spare apparatus, if available.***

1.08 ***Caution: It is important that the following precautions be observed in order to prevent burning of the electrodes of welding pliers. When the No. 577A or 577B welding pliers are equipped with a No. 10, 11, or 12 fixed electrode, do not leave the tool without a guide in place. When these welding pliers are equipped with a No. 13 fixed electrode, exercise extreme care that the current-supply control button is never operated when the electrodes are in con-***

TABLE A — CONTACTS FOR REPLACEMENT PURPOSES

CONTACT	TYPE OF CONTACT AND THICKNESS	APPARATUS ON WHICH USED
P-16A189 (replaces P478608 and P-485120) (see note)	Bar Contact, 0.020 inch (Paladium bar with nickel base)	Crossbar switches, KS-13835 (AMA) reader, and nonwire-spring-type relays except relays and other apparatus, as covered in Section A504.101.5.
P-15A847	Bar Contact, 0.020 inch (No. 1 metal)	10-, 11-, 26-, 27-, and 32-type bank feeder brush tips. Also certain apparatus having frequent contact opens, as covered in Section A504.101.5.
P-16A222	Bar Contact, 0.020 inch (Silver bar with nickel base)	Used as a negatively poled contact with a mating palladium contact on certain apparatus, as covered in Section A504.101.5.
P-10A949	Channel-type Contact, each side 0.012 inch (Paladium)	AF-, AG-, AJ-, and AK-type wire-spring relays (fixed springs).
P-19A353	Channel-type Contact, contact side 0.026 inch thick (0.012 inch paladium on 0.014 inch copper nickel base)	286-, 287-, and 288- (multicontact) type wire-spring relays (fixed springs).
P-16A180	Contact Tape, 0.009 inch thick by 3 inches long (Paladium with 0.001-inch gold overlay)	AF-, AG-, AJ-, and AK-type wire-spring relays and 286-, 287-, and 288- (multicontact) type wire-spring relays (movable twin springs).

Note: The P-478608 contact for general use and the P-458120 contact for use on UB relays are entirely replaced by the P-16A189 contact. However, stocks of the former contacts may be used except on brass springs where the P-16A189 contact must be used in all cases.

tact with each other. Take the following precaution when the No. 636A tool, consisting of the No. 577C and 577D welding pliers, is connected to the current-supply set. When the No. 577C pliers are not in use, make sure that the electrode which holds the contacts is held by the latch. When the No. 577D pliers are not in use, make sure that the jaws are held open by the lock.

1.09 ***Substitution of Steel for Nonmetallic Bushing on No. 577D Welding Pliers (Part of No. 636A Tool):*** If the No. 577D welding pliers are equipped with a nonmetallic bushing for the movable handle stop, replace it with a steel bushing and associated larger diameter spring. Make this replacement as soon as practicable in order to insure continued reliable operation of the welding pliers. Ordering information for the steel bushing and associated spring is given in Fig. 7 and procedures for replacing these parts are covered in Part 6.

2. DESCRIPTION OF CONTACT WELDERS AND ASSOCIATED EQUIPMENT

NO. 1004A AND 1004B TOOL KITS

General

2.01 The No. 1004A and 1004B tool kits each consist of a current-supply set, welding pliers, contact stripping pliers, and other equipment described in this section. In the No. 1004A tool kit, the leads of the No. 577A welding pliers are permanently connected to the terminals of the welding transformer in the No. 102A current-supply set. In the No. 1004B tool kit shown in Fig. 1, the welding transformer of the No. 102B current-supply set has gold-plated terminals to which are connected the gold-plated terminal lugs on the leads of the No. 577B welding pliers. This arrangement provides a reliable, low-resistance connection between the transformer and welding pliers and permits the use of different types of welding pliers having leads with gold-plated terminal lugs.

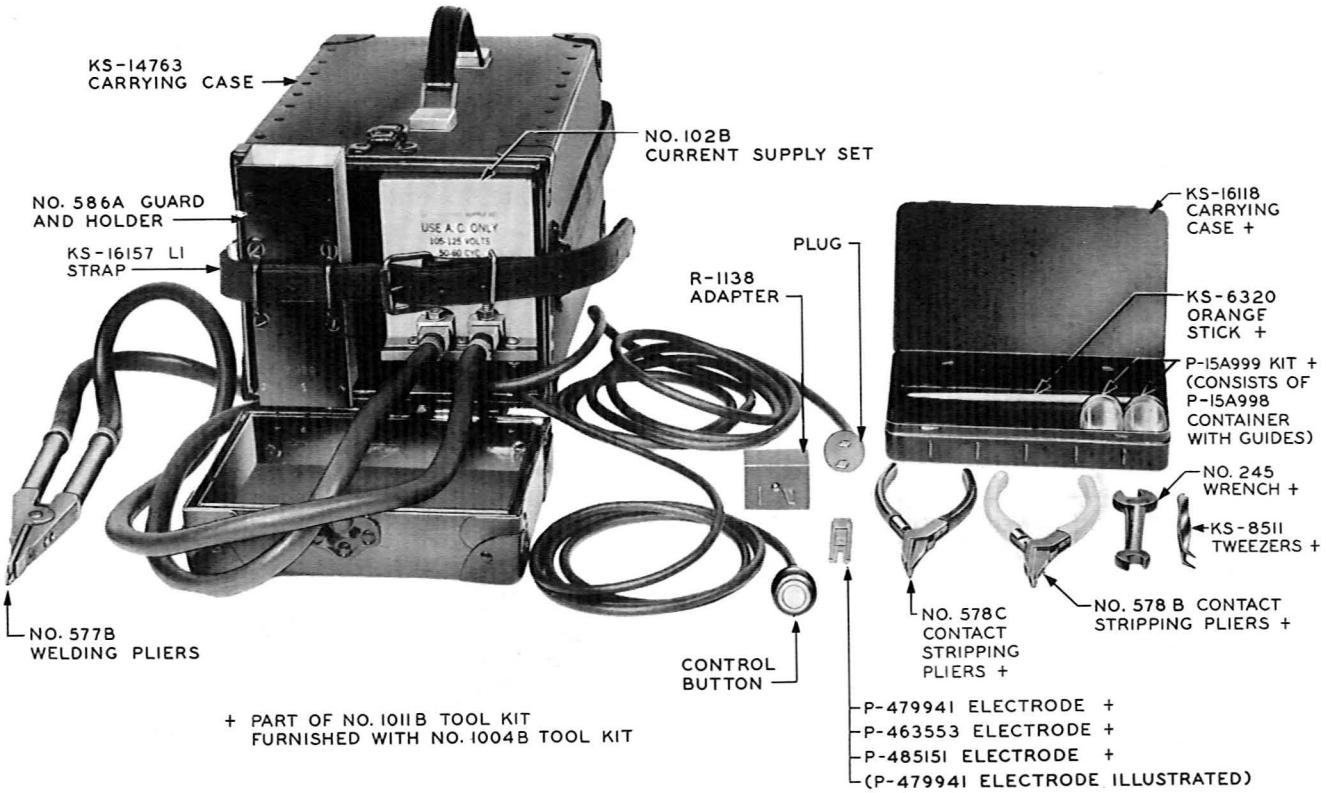


Fig. 1 — No. 1004B Tool Kit

No. 102A and 102B Current-Supply Sets

2.02 These sets are similar except for the welding plier connections noted in 2.01. The circuit of the current-supply sets is shown in Fig. 2. In addition to the welding transformer, this circuit contains an auxiliary transformer and rectifier which provide direct current at the proper voltage for operating the power and time-control relays. Both current-supply sets are equipped with a cord for connection to a 105/125-volt, 50/60-cycle ac power supply. They also have a second cord with a control button which, when depressed, causes the circuit to function and apply the proper welding current through the electrodes of the welding pliers for a predetermined interval. A 10-ampere plug-type fuse is connected in the circuit to the primary winding of the transformer. Access to this fuse is obtained by removing the current-supply set from its carrying case.

2.03 Referring to Fig. 2, when the power cord is connected to the proper supply and the control button is depressed, the circuit is closed through the auxiliary transformer and rectifier to operate the power relay. Operation of this relay closes the circuit to the welding transformer which supplies a high current at low voltage to weld the contact to the spring. The operation of the power relay also closes the circuit to operate the time control (U type) relay. This relay is a slow-operate relay and the welding current is connected to the electrodes only during the short time required for the relay to operate. Operation of the time-control relay opens the circuit of the power relay which releases, thereby opening the circuit to the welding transformer and cutting off the welding current. The time-control relay locks operated through its make contacts and the control button circuit, thereby preventing reoperation of the power relay if the control button is held depressed. Release of the control button returns the circuit to normal.

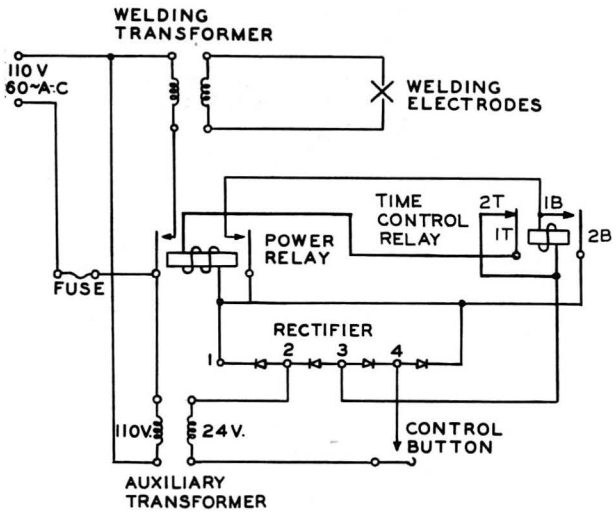


Fig. 2 – Contact Welder Circuit

No. 577A and 577B Welding Pliers

2.04 These welding pliers shown in Fig. 3 are similar except that the leads of the No. 577A pliers are permanently attached to the No. 102A current-supply set of the No. 1004A tool kit while the leads of the No. 577B pliers can be disconnected from the No. 102B current-supply set of the No. 1004B tool kit. The welding pliers are arranged to hold one fixed and one movable electrode. Different combinations of fixed and movable electrodes are required for welding contacts on various apparatus, as covered in Part 5 of this section. The welding pliers are furnished with one No. 20 movable electrode and one No. 11 fixed electrode.

2.05 The welding pliers are adjusted during manufacture to provide the proper welding pressure to the contact. If the pliers are equipped with the steel bushing referred to in 1.09, the pressure is not expected to change during the life of the pliers.

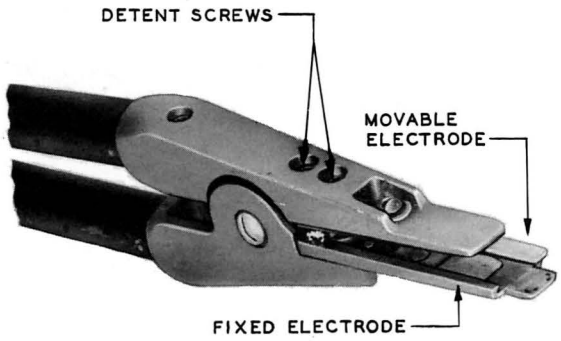


Fig. 3 – No. 577A and 577B Welding Pliers

Carrying Case

2.06 The KS-9715 carrying case is furnished with the No. 1004A tool kit and the KS-14763 carrying case with the No. 1004B tool kit to house the current-supply set and the tools of the respective kits. The carrying cases are similar except that the KS-14763 carrying case is longer than the KS-9715 to provide for the added length of the terminals of the No. 102B current-supply set and the terminal lugs of the No. 577B welding pliers.

Equipment Furnished With No. 1004A and 1004B Tool Kits

2.07 The items listed below are furnished as part of the No. 1004A and 1004B tool kits. The use of a number of these items is described briefly following the listing of the item or in the paragraph noted after the listing.

One — No. 586A tool (guard and holder for No. 577A or 577B tool)

One — R-1138 adapter (for power supply plug)

Four — P-125209 RHM screws
Four — P-283106 washers
— Used for holding the No. 102A or 102B current-supply set in the KS-9715 or KS-14763 carrying case, respectively

One — No. 1011A tool kit (No. 1004A tool kit) or No. 1011B tool kit (No. 1004B tool kit) containing the following items:

One — KS-16157, List 2 strap (No. 1004A tool kit)

One — KS-16157, List 1 strap (No. 1004B tool kit)

One — No. 245 wrench (No. 1011B tool kit)

One — No. 578B contact stripping pliers (see 2.08)

One — No. 578C contact stripping pliers (see 2.09)

Four — KS-6320 orange sticks

One — KS-8511 tweezers

One — P-479941 No. 10 electrode

One — P-463553 No. 12 electrode

One — P-485151 No. 21 electrode

Two — P-479942 kits (No. 1011A tool kit) each consisting of one P-478852 box containing all guides listed in 5.03, Table B, except the R, S, T, U, V, W, and X guides ←

Two — P-15A999 kits (No. 1011B tool kit) each consisting of one P-15A998 container with all guides listed in 5.03, Table B, except the R, S, T, U, V, W, and X guides ←

One — KS-8349 box (No. 1011A tool kit) or KS-16118 carrying case (No. 1011B tool kit) for holding all items of the respective tool kits

2.08 ***No. 578B contact stripping pliers*** are used to remove contacts from springs on all apparatus except step-by-step, wire-spring, and multicontact-type relays, crossbar switches, and the control springs of the KS-13835 reader.

2.09 ***No. 578C contact stripping pliers*** are used for removing contacts from all springs on step-by-step and multicontact-type relays except 229- and 230-type relays and crossbar switches. ← They are also used on offset springs on E-, U-, etc, type relays. For use on certain apparatus, the adjustable stop plate on the notched jaws of these pliers must be positioned, as covered in Section A504.101.2.

ASSOCIATED EQUIPMENT — NOT FURNIISHED WITH NO. 1004A AND 1004B TOOL KITS

2.10 The following items must be ordered, when necessary, as they are not furnished as part of the No. 1004A and 1004B tool kits. The use of these items is described briefly following the listing of the item or in the paragraph noted after the listing.

No. 1013A tool kit (for replacing contacts on wire-spring-type relays, see 2.11)

No. 578D contact stripping pliers (for removing control contacts on KS-13835 reader)

No. 578G contact stripping pliers (for removing contacts from all springs on 229- and 230-type relays)

No. 40 flat graver and No. 15 handle (for removing adhesive on the control contact springs of the KS-13835 reader where they are bonded to a fiber strip. The graver is supp'ied without a handle. Before using the graver, the Dixon No. 15 handle should be assembled on it.)

No. 640A spring spreader (for blocking control contact springs of the KS-13835 reader)

No. 179A gauge (guide for cutting worn tips of selector bank feeder brushes)

KS-16060 cutting pliers (for cutting worn tips of selector bank feeder brushes)

No. 395A feeder brush spacer (for holding selector bank feeder brushes while welding contacts)

No. 676A feeder brush spacer (for aligning feeder brushes when replacing selectors on the associated banks)

No. 13 electrode (for repairing selector bank feeder brushes)

No. 14 electrode (for replacing contacts on VON springs of 197-type switches)

No. 15 electrode (for replacing contacts on 229- and 230-type relays)

No. 22 electrode (for replacing reading and control contacts on KS-13835 reader and for replacing contacts on VON springs of 197-type switches)

R guide (for replacing reading contacts on KS-13835 reader)

S and T guides (for replacing contacts on VON springs on 197-type switches)

U, V, W, and X guides (for replacing contacts on 229- and 230-type relays)

Replacement contacts (see 1.05)

No. 1013A Tool Kit (Fig. 4)

2.11 The No. 1013A tool kit shown in Fig. 4 is used in conjunction with the No. 1004B tool kit for replacing contacts on wire-spring-type relays. The No. 1013A tool kit consists of the items listed below. The use of a number of these items is described briefly following the listing of the item or in the paragraph noted after the listing.

One — KS-16261 carrying case (for holding all items of the No. 1013A tool kit)

One — No. 636A tool (see 2.12)

One — No. 586B guard and holder (for holding No. 636A tool)

One — KS-16118 carrying case (for holding the following items):

One — P-15A994 container [for holding P-10A949 contacts (fixed)]

One — P-16A181 container [for holding P-16A180 contacts (twin)]

One — P-15A995 container [for holding P-19A353 contacts (fixed)]

One — No. 578E contact stripping pliers (see 2.13)

One — No. 627A armature blocking tool

One — No. 628A balancing spring lifter

One — No. 629A spring holder

One — No. 629B spring holder

One — No. 630A spring holder with detachable clamp

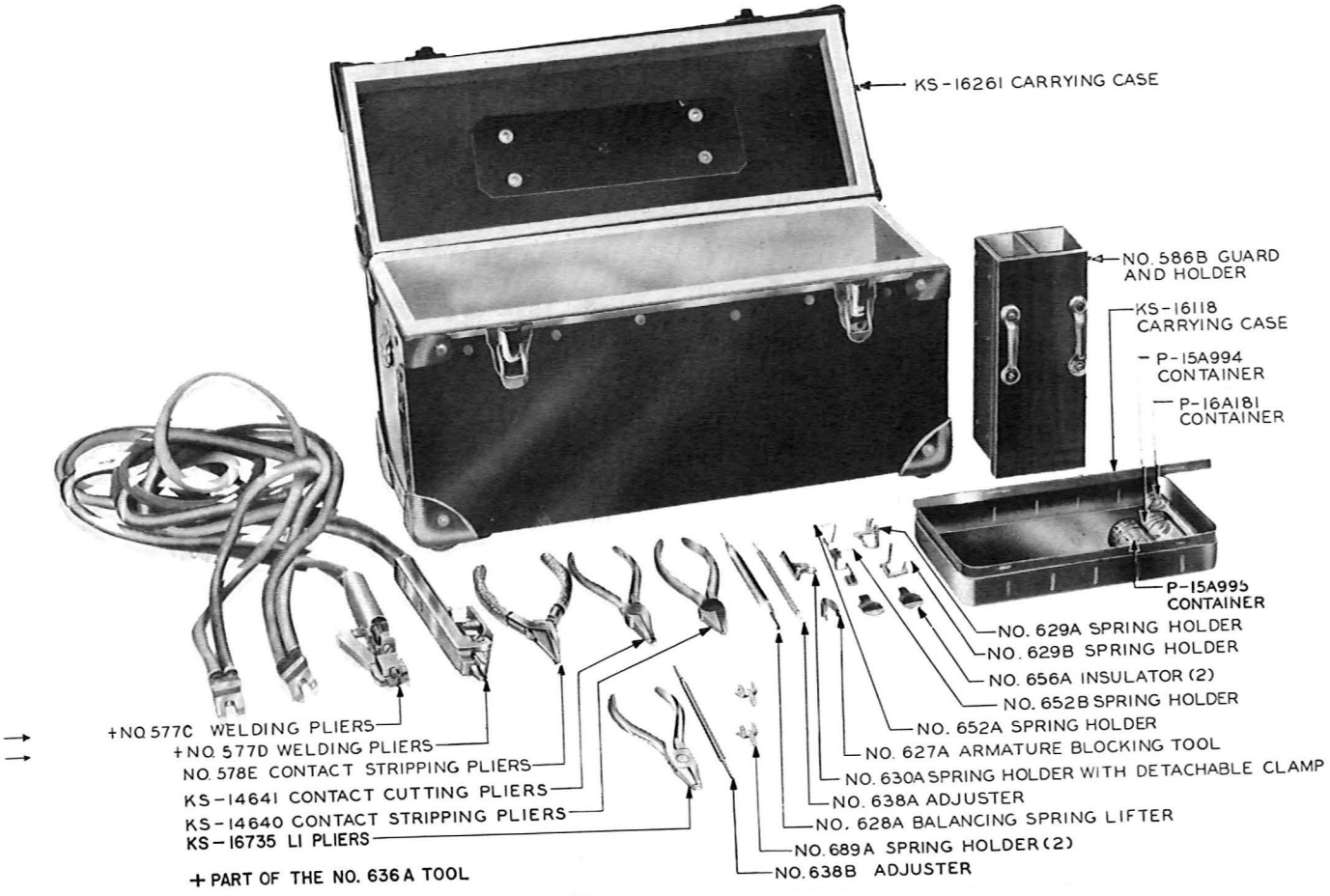


Fig. 4 — No. 1013A Tool Kit

One — No. 638A adjuster

One — No. 638B adjuster

One — No. 652A spring holder

One — No. 652B spring holder

Two — No. 656A insulators

Two — No. 689A spring holders

One — KS-14640 contact stripping pliers (see 2.14)

One — KS-14641 contact cutting pliers (see 2.15)

One — KS-16735 List 1 cutting pliers (see 2.16)

2.12 ***No. 636A Tool:*** The No. 636A tool consists of the No. 577C and 577D welding pliers and associated leads. The No. 577C welding pliers are used to weld contacts on the fixed contact springs of wire-spring-type relays and the No. 577D welding pliers are used to weld contacts on the movable twin springs of these relays.

2.13 ***No. 578E Contact Stripping Pliers:*** These pliers are used to remove contacts from the movable twin springs of wire-spring-type relays.

2.14 ***KS-14640 Contact Stripping Pliers:*** These pliers are used to remove contacts from the fixed springs of wire-spring-type relays.

2.15 *KS-14641 Contact Cutting Pliers:* These pliers are used to cut the P-16A180 contact tape after a portion of it has been welded to a movable twin spring of a wire-spring-type relay.

2.16 *KS-16735 List 1 Cutting Pliers:* These pliers are used for cutting the end of the fixed contact spring of wire-spring relays after the contact has been removed to obtain a better alignment between the replacing contact on the fixed spring and the mating contacts on the movable springs.

3. LIST OF TOOLS, GAUGES, MATERIALS, AND TEST APPARATUS

CODE OR SPEC NO.	DESCRIPTION
TOOLS	
508A	Armature Blocking Tool
KS-2663	File
—	3-inch C Screwdriver (or the replaced 3-inch Cabinet Screwdriver)
—	4-inch E Screwdriver (or the replaced 4-inch Regular Screwdriver)
—	V-Notch Diagonal Pliers
GAUGES	
→79B	0-1000 Gram Push-Pull Tension Gauge
131A	Thickness Gauge Nest
→171A	Thickness Gauge Nest
KS-6938	Thickness Gauge Nest
→R-8550	Scale
MATERIALS	
→KS-6824	Sealing Compound
—	Bell Seal Bond Paper (or equivalent)
TEST APPARATUS	
35 Type	Test Set
—	Weston Model No. 931 Voltmeter (scale 300/150/75/30 V) (or equivalent)

4. MAINTENANCE REQUIREMENTS

No. 102A and 102B Current-Supply Sets

4.01 *General:* When necessary to check or readjust relays in the No. 102A and 102B current-supply sets, make sure that the set is disconnected from the power supply. Remove the current-supply set from its carrying case by removing the mounting screws from the bottom of the case with the 4-inch E screwdriver.

4.02 *Time-Control Relay:* The time-control (U type) relay in the contact welder circuit (Fig. 2) shall meet the requirements specified in Section A461.011 in accordance with the following information.

(a) ***Armature Travel*** 0.035 inch

(b) ***BSP Fig. No.*** 144/101

(c) ***Test Clip Data***

CONN BAT.	CONN GRD	TEST SET PREP	INSULATE
2T (time-control relay)	1B (time-control relay)	NGB	1B (time-control relay)

(d) ***Electrical Requirements***

	TEST	READJUST
Operate	13.2 ma	12.5 ma
Nonoperate	9.6 ma	10.1 ma

4.03 *Power Relay:* The power relay in the contact welder circuit (Fig. 2) shall meet the following requirements:

(a) ***Test Clip Data***

CONN BAT.	CONN GRD	TEST SET PREP	BLOCK
1T (time-control relay)	2B (time-control relay)	NGB	Time-control relay operated

(b) Contacts shall make with the relay electrically energized against a 0.030-inch gauge and shall not make with the relay electrically energized against a 0.037-inch gauge.

Use the KS-6938 gauge.

(c) The contact separation measured at the lower edge of the bottom contact shall be

Min 0.074 inch

Use the No. 131A gauge.

(d) *Electrical Requirements*

	TEST	READJUST
Operate	100 ma	95 ma
Hold	60 ma	57 ma
Release	40 ma	42 ma

4.04 *Rectified Voltage:* The dc voltage supplied from the rectifier (Fig. 2) at the winding terminals of the time-control relay shall be

Min 15 volts

To check this voltage, proceed as follows.

(a) On the No. 102B current-supply set, disconnect the welding plier leads from the current-supply set terminals using the No. 245 wrench. On the No. 102A current-supply set, insert a sheet of paper between the electrodes of the welding pliers and place the pliers so as to avoid shorting the electrodes.

(b) Connect the power cord to a 105- to 125-volt ac supply.

(c) Block the time-control relay in the unoperated position with the No. 508A armature blocking tool.

(d) Connect the 35-type test set or the Weston Model No. 931 voltmeter across the winding of the time-control relay and check the voltage indicated when the control button is depressed.

(e) If the voltage is below the specified minimum, it is an indication that the rectifier (No. 23A varistor or the KS-15657, List 7 rectifier stack) is not functioning properly.

5. REPLACEMENT OF PARTS — WELDING PLIERS AND ASSOCIATED EQUIPMENT

Ordering Information

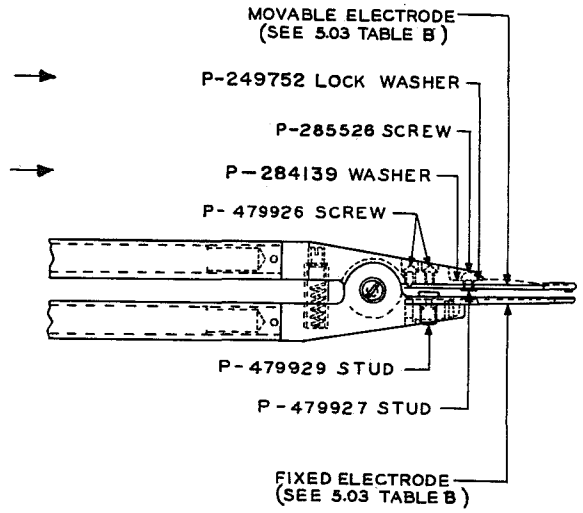
5.01 The figures in this part show the parts of the welding pliers and current-supply set which may be replaced in the field as follows. No. 577A and 577B welding pliers (Fig. 5); No. 577C welding pliers (Fig. 6); No. 577D welding pliers (Fig. 7); and No. 102B current-supply sets (Fig. 8). These parts are shown in proper relation to associated parts. The piece-part numbers and names of replaceable parts as listed by the Western Electric Company Merchandising Department are given on the figures. No attempt should be made to replace parts not designated.

5.02 When ordering parts for replacement purposes, give the piece-part number as well as the name of the part, for example, P-479941 Electrode. Do not refer to the BSP number or any other explanatory information.

5.03 Table B lists the designations of electrodes and guides with reference to their use in replacing contacts on the apparatus covered in Section A504.101 subdivisions. Table C which supplements Fig. 5 and Table B lists the ordering information for the various electrodes and guides which can be used on the welding pliers shown in Fig. 5.

TABLE B — ELECTRODES AND GUIDES — DESIGNATIONS

TYPE OF APPARATUS	TYPE OF SPRING	ELECTRODE DESIGNATIONS FIXED	ELECTRODE DESIGNATIONS MOVABLE	GUIDE DESIGNATIONS
E- and similar-type relays	All	11	20	D
U-, Y-, and UA-type relays	All	11	20	A
UB-type relays	Solid	12	21	P
	Bifurcated	12	21	N



NOTE 1 - NO. 577A TOOL NOT REPLACABLE IN FIELD AS LEADS ARE PERMANENTLY CONNECTED TO NO. 102A CURRENT SUPPLY SET.

NOTE 2 - NO. 577B TOOL INCLUDING LEADS REPLACABLE IN FIELD AS LEADS ARE DETACHABLE FROM NO. 102B CURRENT SUPPLY SET.

Fig. 5 – No. 577A and 577B Welding Pliers

TABLE B — ELECTRODES AND GUIDES — DESIGNATIONS (Cont)

TYPE OF APPARATUS	TYPE OF SPRING	ELECTRODE DESIGNATIONS FIXED	MOVABLE	GUIDE DESIGNATIONS
Step-by-step-type relays	L shaped	10	20	E
	Straight	10	20	F
	Front contact spring	15*	22*	W* and U*
229- and 230-type relays	Armature spring	15*	22*	V* and X*
	Transfer	15*	22*	W* and U*
	Break spring			
245- and 254-type relays	Solid	11	20	H
	Bifurcated	11	20	J
263- and 264-type relays	Solid	11	20	A
	Bifurcated	11	20	B
197-Type Switches				
VON Springs	Solid	14*	22*	S* and T*
Rotary interrupter springs	Solid	14*	22*	S* and T*

TABLE B — ELECTRODES AND GUIDES — DESIGNATIONS (Cont)

TYPE OF APPARATUS	TYPE OF SPRING	ELECTRODE DESIGNATIONS FIXED	MOVABLE	GUIDE DESIGNATIONS
300- to 303-Type Crossbar Switches				
Select off-normal	Solid	11	21	H
	Bifurcated	11	21	J
Hold off-normal	All	11	21	C
Cross-points	Solid	11	21	M
	Bifurcated	11	21	L
304- to 308-, 314-, 315-, 318-, 324-, 325-, 328-334-, and 338-Type Crossbar Switches				
Select off-normal	Solid	11	21	H
	Bifurcated	11	21	J
Hold off-normal	#	11	21	A
Cross-points	Solid	11	21	M
	Bifurcated	11	21	L
KS-13835 Reader				
Control springs	All	11	22*	A
Reading springs	Solid (movable)	11	22*	R*
200-, 202-, 206-, 208-, 209-, 211-, and 1202-Type Selectors				
10-, 11-, 26-, 27-, and 32-type banks	One-piece feeder brush	13*	21	—
Wire-Spring-Type Relays				
AF-, AG-, AJ-, and AK- type relays	Fixed	See Fig. 6		—
	Movable	See Fig. 7		—
286-, 287-, and 288- (multi-contact) type relays	Fixed	See Fig. 6		—
	Movable	See Fig. 7		—

#All springs, except those of the two break combinations on 324-, 325-, and 328-type switches. In the case of the two break combinations, replace the spring assembly.

*The No. 13, 14, 15, and 22 electrodes and the S, T, R, U, V, W, and X guides are not included as part of the No. 1004A or 1004B tool kits.

TABLE C — ELECTRODES AND GUIDES — ORDERING INFORMATION

ELECTRODE DESIGNATION	ORDERING INFORMATION
10	P-479941 Electrode
11	P-479940 Electrode
12	P-463553 Electrode
13	P-11A860 Electrode
14	P-10B920 Electrode
15	P-12B022 Electrode
20	P-480215 Electrode
21	P-485151 Electrode
22	P-10A665 Electrode

GUIDE DESIGNATION	ORDERING INFORMATION
A	P-479918 Guide
B	P-479919 Guide
C	P-479920 Guide
D	P-479921 Guide
E	P-479922 Guide
F	P-479923 Guide
H	P-480371 Guide
J	P-480372 Guide
L	P-480374 Guide
M	P-482265 Guide
N	P-485148 Guide
P	P-485149 Guide
R	P-485150 Guide
S	P-10B923 Guide
T	P-11B200 Guide
U	P-12B328 Guide
V	P-12B329 Guide
W	P-12B330 Guide
X	P-12B331 Guide

REPLACEMENT PROCEDURES

5.04 No replacement procedures are given for screws or other parts where the procedure consists of a simple operation.

No. 577A and 577B Welding Pliers

5.05 Since it is necessary to change electrodes and guides on these pliers in order to weld contacts on the different types of apparatus covered in Section A504.101.2, the procedures for replacing the electrodes and guides are given in that section.

No. 577C and 577D Welding Pliers (No. 636A Tool)

5.06 Before replacing the electrodes on either the No. 577C or 577D welding pliers, disconnect the welding plier leads from the terminals of the No. 102B current-supply set, using the No. 245 wrench.

No. 577C Welding Pliers

5.07 The No. 577C welding pliers have two replaceable electrodes which form the jaws of the pliers. The third electrode on which the replacing contact is positioned (contact electrode) is not replaceable in the field. Before replacing either the movable or fixed jaw electrode, make sure that the contact electrode is in the latched position. To latch, pull the electrode back toward the handle of the pliers until the latch spring engages the projection on the electrode.

5.08 ***Movable Jaw Electrode:*** Fig. 6 — Hold the electrode jaws open and remove the movable jaw electrode mounting screws with the 3-inch C screwdriver. Remove the electrode. Position the new electrode in the pliers so that it

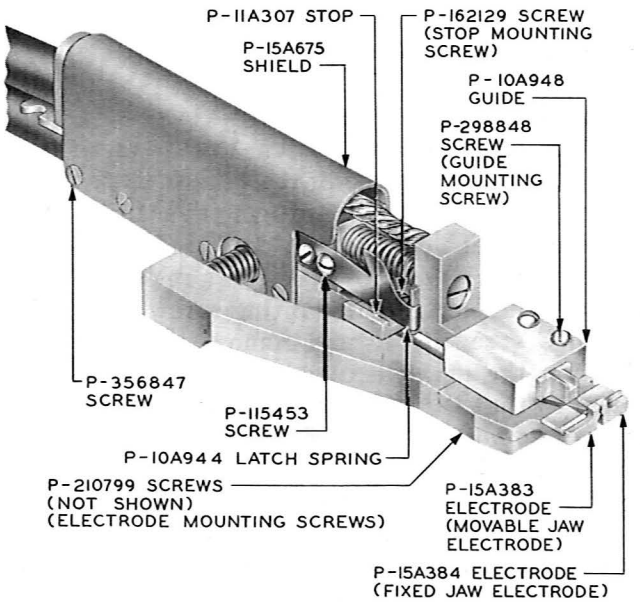


Fig. 6 — No. 577C Welding Pliers

faces the fixed jaw electrode and align the holes in the electrode with the corresponding mounting holes in the pliers. Insert and tighten the electrode mounting screws, taking care not to exert force which would be sufficient to damage the threads in the electrode. Allow the electrode jaws to close.

5.09 ***Fixed Jaw Electrode:*** Fig. 6 — Remove the guide mounting screws, using the 3-inch C screwdriver. Then, hold the electrode jaws open and remove the fixed jaw electrode mounting screws with the screwdriver. Position the new electrode on the pliers so that it faces the movable jaw electrode and align the holes in the electrode with the corresponding mounting holes in the pliers. Insert and tighten the electrode mounting screws, taking care not to exert force which would be sufficient to damage the threads in the electrode. Align the holes in the guide with the corresponding holes in the electrode. Insert and tighten the guide mounting screws, again taking care not to exert force which would be sufficient to damage the threads in the electrode. Release the latch and allow the contact electrode to move forward to the welding position. Check that the contact electrode is centered with respect to the jaw electrodes. If necessary, loosen the guide and the stop and guide mounting screws and shift the contact electrode, as required. Tighten the mounting screws and place the contact electrode in the latched position.

No. 577D Welding Pliers — Fig. 7

5.10 To replace either of the electrodes, proceed as follows. Lock the jaws of the pliers open by depressing the handle so that the catch can be swung to an upright position over the handle. Then, release the handle, making sure the catch engages the recess in the handle. Remove the electrode mounting screw, using the 3-inch C screwdriver and remove the electrode. Position the new electrode in the recess in the pliers so that it faces the other electrode and its mounting hole is in alignment with its corresponding hole in the pliers. In the case of the fixed electrode, make sure that the electrode is positioned under the spring in the pliers. Insert and tighten the mounting screw, taking care not to exert force which would be sufficient to strip the threads in the electrode.

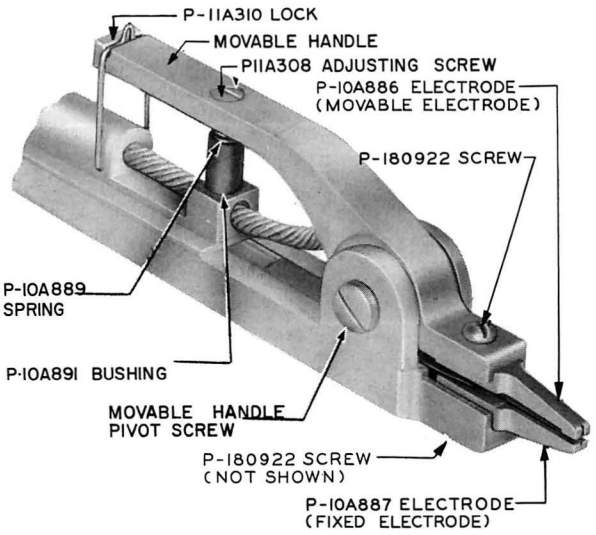


Fig. 7 — No. 577D Welding Pliers

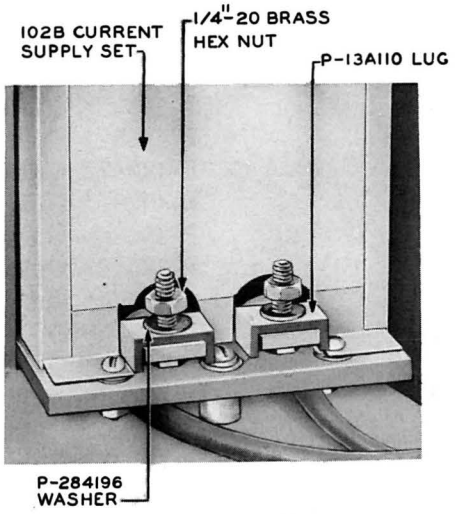


Fig. 8 — No. 102B Current-Supply Set

6. SUBSTITUTION OF STEEL FOR NONMETALLIC BUSHING ON NO. 577D WELDING PLIERS (PART OF NO. 636A TOOL)

6.01 As initially manufactured, the No. 577D welding pliers were equipped with a nonmetallic bushing to act as a stop for the movable handle and enclose the spring that exerts the pressure to hold the electrodes closed during welding. Later, a steel bushing and spring of slightly larger diameter were adopted to provide more reliable electrode pressure during use of the pliers. The pliers should be equipped with the

steel bushing and larger diameter spring as covered in 6.02 through 6.06 as soon as practicable to insure continued reliable operation of the pliers.

6.02 Remove the sealing compound over the adjusting screw in the movable handle of the pliers using the No. 40 flat graver equipped with No. 15 handle. Take care not to damage the screw threads in the handle of the pliers when removing the compound with the graver.

6.03 Remove the adjusting screw with the 3-inch C screwdriver. Substitute the new bushing and spring. Remount the adjusting screw with the screw underflush with the top of the handle to permit application of sealing compound above the screw. Adjust the electrode pressure and separation between electrodes as covered in 6.04 and 6.05. Remove the spring and cut off turns of the spring in 1/2 turn steps with the diagonal pliers if this is necessary to obtain the required adjustments with the adjusting screw underflush. Smooth the cut end of the spring with the KS-2663 file.

6.04 ***Adjusting Electrode Pressure***

(1) Clamp the handle, that mounts the fixed electrode, in a vise with the movable jaw pivot screw vertical and the movable jaw free to operate.

(2) Unlatch the pliers. Open the jaws of the pliers by compressing the movable handle. Hold the 0.016-inch gauge of the No. 171A gauge nest vertically below the electrodes and insert the gauge between the electrodes so that the square end of the gauge is in line with the groove in each electrode. Release the handle of the pliers so that the gauge is held between the electrodes.

(3) Apply the finger of the No. 79B gauge to the tip of the movable electrodes. Check whether the gauge is released when a pull of from 495 to 585 grams is exerted on the movable electrode. Turn the adjusting screw clockwise with the 3-inch C screwdriver to increase the pressure or counterclockwise to decrease the pressure.

(4) After adjusting the electrode pressure with the adjusting screw underflush with the top of the handle (see 6.03) check the separation between electrodes, as covered in 6.05.

6.05 ***Adjusting Seperation Between Electrodes:*** Unlatch and fully compress the welding plier handles. Measure the separation at the tip of the electrodes with the R-8550 scale. If the separation is less than 3/32 inch, turn the adjusting screw counterclockwise with the 3-inch C screwdriver to increase the separation. If the position of the adjusting screw is changed, recheck the adjustment for electrode pressure, as covered in 6.04.

6.06 ***Application of Sealing Compound:*** After adjusting the electrode pressure and separation between electrodes with the adjusting screw underflush with the top of the handle, fill the hole above the adjusting screw with the KS-6824 sealing compound.

REASONS FOR REISSUE

1. To revise the notes for Section A504.101.5 (1.04).
2. To revise Table A.
3. To add information on substitution of steel for nonmetallic bushing on No. 577D welding pliers (1.09).
4. To omit a reference for conversion of No. 1004A tool kits by the Western Electric Company (2.01).
5. To revise Fig. 1.
6. To omit the boxes for holding contact from the list of items furnished with No. 1004A and 1004B tool kits (2.07).
7. To revise Fig. 4.
8. To revise the List of Tools, Gauges, Materials, and Test Apparatus (Part 3).
9. To add information on tools required for replacing contacts on 229- and 230-type relays (2.10, Table B, and C).
10. To revise Fig. 7.
11. To add procedures for substitution of steel for nonmetallic bushing of No. 577D welding pliers (Part 6).