

**KS-16363 WIRE-WRAPPING TOOLS  
AND ASSOCIATED BITS AND STATIONARY SLEEVES  
REQUIREMENTS AND ADJUSTING PROCEDURES**

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**1. GENERAL**

**1.01** This section covers the KS-16363, L1 (Mfr Disc.), the KS-16363, L2 (Mfr Disc.), and the KS-16363, L3, wire-wrapping tools. The associated wrapping bits and stationary sleeves are also covered. The KS-16363, L1, wrapping tool with bit and

sleeve is shown in Fig. 1. The KS-16363, L2 and L3, are shown in Fig. 2.

**1.02** The reasons for reissuing this section are listed below. Revision arrows are used to emphasize the more significant changes. The Equipment Test List is affected.

(1) To delete the requirement of returning wrapping bits to the Western Electric distributing house

(2) To add a warning covering the inspection of wire wrapping bits

(3) To update the practice to standard format.

**1.03** The following Bell System Practices are referenced within this section:

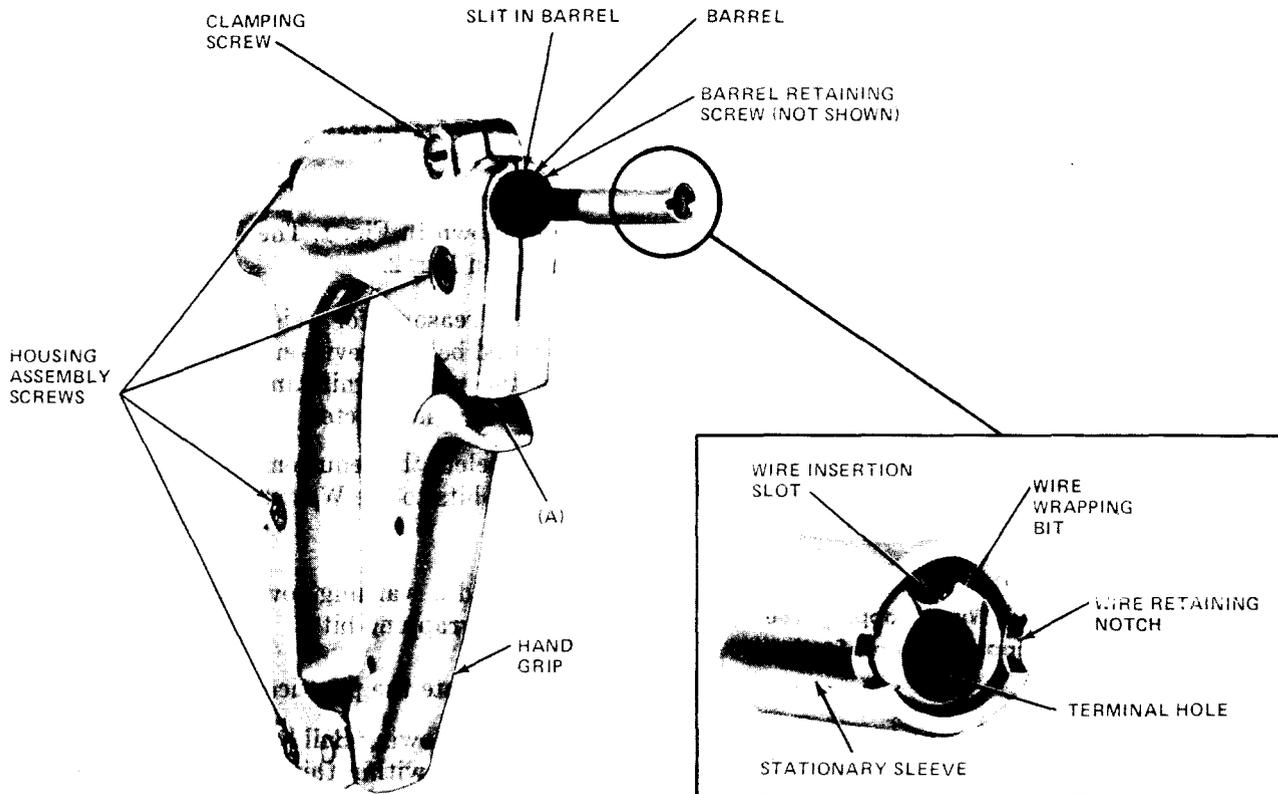
SECTION	TITLE
020-010-711	Apparatus—General Requirements and Definitions
069-132-811	Punched or Wire-Type Terminals (Not Having Notches or Perforations)—Method of Making and Removing Wrapped Connections

**1.04** The identification and use of wrapping bits and stationary sleeves are covered in Section 069-132-811, describing the method of making and removing wrapped connections. Bits and sleeves having the same color code as indicated by a painted band on the bit or a plastic band on the sleeve are used together.

**Note:** Some old KS-16903, L1, bits may have a green band instead of yellow. These should be used with the yellow color coded KS-20963, L3, sleeve.

**NOTICE**

Not for use or disclosure outside the  
Bell System except under written agreement



**Fig. 1—KS-16363, L1, Hand Wire-Wrapping Tool and Associated Wrapping Bit and Stationary Sleeve**

**1.05** The KS-16363, L2 and L3, hand wire-wrapping tools are essentially the same. The difference is the List 2 model has an aluminum housing while the List 3 model has an insulated plastic housing and is electrically insulated.

**1.06** The KS-16363, L2, and L3 (Fig. 2) wire-wrapping tools have a universal hand tightened chuck which simplifies the attachment of the KS-20963 sleeve. This brings the KS-16363, L2 and L3, wire-wrapping tools into conformity with all other Bell System wire-wrapping tools. The KS-21232, L1, electric-powered wire-wrapping tool for 20- through 30-gauge wire also has the same type chuck; therefore, all current and future sleeves will fit interchangeably in either hand tools or powered tools. The old wire-wrapping sleeves, KS-16363, L32 and L33 (Mfr Disc.), will not fit into the new chuck on the KS-16363, L2 or L3, wire-wrapping tools.

**1.07** The KS-20963, L2 and L3, sleeves, pressing up against the tang of the wire-wrapping bit, has caused jamming of the wire-wrapping tools. To prevent this, a wire-retaining ring has been added to the KS-20963, L2 and L3, wire-wrapping sleeves. The retaining ring on the sleeves prevents jamming as this ring butts up against the end of the collet.

**1.08** The normal position of the hand grip is that position in which the hand grip rests against the normal stop in the housing. This stop may be observed through the slot between the two halves of the housing when the hand grip is partially operated.

**1.09** The fully operated position of the hand grip is that position in which the hand grip has moved the bumper spring against the bumper-spring stop in the housing. In this position the inner edge of the hand grip is approximately 1/16 inch from the inner end of the slot between the two halves of the housing.

1.10 For additional information necessary for proper application of the requirements listed herein, reference shall be made to Section 020-010-711, Apparatus General Requirements and Definitions.

1.11 One drop of KS-7470 oil, for the purpose of the section, is the amount of oil discharged from the nozzle of the 486A oil can when the sides are depressed until a drop is released.

1.12 One discharge of KS-7471 grease, for the purpose of this section, is a column of grease approximately 1/8 inch long discharged from the nozzle of the 353C grease gun.

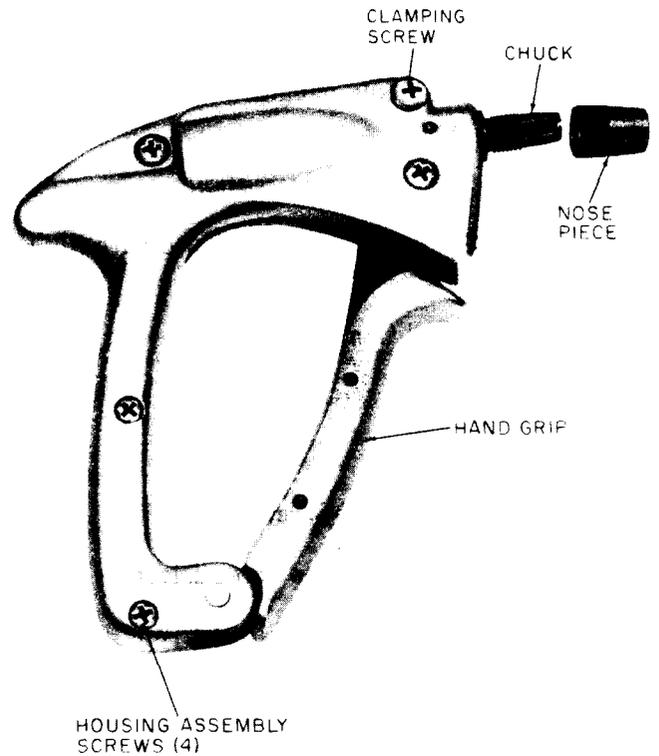


Fig. 2—KS-16363, L2 and L3, Wire-Wrapping Tools

1.13 Table A is an index of requirements and adjusting procedures included in Parts 3 and 4.

TABLE A

REQUIREMENT AND ADJUSTING PROCEDURE INDEX

TITLE	REQUIREMENT PARAGRAPH NO.	PROCEDURE PARAGRAPH NO.
Cleaning and Verification of Wrapping Bit and Stationary Sleeve	3.01	4.01
Cleaning and Lubrication of Wire-Wrapping Tool	3.02	4.02
Position and Alignment of Stationary Sleeve and Alignment of Wrapping Bit	3.03	4.03
Freedom of Operation	3.04	4.04
Hand-Grip Pull	3.05	4.05

## 2. APPARATUS

2.01 *List of Tools, Gauges, and Materials:*

The following tools, gauges, and materials are used in this section:

TOOLS	DESCRIPTION
353C	Grease Gun (Equipped with 570A Straight Nozzle)
486A	Oil Can
KS-2663	File
R-2969	Brush
◆AT-7825◆	4-inch E Screwdriver
◆AT-7739◆	No. 1 B-type Screwdriver
◆AT-7739◆	No. 2 B-type Screwdriver
—	Reading Glass
<b>GAUGES</b>	
79B	Gauge (0-1000 Gram Push-Pull Tension Gauge)
<b>MATERIALS</b>	
KS-2423	Cloth
KS-7470	Oil
KS-7471	Grease
KS-7860	Petroleum Spirits

## 3. REQUIREMENTS

3.01 *Cleaning and Verification of Wrapping Bit and Stationary Sleeve:*

**Requirements** (a) and (b) will be checked once a month. The bit and sleeve will be gauged by sight using a reading glass. The monthly check of requirement (b) is intended to provide the first warning that parts may have deteriorated so their further use is undesirable. To check the cleaning and verification of the wrapping bit and stationary sleeve, proceed as follows:

◆**Warning:** *It should be understood that without maintenance, wire wrapping bits have a limited useful life of approximately 30,000 to 50,000 connections. Accumulations of tin plating, insulation, and dirt may cause the bit to produce*

*poor connections or render the wrapped wire exceedingly brittle. All bits should be visually inspected periodically as covered in (a) and (b) and replaced after a maximum of 50,000 wraps.◆*

(a) Gauge by sight and feel to determine if the terminal hole and wire insertion slot of the wrapping bit are free from accumulations of foreign matter. To check this requirement, insert a length of uninsulated 24-gauge wire to the bottom of the hole (approximately 3/4 inch) and the inner end of the slot (approximately 2 inches) and then withdraw the wire. Note whether the wire enters freely to the full length (approximately 2 inches) and whether any particles of foreign matter are removed as the wire is withdrawn.

(b) The outer end of the stationary sleeve and wrapping bit will be free of corrosion and will not be appreciably worn or deformed. The radial surface at the outer end of the wire insertion slot of the wrapping bit will be bright and will be free from pits, excessive wear, and patches of metallic particles deposited during wire-wrapping operations (Fig. 3).

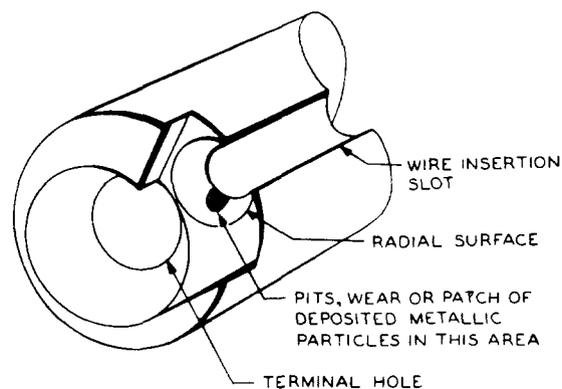
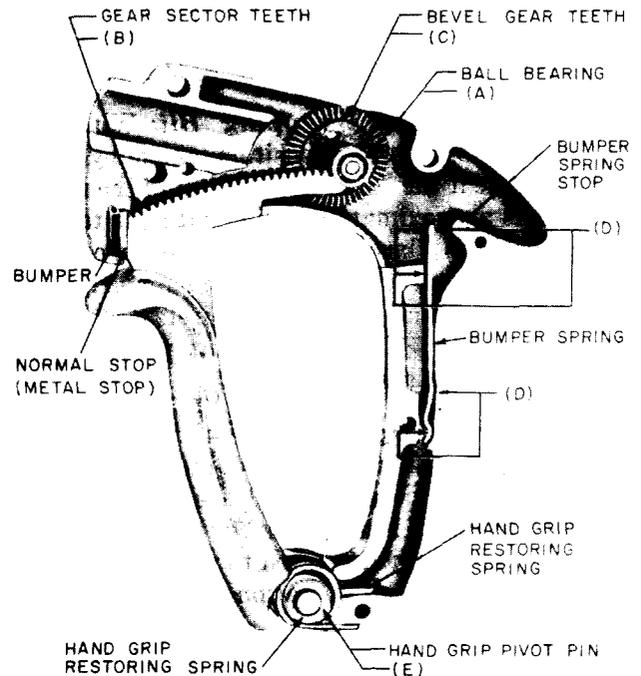


Fig. 3—Outer End of Wrapping Bit—Conditions Which May Occur on Radial Surface

**3.02 Cleaning and Lubrication of Wire-Wrapping Tool:** To check the need for cleaning and lubrication, proceed as follows:

- (a) The following parts shall be adequately lubricated. When lubrication is necessary, the lubricant and the amounts to be applied are as follows:

PART	LUBRICANT AND AMOUNT
Ball Bearings, Fig. 4(A)	Space between inner and outer races of both ball bearings filled with KS-7471 grease
Teeth on Gear Sector, Fig. 4(B)	Five discharges of KS-7471 grease from the 353C grease gun distributed over the teeth
Teeth on Bevel Gear, Fig. 4(C)	Eight discharges of KS-7471 grease distributed over the teeth
Bumper Spring, Fig. 4(D)	One discharge of KS-7471 grease distributed over the five contacting surfaces indicated
Hand-Grip Pivot Pin, Fig. 4(E)	One drop of KS-7470 oil



**Fig. 4—KS-16363, L1, Wire-Wrapping Tool—Interior View Showing Gearing and Associated Parts**

- (b) **Recommended Lubrication Intervals:**  
Parts shall be lubricated annually. This interval may be extended if periodic inspections have indicated and local conditions are such as to insure that the parts will be adequately lubricated during the extended interval.

**3.03 Positioning and Alignment of Stationary Sleeve and Alignment of the Wrapping Bit:** To determine if the stationary sleeve is properly positioned and aligned, and that the wrapping tool is properly aligned, proceed as follows:

- (a) **Positioning and Alignment of the Stationary Sleeve:** To check the positioning and alignment of the stationary sleeve, proceed as follows:

- (1) When using the older type of sleeve, gauge by sight to determine if the shoulder of the stationary sleeve seats against the barrel. If using the new KS-20963 type sleeve, insert the sleeve into the barrel chuck with the flared portion of the sleeve in the "12 o'clock" or top position. Make sure the sleeve does not restrict the rotation of the bit as no shoulder is provided on these sleeves.

(2) The stationary sleeve shall be held firmly in the barrel. This will be gauged by feel to verify that the stationary sleeve is secure.

(b) **Alignment of Wrapping Bit:** With the hand grip in normal position, gauge by sight to determine if the wire insertion slot of the wrapping bit is approximately in line with the top (12 o'clock position) flared area of the sleeve. To check this requirement, fully operate the hand grip several times allowing it to return unretarded to the normal position. The requirement will be met after each operation.

**3.04 Freedom of Operation:** With the wrapping bit and stationary sleeve mounted in the tool, the hand grip will operate and release smoothly and without bind when it is moved slowly to the fully operated position and then allowed to return slowly to the normal position. This operation will be gauged by feel.

**3.05 Hand-Grip Pull:** To test the hand-grip pull, proceed as follows:

(a) The pull required to just move the hand grip from the normal position (Fig. 1, Location A) will be a minimum of 600 grams and a maximum of 1000 grams. To determine this, use the 79B gauge applied to the hand grip adjacent to the housing.

(b) As the hand grip is pulled slowly to its fully operated position, gauging by feel, there will be an appreciable increase in the resistance to pull when the hand grip is approximately 1/4 inch from the fully operated position. To check this requirement, proceed as follows:

(1) With the hand grip in the fully operated position, mark a pencil line on the housing in line with the outer edge of the portion of the grip which enters the housing. Then mark another line on the housing, 1/4 inch from the first line toward the unoperated position of the hand grip.

(2) Hold the tool between the thumb and two fingers with the fingers on the upper portion of the hand grip.

(3) Slowly operate the hand grip and note the point at which the increased resistance occurs with respect to the mark on the housing

toward the unoperated position. The increased resistance to hand-grip pull is due to engagement of the hand grip with the bumper spring in the housing.

#### 4. ADJUSTING PROCEDURES

**4.01 Cleaning and Verification of Wrapping Bit and Stationary Sleeve:** To clean and verify the condition of the wrapping bit and stationary sleeve, proceed as follows:

(1) Using a 5-inch length of clean, straight, uninsulated 24-gauge wire, insert the wire without forcing it into the wire insertion slot to the full length of the slot (approximately 2 inches). Hold the exposed length of wire with the fingers at a point approximately 2 inches from the end of the bit. Hold the tool so the bit faces downward and fully operate and release the hand grip three times. Remove the wire. Repeat this procedure to clean the terminal hole using a 5-inch length of clean, straight, uninsulated 24-gauge wire inserted approximately 3/4 inch to the bottom of the hole.

(2) If the stationary sleeve and/or wrapping bit do not meet requirements covered in subparagraph 3.01(b), replace the part.

**4.02 Cleaning and Lubrication of Wire-Wrapping Tool:** To clean and lubricate the wire wrapping tool, proceed as follows:

(1) In order to clean and lubricate the wire-wrapping tool, first separate the halves of the housing and remove parts, as covered in (2) through (4).

(2) Place the tool on a flat surface. Remove the clamping screw using the 4-inch regular screwdriver. Remove the four housing assembly screws using the No. 2 B-type screwdriver. Do not remove the barrel retaining screw on the KS-16363, L1, tool, as shown in Fig. 1. Remove the wrapping bit and stationary sleeve.

(3) Carefully separate the two halves of the housing. If necessary, gently pry them apart with the 4-inch E screwdriver at the sections adjacent to the clamping screw hole and near the pivot pin. Take care not to burr the edges of the housing. If

a burr should be formed, remove it using the KS-2663 file. As the two halves are separated, take care not to lose parts which may drop from the housing (stop, bumper, and bumper spring shown in Fig. 5).

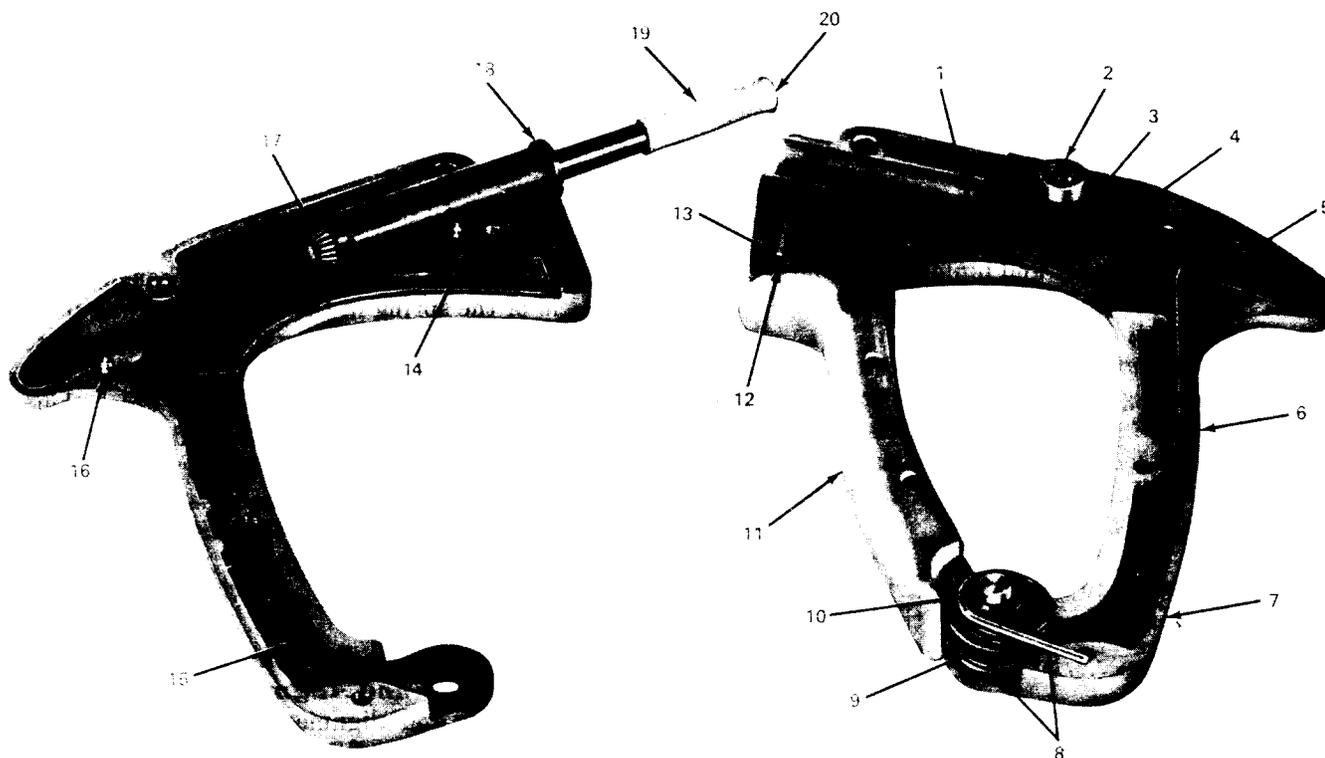
- (4) Remove the metal stop, bumper, and bumper spring. Swing the hand grip aside sufficiently to clear the bevel gear and pinion and remove the gear, pinion, and ball-bearing assembly.
- (5) Clean the interior of both halves of the housing and the gears using a KS-2423 cloth moistened with KS-7860 petroleum spirits. Then wipe the parts with a clean, dry cloth. Clean the grease from both ball bearings with an R-2969 brush and petroleum spirits.
- (6) Apply grease to both ball bearings using the 353C grease gun equipped with the 570A nozzle.
- (7) Remount the bevel gear, pinion, and ball-bearing assembly, as covered in (8).
- (8) Position the gear, pinion, and ball-bearing assembly in the portion of the housing that does not contain the two dowels with the face of the gear upward, as shown in the right half of Fig. 5. This positioning of the gear is necessary in order that the wrapping bit will rotate in the proper direction (counterclockwise as viewed from the outer end of the wrapping bit) when the hand grip is operated. Swing the hand grip so its gear sector is engaged with the pinion teeth of the gear and pinion.
- (9) Mount the metal stop and bumper, making sure the stop is toward the end of the gear sector on the hand grip. Mount the bumper spring. (See Fig. 5.)
- (10) Apply grease to the teeth of the gear sector, the bevel gear, and bumper spring using the 353C grease gun and 570A nozzle.
- (11) Apply oil to the hand-grip pivot pin using the 486A oil can.
- (12) Place the right half of the housing (Fig. 5) on a flat surface. Make sure the hand-grip restoring springs are positioned on the hand grip at the pivot pin as follows. The slightly offset end of

both springs should be in their respective recesses in the hand grip and should lie against the center section of the hand grip. The straight end of the inner restoring spring should be in the recess in the right half of the housing. With the other parts of the tool positioned, as covered in (8) and (9), hold the left half of the housing (Fig. 5) in a tilted position so the straight end of the outer restoring spring lies in the recess in this half. Then, keeping the end of the spring in the recess, carefully position this half of the housing on the other half so the hand-grip pivot pin fully enters its hole and the dowels in one half of the housing enter their holes in the other half. Insert and moderately tighten all of the housing screws and then securely tighten the screws. This is necessary since fully tightening one screw with the others loose may cause binding of the hand grip.

#### 4.03 *Positioning and Alignment of Stationary Sleeve and Alignment of Wrapping*

**Bit:** Positioning and alignment of stationary sleeve is not required on the KS-16363, L2 and L3, wire-wrapping tools. Positioning and alignment of stationary sleeve is required as follows on the KS-16363, L1, wire-wrapping tool:

- (a) If the wire insertion slot in the bit is not in alignment with the slit in the barrel, proceed as covered in (1) through (6).
  - (1) Loosen the clamping screw with the 4-inch E screwdriver and remove the bit and sleeve.
  - (2) Loosen the Phillips head screw directly below the clamping screw with the No. 2 B-type screwdriver.
  - (3) Remove the barrel retaining screw with the No. 1 B-type screwdriver and remove the barrel.
  - (4) Hold the barrel pinion stationary, insert the bit in the barrel, and rotate the bit until the flat on the bit engages the corresponding flat on the pinion shaft. Facing the slit end of the barrel, hold the barrel so the retaining screw hole is at the right. Rotate the bit and pinion until the slot in the bit is in alignment with the slit at the top of the barrel. With the hand grip in the unoperated position and the



- 1 - GEAR SECTOR
- 2 - BALL BEARING
- 3 - PINION
- 4 - BEVEL GEAR
- 5 - BUMPER SPRING STOP
- 6 - BUMPER SPRING
- 7 - RECESS IN HOUSING
- 8 - HAND GRIP RESTORING SPRINGS
- 9 - BOTTOM PART OF GEAR SECTOR
- 10 - HAND GRIP PIVOT PIN

- 11 - HAND GRIP
- 12 - NORMAL STOP (METAL STOP)
- 13 - BUMPER
- 14 - DOWEL
- 15 - RECESS IN HOUSING
- 16 - DOWEL
- 17 - PINION
- 18 - BARREL
- 19 - STATIONARY SLEEVE
- 20 - WRAPPING BIT (NOT SHOWN)

**Fig. 5—KS-16363 Wire-Wrapping Tool—Interior View [Shown with KS-16363, L1 (Mfr Disc.) Barrel and Sleeve]**

slot in the bit in line with the slit in the barrel, fully insert the barrel in the housing so the pinion engages its mating gear.

(5) While holding the bit firmly in place, align the barrel retaining screw hole with the corresponding hole in the housing. Insert and securely tighten the barrel retaining screw.

(6) Mount the sleeve in the barrel, as covered in (b) (2).

(b) If the position and alignment of the stationary sleeve do not meet the requirements, proceed as covered in (1) and (2).

(1) Loosen the clamping screw using the 4-inch E screwdriver.

(2) Mount the sleeve in the barrel so the shoulder of the sleeve is against the barrel and the wire insertion notch in the sleeve is in alignment with the wire insertion slot in the bit. If

using the new KS-20963 wire-wrapping sleeve, make sure the wire insertion slot in the wrapping bit is approximately in line with the flared portion of the sleeve. Tighten the Phillips head screw directly below the clamping screw and then tighten the clamping screw.

**Note:** When mounting the wrapping bit and stationary sleeve in the L1 models before tightening the clamping screw, hold the sleeve and operate the hand grip a few times. This will relieve any potential binding between the sleeve and the tang of the bit.

**4.04 Freedom of Operation:** To adjust the freedom of operation, proceed as follows:

(a) If binding occurs during operation of the hand grip, remove the bit and sleeve from the tool and examine both parts for damage or distortion. Rotate the bit in the sleeve to check for distortion of the parts. Replace parts as required.

(b) If binding occurs during operation of the hand grip with the bit and sleeve removed, check for the following:

- ◆(1) Loose screws, especially the screw behind the chuck.◆
- (2) Excessive tightening of housing screw adjacent to the hand-grip pivot. Slightly loosen the screw with the No. 2 B-type screwdriver.

(3) Separate the halves of the housing, as covered in subparagraphs 4.02(2) and (3), and check for the following conditions: foreign material or lack of lubrication on the gears, worn teeth on barrel pinion, worn teeth on bevel gear and associated pinion, worn teeth on gear sector, worn ball bearings, distortion or damage to hand grip or housing. Clean and lubricate gears and bearings, as required, and replace defective parts, as required.

(c) If the halves of the housing have been separated, reassemble them as covered in subparagraph 4.02(12).

**4.05 Hand-Grip Pull:** To adjust the hand-grip pull, proceed as follows:

(1) If requirement 3.05 is not met, check for freedom of operation covered by requirement 3.04.

(2) If the freedom of operation requirement is met but requirement 3.05(a) is not met, replace the restoring springs.

(3) If the freedom of operation requirement is met but requirement 3.05(b) is not met, separate the halves of the housing, as covered in subparagraphs 4.02(2) and (3). Check the position of the bumper spring and, if necessary, position it as shown in Fig. 5. If the requirement still is not met, replace the bumper spring. Assemble the two halves of the housing, as covered in subparagraph 4.02(12).