Handbook

Operation and Service Instructions with Illustrated Parts Breakdown

No. 407-F

TOOL KIT,TUBE FLARING,HAND OPERATED

NSN-5180-00-799-8860

IMPERIAL EASTMAN®
An Imperial Clevite Company
6300 W. Howard St.
Chicago, IL 60648-3492

TABLE OF CONTENTS

Section		Page
I	Description	2
II	Method of Operation.	2
III	Illustrated Parts Breakdown .	5

I. DESCRIPTION

1-1. This tool is designed to square, deburr and produce single 37° flares, conforming to Specification MS-33584, on corrosion-resisting steel tubing (MIL-T-6845) used primarily in the maintenance of aircraft fuel and hydraulic systems.

1-2. This tool will square, deburr and flare tubing conforming to Specification MIL-T-6845 in the following sizes and wall thicknesses:

Outside Diameter In Inches	Wall Thickness In Inches
1/8	.020, .028
3/16	.020, .028
1/4	.016, .028, .035
5/16	.035
3/8	.028, .035
1/2	.035, .049
5/8	.035, .049
3/4	.028, .035, .049
1	.028, .035
1-1/4	.035, .049
1-1/2	.035, .049, .065

II. METHOD OF OPERATION

2-1. CUTTING TUBING. Cut tubing cleanly, using a sawing vise and a hacksaw with a fine-tooth blade.

2-2. MOUNTING AND ASSEMBLING TOOL. Clamp base of tool in a standard machinist's vise. Slots in both sides of base of tool provide gripping surfaces for vise jaws. (See figure 2-1.)

a. Assemble operating handle to spindle and tighten retaining thumb screw.

b. Tool is packed with flaring assembly in spindle. in order to remove the flaring assembly, before proceeding with the following steps of operation, back off the carriage screw, grasp the flaring assembly firmly with the left hand and turn spindle operating handle counter-

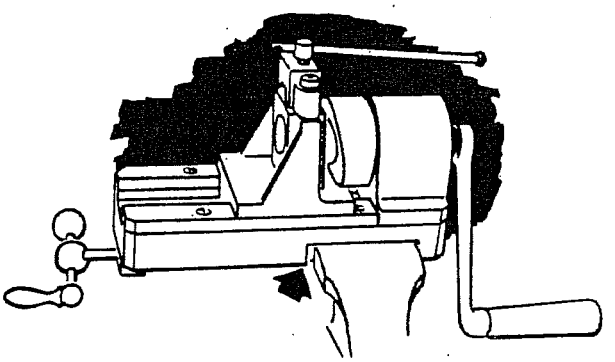

Figure 2-1

clockwise with the right hand. (See figure 2-2.) Continue turning operating handle until flaring assembly can be removed from spindle opening.

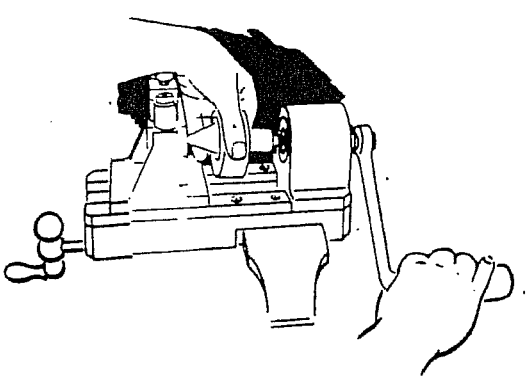

Figure 2-2

2-3. LUBRICATION OF TOOL. Before setting tool into operation, the following points should be lubricated with MIL-L-2104A oil, or any standard lubricating oil, SAE 30 viscosity:

a. Lead screw, 24, figure 3-1.

b. Thrust collar, 23, figure 3-1.

c. Base slide surfaces, 17, figure 3-1.

d. Clamp screw, 2, figure 3-1.

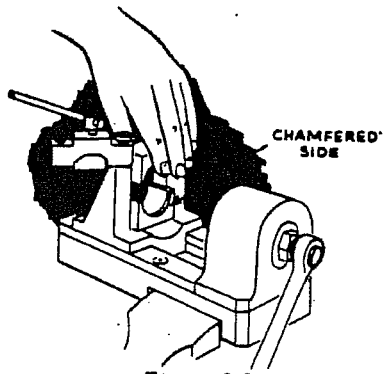

Figure 2-3

2-4. CLAMPING TUBING IN JAWS. Back off clamping screw completely and swing clamp into open position.

a. Place two halves of jaws corresponding to size of tubing to be used in clamping slide with chamfered side of jaws facing spindle. (See 2-3.) Swing clamp into closed position.

b. Insert tubing into jaws so that end of tubing extends toward spindle approximately 1/2 inch beyond face of jaws. Tighten clamp. Back off carriage screw.

2-5. SQUARING TUBING. Insert squaring tool into spindle opening. (See figure 2-4.) The pin on the shaft end of the tool slips into hole at bottom of spindle opening to prevent tool from turning.

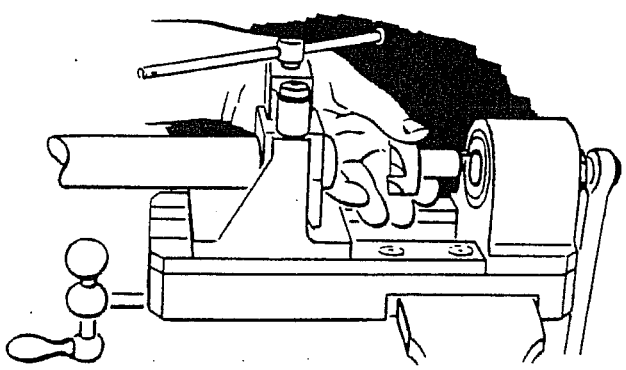

Figure 2-4

a. Advance tubing into squaring tool slowly, by advancing carriage screw, at the same time turning spindle operating handle clockwise. (See figure 2-5.) Continue this operation until face of tubing is completely squared. Do not attempt to remove more material than is necessary.

b. Retract carriage and remove squaring tool from spindle.

2-6. DEBURRING, INTERNAL. Select proper internal deburring tool for size of tubing being used. The smaller tool is used for 1/8 to 1/2" O.D. tubing. The larger tool is used for 5/8 to 1-1/2" O.D. tubing.

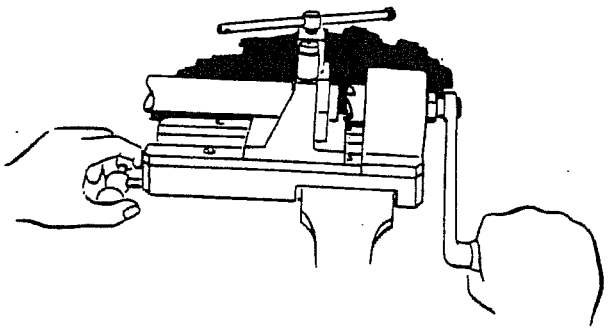

Figure 2-5

a. Place internal deburring tool in spindle opening, engaging pin with hole in spindle. (See figure 2-6.)

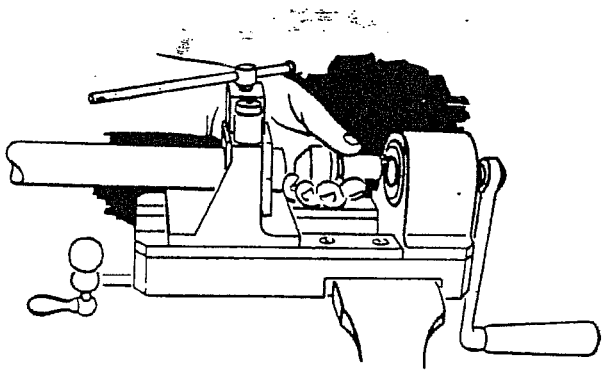

Figure 2-6

b. The tool is spring loaded to prevent over-feeding. Advance carriage until tubing strikes face of cutter. Then advance an additional one revolution of carriage screw. This sets up the automatic pressure feed. Turn spindle operating handle four to five revolutions, without advancing carriage.

c. Retract carriage completely and remove internal deburring tool.

2-7. DEBURRING, EXTERNAL. Place external deburring tool in spindle, engaging pin with hole in spindle. (See figure 2-7.)

a. Raise spring loaded file segment, and while holding in this position advance carriage until end of tubing is approximately in center of file. (See figure 2-8.) Release file segment and turn spindle operating handle until complete deburring is accomplished.

b. Retract carriage completely and remove external deburring tool.

2-8. POSITIONING TUBING.

a. Back off clamping screw completely and swing clamp into open position. Remove tubing and jaws.

b. All chips, filings and foreign matter should be removed from jaw holder slide, jaws and end of tubing to be flared. Use brush for this purpose.

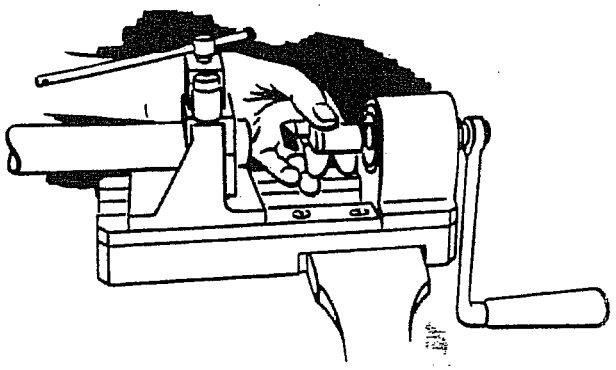

Figure 2-7

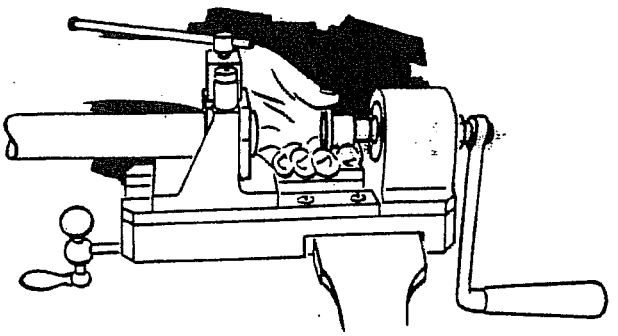

Figure 2-9

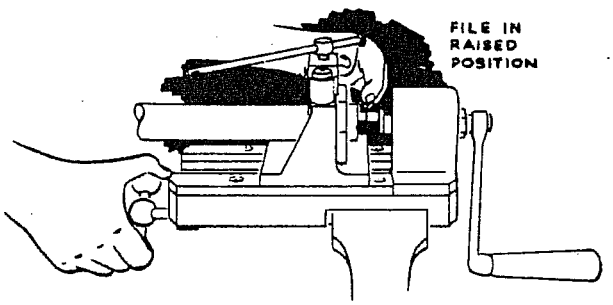

Figure 2-8

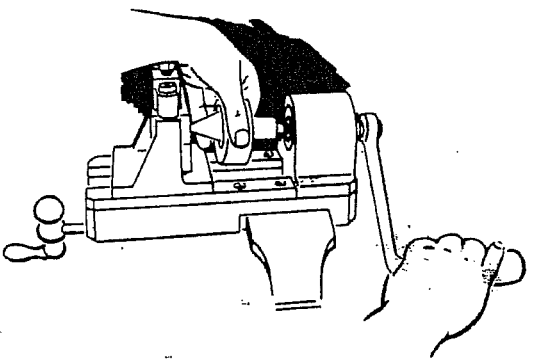

Figure 2-10

c. Replace jaws, insert tubing so that end extends approximately 1/4 inch beyond face of jaws. Swing clamp screw into closed position, but do not tighten.

d. The two tube stop gages are marked on the shank with appropriate sizes and wall thicknesses of tubing. Select the proper gage and insert in spindle opening. (See figure 2-9.)

e. Advance carriage until face of tube stop gage contacts face of jaws. This operation has pushed tubing back to proper depth for flaring. Clamp tubing securely in this position.

f. Retract carriage completely and remove tube stop gage.

2-9. FLARING TUBING.

a. Insert flaring tool assembly into spindle. (See figure 2-10.) It will be noted that the shaft of this tool is threaded. Chips and foreign matter should be removed from threads and flaring cone surface. Engage with threads in spindle opening and hand tighten.

b. Advance carriage while turning spindle operating handle clockwise. After tubing strikes flaring cone, continue advancing carriage slowly. Tubing should not be forced into the revolving flaring cone. For best results, turn carriage feed screw approximately 1/4 turn for each revolution of the spindle operating handle.

c. A definite resistance is encountered upon completion of flare. At this point the flare will be pressed against the jaw chamfer.

d. Retract carriage, while revolving spindle operating handle, until the cone is clear of flared surface of tubing. This will insure a flawless and concentric flare.

e. Back off clamping screw and swing clamp into open position. Remove tubing.

2-10. INSPECTION OF FLARE O.D.

a. The flare O.D. Gage contains openings for checking flares on each size of tubing within range of the kit. All openings are clearly marked with the tubing O.D. size. Each opening has two steps, a Go and No-Go. Select the proper location on gage and pass flare through opening. (See figure 2-11.) The outer step is the "Go" position. The inner step is the "No-Go" position

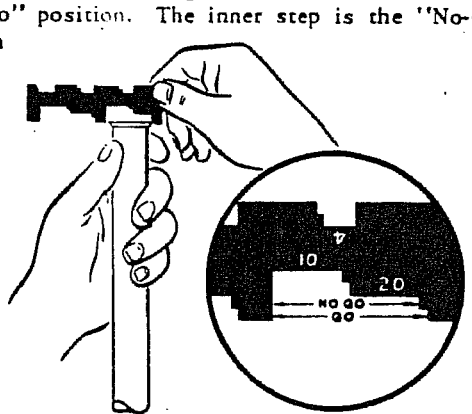

Figure 2-11

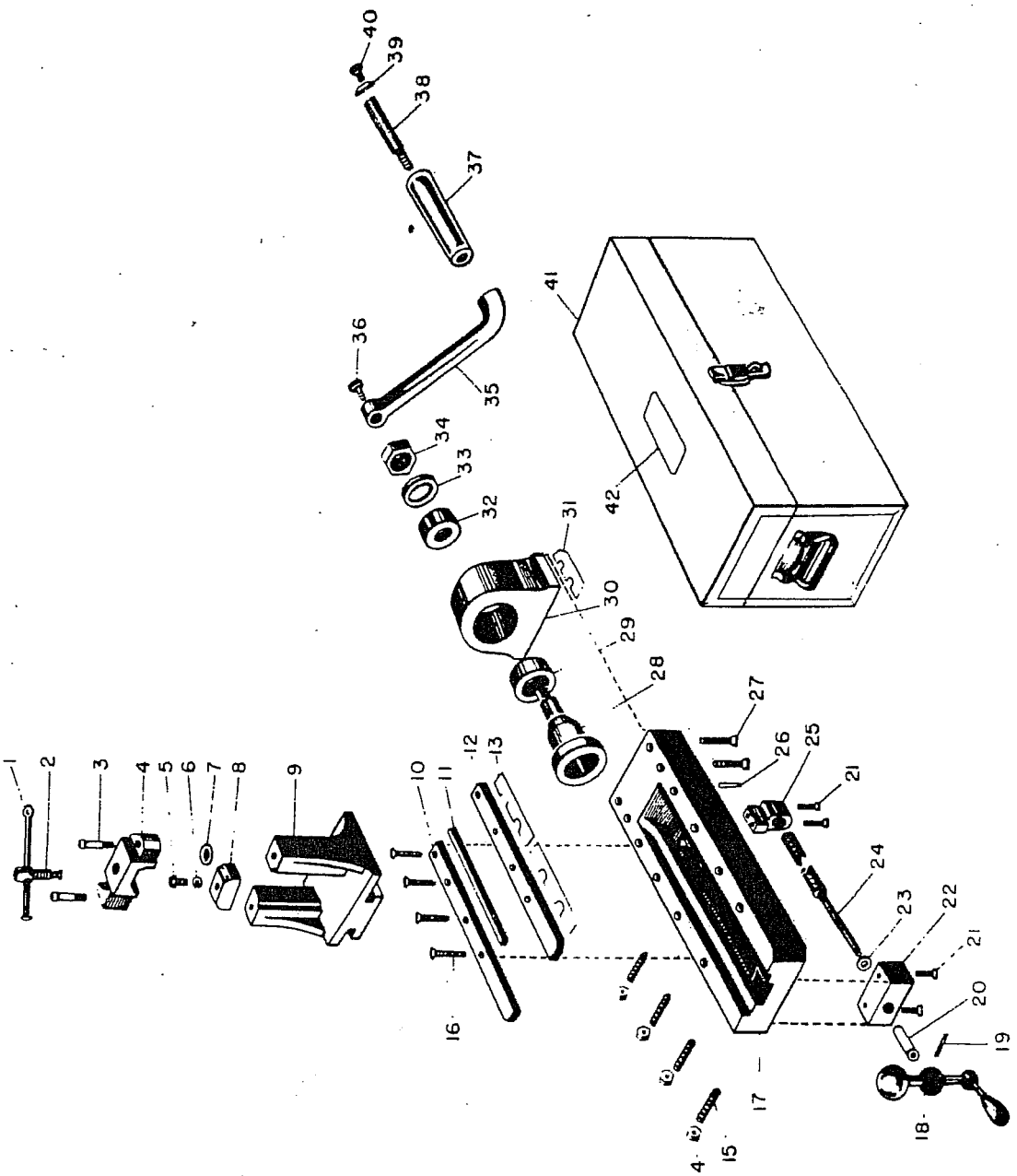
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Figure 3-1

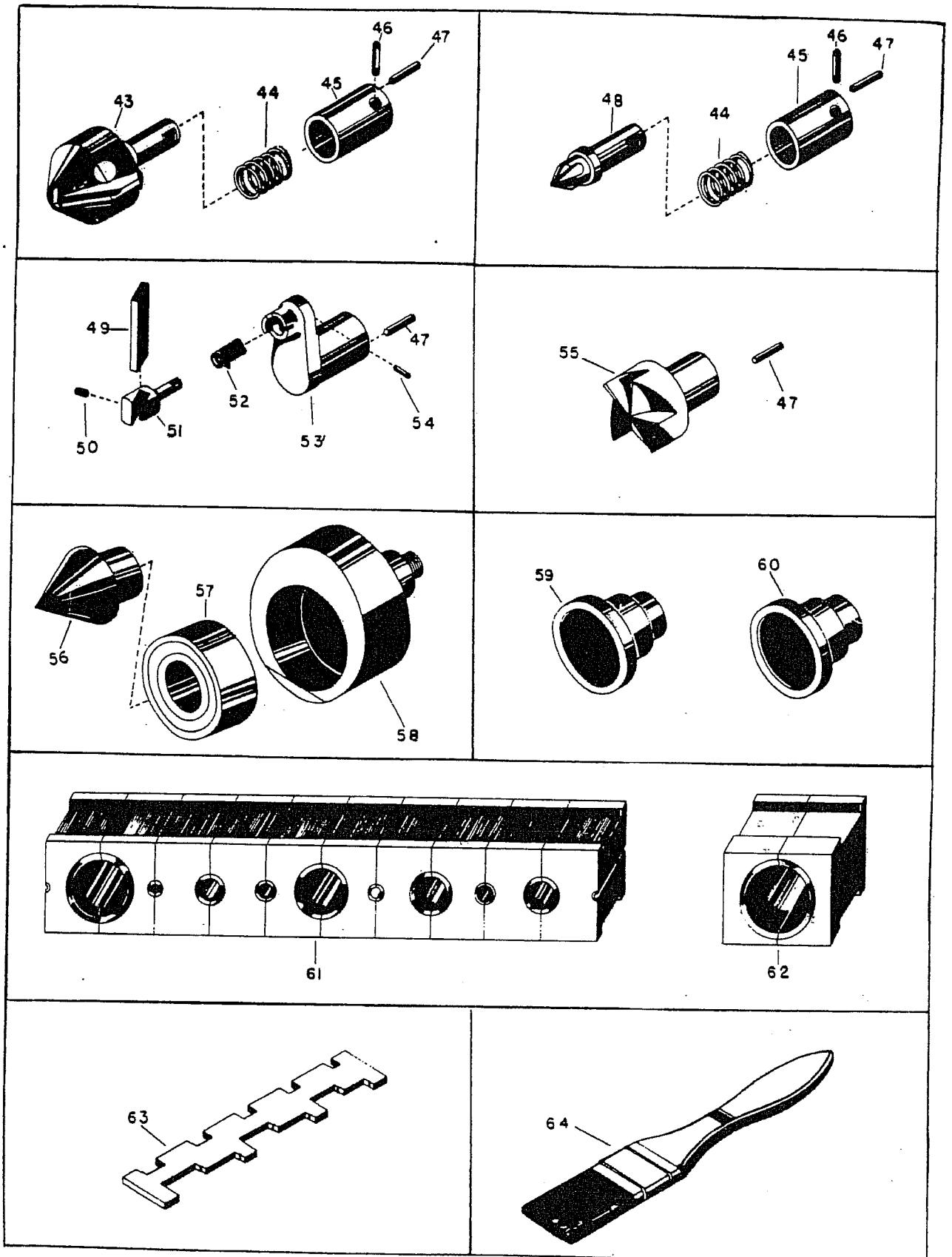

Figure 3-2

5180-00-799-8860
TOOL KIT:TUBE FLARING HAND OPERATED
DATE OF AWARD OF CONTRACT 04/04/86
ITEM NO. IN CONTRACT 2
CONTRACT NO. GS-00F-83169

ASSEMBLY PARTS LIST

FIG. and INDEX NO.	PART NUMBER	PART DESCRIPTION	QUANTITY
3-1-1	60A65-AA4-3	HANDLE	1
-2	-AA4-2	CLAMP SCREW	1
-3	-AA -12	SOCKET SHOULDER SCREW	2
-4	-AA4-1	YOKE	1
-5	-AA4-5	RETAINING SLEEVE	1
-6	-AA4-7	RETAINING WASHER	1
-8	-AA4-4	PRESSURE PLATE	1
-7	-AA -7	WASHER	1
-9	-CA -2	JAW HOLDER	1
-10	-BA -3	PLATE	1
-11	-AA -4	GIB	1
-12	-BA -17	PLATE	1
-13	-AA -16	SHIM (TAILSTOCK)	2
-14	-AA -9	JAM NUT	4
-15	-AA -8	SOCKET SET SCREW	4
-16	-AA -11	FLAT HEAD SOCKET CAP SCREW	8
-17	-DA -1	BASE	1
-18	-AA3-2	HANDLE	1
-19	-AA3-3	COILED SPRING PIN	1
-20	-AA3-4	SLEEVE	1
-21	-AA -10	SOCKET CAP SCREW	4
-22	-AA3-6	THRUST BLOCK	1
-23	-AA3-5	THRUST COLLAR	1
-24	-AA3-1	LEAD SCREW	1
-25	-AA -5	SCREW BLOCK	1
-26	-AA -14	TAPER PIN	2
-27	-AA -13	SOCKET CAP SCREW	4
-28	-BA1-2	SPINDLE	1
-29	-AA1-3	ROLLER BEARING (1¼ I.D.)	1
-30	-BA1-1	HEADSTOCK	1
-31	-AA -15	SHIM (HEADSTOCK)	1
-32	-AA1-4	ROLLER BEARING (¼ I.D.)	1
-33	-AA1-5	WASHER	1
-34	-AA1-6	LOCK NUT	1
-35	-BA2-1	CRANK	1
-36	-AA -6	THUMB SCREW	1
-37	-AA2-3	HANDLE	1
-38	-AA2-2	STEM	1
-39	-AA2-4	WASHER	1
-40	-AA2-5	OVAL HEAD SCREW	1
-41	-AM -1	CARRYING CASE	1
-42	-AM -2	NAME PLATE	1
3-2-43	-AC -1	INTERNAL DEBURRING TOOL	1
-44	-AC -3	COMPRESSION SPRING	2
-45	-AC -2	SHELL	2
-46	-AC -4	SCREW PIN	2
-47	-AB -6	COILED SPRING PIN	4
-48	-AD -1	INTERNAL DEBURRING TOOL	1
-49	-AB -2	FILE	1
-50	-AB -3	SOCKET SET SCREW	1
-51	-AB -7	PIVOT SHAFT	1
-52	-AB -4	TORSION SPRING	1
-53	-AB -1	HOLDER	1
-54	-AB -5	COILED SPRING PIN	1
-55	-AE -1	FACING TOOL	1
-56	-AF -2	CONE	1
-57	-AF -3	BALL BEARING	1
-58	-BF -1	CONE HOLDER	1
-59	-AJ	TUBE STOP GAGE (.025)	1
-60	-AK	TUBE STOP GAGE (.040)	1
-61	-CH	JAW SET (1/8 - 1¼ O.D.)	1
-62	-BG	JAW SET (1½ O.D.)	1
-63	-AL	FLARE O.D. GAGE	1
-64	-AN	BRUSH	1