

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

OPERATOR'S MANUAL

GRINDING MACHINE, VALVE FACE

(K. O. LEE MODEL K403 CM)

(4910-540-4679)

Headquarters, Department of the Army, Washington, D. C.

2 September 1964

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Change }
No. 1 }

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C., 5 October 1972

Operator's Manual
GRINDING MACHINE, VALVE FACE
(K. O. LEE MODEL K403 CM)
(4910-540-4679)

This change is current as of 18 September 1972.

TM 9-4910-428-10, 2 September 1964, is changed as follows:

The items in the following table, formerly included as part of the Basic Issue Item List on page 11, are redesignated as parts included with the end item and considered a component or part of the item configuration. Paragraph 3c. in the Appendix contains the manufacturers' codes for these items.

PART	FSCM/PART NUMBER
ADAPTER, CONNECTOR: 2 connector mating ends, stght shape, 5 contacts, 1 female, U-hollow, 2 female, flat one end, 2 male, flat other end, nonlocking, 1.078 lg X 1.438 dia in.	22527:9-525-10
BUTT GRINDING ATTACHMENT: micrometer	35472:K436C
COLLET, VALVE REFACER:9/32 to 9/16	35472:K43D
COLLET, VALVE REFACER:1/2 to 11/16	35472:K43E

PART	FSCM/PART NUMBER
GAUGE ASSEMBLY: depth	35472:K436D
GRINDING ATTACHMENT: rocker arm	35472:K450
HOLDER: diamond, w/P176D diamond screw	35472:K534
STOP:	35472:K136P
WHEEL:grinding	35472:OV5GH80W
W H E E L : g r i n d i n g	35472:OV5GH80S

Page 9. Change Appendix designation from "Appendix I" to "Appendix".

Page 10. Paragraph 3c., change code 74545 to read as follows:

74545 Hubbell Harvey, Inc. (Formerly Harvey-Hubbell, Inc.)

Add the following code:

22527 Fisher Scientific Co.

Page 11: Appendix, Section II is amended to read as follows:

Section II
BASIC ISSUE ITEMS LIST

(1) Source, Maint. and Recov. code			(2) Federal Stock no.	(3) Description	(4) Unit of issue	(5) aqty inc in unit
(a) Source	(b) Maint	(c) Recov.				
C	O/C	-	5120-240-5292	TOOLS AND EQUIPMENT FOR: GRINDING MACHINE, VALVE FACE: (4910-540-4679) KEY, SOCKET HEAD SCREW: hex type. L-type handle, 1/8 w across flats	EA	1

By Order of the Secretary of the Army

BRUCE PALMER, JR.
General, U.S. Army
Acting Chief of Staff

Official:

VERNE L. BOWERS,
Major General, U.S. Army,
The Adjutant General.

Distribution:

Active Army

DCSLOG (3)	Armies (3) except
CNGB (1)	Second (2)
TSG (1)	Seventh (5)
COE (6)	Eighth (5)
Dir of Trans (1)	AVSCOM (10)
OCC-E (1)	Corps (2)
USCONARC (3)	Ft Belvoir (2)
ARADCOM (2)	4th USASA Fld Sta (1)
ARADCOM Rgn (2)	Army Depot 2) except
OS Maj Comd(1)	LBAD(1)
LOGCOMD (3)	TEAD (16)
AMC(12)	Units org under fol TOE:
WECOM (10)	5-278 (2)

NG: None

USAR: None

For explanation of abbreviations used, see AR 310-50,

SECTION I

GENERAL INSTRUCTIONS

1. Introduction

You are naturally anxious to start operating this machine but before actually grinding your first valve we urge you to follow carefully these instructions for setting-up and preparing the machine, then when you grind the first valve follow the operating instructions step by step and you will be more than pleased with the results.

2. Machine Placement

Your K. O. Lee Valve Refacer is a precision machine representing a considerable investment and good judgment in the placement of it will pay dividends. A K. O. Lee Valve Wagon is the ideal place to set up your machine but if you do not have one, select a spot where it will not be exposed to dust, grit, the danger of heavy objects being placed or dropped on it and where it will not be affected by the vibration of other machines. If placed on a bench, level the machine using metal or hardwood shims under the feet. If on a valve wagon bolt machine to top with holes provided.

3. Assembling Machine

Assembly of the K. O. Lee Valve Refacer is a simple operation, because all parts except a few specially packed to assure safe transportation are factory assembled.

a. The separate packing carton included contains the following parts for assembly.

- (1) *Shaft driven work head* (lubricate before using). Mount on rear stud on table, secure with slotted nut. Remove stop pin from rear of work head hand nut-you will find milled end to use as wrench in slotted nut.
- (2) *Flexible shaft*. Affix to coolant pump and work head and screw tightly by hand.
- (3) *Splash shield*. Mount on base in front of machine base.
- (4) *Table stop Screw*-screw into R.H. Side of table base, adjusts movement of table for controlled travel to left.
- (5) *Soluble oil concentrate* (1 pt can). See paragraph 6d for proper mixture.
- (6) *Work head stop pin*. Place in reamed

holes for desired degree setting on table back of work head base. Round side against work head for accurate angle, i.e. 45°; flat side against work head for minus 1°, i.e. 44°.

b. Balance of equipment represents accessory parts for use or for mounting as required.

- (1) *Rocker arm attachment* (universal cone-type). Mounts on forward stud on top table when operation is required.
- (2) *Diamond screw and holder*. Mounts on Rocker Arm and Diamond Dresser Attachment to dress wheel. Remove top cone assembly only.
- (3) *V-rest*. Mounts on forward table stud and positioned for grinding butts of valves using side of grinding wheel (on models without butt grinder).
- (4) *1/8-inch hex wrench*.

c. Now-that assembly has been completed, wipe the protective oil coating from machine and prepare for lubrication.

4. Lubrication

a. *Work Head*. This unit is shipped with oil ready for operation. If for any reason oil is not in unit, remove large screw plug on top of work head to oil worm drive and spindle bearings, fill and maintain to visible oil level line (see oil window) with Texaco Universal Gear Lubricant No. EP80, EP90, No. 70 or No. 50 motor oil or equivalent. DO NOT put soluble oil, provided with machine, in work head.

b. *Table Ways*. Position table for oiling ways by moving table to the left as far as possible and fill center cups and R.H. cups. Move table to right as far as possible and fill center cups and L.H. cups. There are four spring cap type oil cups on top of table which should be filled and maintained with (S.A.E. No. 10) oil weekly. These cups oil bottom and top table ways and rear bearing feed screw assembly.

c. *Feed Screw Assembly K403 and K403C Series*. The ball type oil cup on front top of base cares for the front bearing of this unit. Oil rear feed screw bearing by moving table to the front of machine exposing oil hole in base. Fill with S.A.E. No. 10 or equivalent. Also apply oil

directly on screw for easy operation.

d. Feed Screw Assembl K500 and K500C Series. Two alemite fittings. 1-Top front for greasing bearings. 1-feed nut accessible after tank is removed from left side.

e. Water Pump. There is one alemite fitting located on side of pump for lubricating entire pump. The pump unit is packed with Socony AA1 grease.

f. Table Traverse. Move table to extreme right and apply SAE No. 10 oil to arm and pivot exposed underneath.

g. Electric Motor. The bearings on the motor driving wheel spindle and water pump have oil cups (2). Oil motor bearings with SAE No. 10 motor oil. This should be done every 6 months.

h. Grinding Wheel Spindle. Bearings of this unit are packed and sealed requiring no lubrication.

5. Adjustments

Your K.O. Lee Valve Refacer has been accurately adjusted and tested for precision operation at the factory before shipment, therefore adjustments should not be necessary.

a. Motor V-Belt. The belt tension can be adjusted simply by positioning the motor assembly forward or back after loosening motor mount bolts, securing belt after adjustment. This adjustment is necessary to compensate for stretch in belt on this valve refacer-all other adjustments automatically compensate for wear.

b. Table Ways. Have automatic compensation for wear-need no adjustment. V type construction ways wear in-not out.

c. Work Head Spindle Bearings. The work head on the K. O. Lee Valve Refacer has plain bearings with automatic takeup for wear.

d. Model K500 and K500C Series. Feed screw nut and feed bar have spring load and no adjustment is ever necessary.

6. Replacement of Parts

a. Installation of Belt. Worn belt can be replaced by removing the belt guard, using Allen wrench inserted through removable cap openings in bolt guard castings. Loosen motor mount nuts and slide motor forward. Replace bolt and adjust tension by positioning motor back and secure.

b. Removing and Installing Main Spindle

Bearings. Worn main spindle bearings may be conveniently replaced when required. The only tools necessary are a large screwdriver, 5/16-inch Bristo wrench, and a pair of Truarc or needle-nose pliers.

- (1) First remove R.H. grinding wheel by removing nut and flange washer. Next remove wheel flange from shaft, prying loose with screwdriver protecting base finish with soft wood block or rubber pad. Now remove Truarc lock spring by pinching open section together with Truarc or needle-nose pliers, remove the lock spring then washer, and spacing collar.
- (2) Now remove the belt (*a* above) on the L.H. side spindle housing. Spindle pulley removes from shaft by loosening setscrew with 5/16-inch Bristo wrench. Remove Truarc lock spring, thin washer (s), thrust springs, and spacing collar like the procedure followed to free R.H. side bearing. To correct for slight variations in casting dimensions, thin washers are employed, so the number of washers used for spacing purposes vary. Care should therefore be taken to replace those parts removed as found in the original assembly of your particular unit. The spindle and bearings may now be pushed out R.H. side of housing. Bearings or complete spindle and bearing unit may now be replaced in the machine.
- (3) To replace spindle and bearings, assemble by inserting from R.H. side of housing, and push into place. Reversing disassembling process, start on L.H. side replacing spacing collar, thrust springs, thin washer (s) and lock with Truarc lock spring. Make certain that lock spring is properly seated in the housing groove. Next place spacing collar, thin washer and Truarc lock spring over shaft on R.H. side. Then using screw driver or flat bar, place end against rear inside of wheel guard exerting pressure against the projecting shaft end (use soft wood block or rubber pad to protect shaft end), forcing shaft as far to the

left as possible against thrust springs. While applying pressure, position the spacing collar, thin washer, and lock spindle in place with Truarc lock spring which seats in housing groove. Slip wheel flange over shaft and twist to tight position.

- (4) Replace belt pulley on shaft (L.H. side), place belt over pulley to line up with motor pulley and lock pulley in place by tightening setscrew. Replace grinding wheel and belt guard to their respective positions, level machine, and it is ready to operate.

c. Removing Coolant Tank. Tank is mounted on slides and removes from side of the machine.

d. Coolant Solution. This soluble oil is made for use in any type water. Coolant tank must be clean. Soluble oil should be at room temperature. Shake well before using. Mix one ounce of soluble oil to each quart of water. Always add oil to water. Never water to oil. After emulsion is formed water may be added. Oil should be added slowly with agitation. It is important that mixture is thoroughly mixed. Maintain coolant level with additional water until solution fails to prevent rust. At this point it is advisable to thoroughly clean coolant tank, and prepare new filling of coolant. Soluble oil can be obtained from K. O. Lee Company. 1 quart can No. 2659. If the machine is exposed to freezing temperatures, white kerosene may be used instead of soluble oil and water.

SECTION II

OPERATION

7. Work Head Collet

One collet, size 9/32- to 9/16-inch capacity is provided with machine as standard equipment. To change collets remove hand screw at back of work head, pull out sleeve and collet. Insert collet, replace sleeve and hand screw.

a. Keep collets, cone sleeve and inside of work head clean and dry. A light film of oil should be applied to cone whenever unit is removed from spindle. These collets are accurate to .0005 inch and any dirt or grit will reduce their accuracy. They grip at each end on actual working surface of valve stem-assuring accuracy between stem and new angle grind.

b. A special small collet and cone sleeve (K43C) with ¼ to 3/8-inch capacity and a large collet (K43E) with ½- to 11/16-inch capacity are available extras adaptable to work head.

Caution: When small collet (¼ to 3/8 in.) is used cone must be against collet. Small spacer furnished with collet is positioned between cone and hand screw.

8. Setting Grinding Angle

To set machine for desired grinding angle, place stop pin in correct hole on table top to the rear of work head. With the round side of the pin next to work head, hold work head against the stop pin and tighten nut using milled end of valve stop pin for wrench. For 44° angle valves,

place stop pin in 45° angle hole with flat side of pin next to work head. This gives -1° reading when flat side of pin flushes to work head base.

9. Dressing Wheel Face

a. Position rocker arm and wheel dresser attachment on front table stud and lock in position. The diamond holder is placed on attachment stud over lower cone. Turn on machine and feed diamond up to wheel slowly. It is best to dress wheel dry because use of coolant is apt to crack diamond. If wet dressing is desired be sure to open coolant valve and have coolant flowing before applying diamond to wheel. Rough dress the wheel by passing the diamond rapidly back and forth across the wheel using light feed until wheel is true. Finish dress by passing diamond slowly across wheel several times, without feed the last few times. Back off diamond from wheel when completed. Strict adherence to the foregoing procedure will result in a smooth wheel capable of producing the finest possible valve face finish. Remove attachment from machine and prepare to chuck valve.

b. If excessive carbon on valves to be ground is cleaned off with wire brush, wheel will not become filled with the soft carbon, eliminating too frequent wheel dressing.

10. Dressing Wheel Side

To dress side of wheel, position dresser and move table toward wheel until diamond ALMOST touches side of wheel. It may be necessary to turn diamond holder over so that large counterbore on underside is up. This positions diamond nib on opposite side of stud and gives necessary travel to dress side of wheel. Set table stop screw, start machine and feed diamond up to wheel by backing off table stop screw. Dress wheel by passing diamond across it using hand wheel and hold table firmly against stop with table traverse handle.

11. Chucking the Valve

First clean stem thoroughly with wire brush to remove carbon and dirt that may cause inaccurate chucking. Insert valve into work head so that one end of double end collet grabs stem as close to head as possible still remaining on ground surface of stem. This is important to insure stem and valve face being concentric to make valve seat perfectly. With valve in position set the stop pin, in the center of the hand nut, by pushing it against the end of the tightened valve. This serves as a guide for the rest of the valves in this series and saves time.

12. Grinding Valve Face

With the workhead secured at proper grinding degree, wheel properly dressed, and the valve having been thoroughly chucked, you are ready to grind the valve face.

a. Start the machine and proceed with grinding the valve face. Feed valve up to the wheel slowly, making sure coolant is directed onto valve, and grind in same manner as when dressing wheel but do not let the valve pass off the wheel. Set traverse handle to most convenient position. Twist to left to loosen, move to position, twist to right to tighten. Use light feed, traversing valve across wheel and back again each time before more feed is applied. If only part of the valve face touches the grinding wheel check the stem for straightness. If bent discard valve. If straight be sure it is clean and clean the collet and inside of work head because any foreign matter will affect the accuracy of the collet. When face is cleaned up, allow valve to "Spark-out", i.e. traverse the valve back and forth slowly across the wheel without feed until no sparks are visible. Back

the valve off the wheel and stop motor. Remove valve from work head, and you will now be able to observe a quality finish on the ground valve face. Repeat operation for successive valves. The grinding wheel furnished with machine gives excellent results on general valve grinding. However, a special grinding wheel (OV5FH60W) is available for grinding soft steel valves, and OV5GH80S wheel is for Stellite valves.

b. If removal of the valve with motor running is necessary, valve may be removed from workhead in this manner. Back the valve off the wheel and move table to extreme right, hit hand screw a glancing blow with hand in direction of rotation. If this is faster than RPM of spindle, collet will open. New valve is positioned in head against stop and nut is gripped lightly with right hand to lock.

13. Butt Grinding

a. *Butt Grinding Machines Not Equipped With Micrometer Butt Grinding Attachment.* Position V-rest on front table stud and lock in position. Move table to rear lining up V-rest with side of grinding wheel using valve butt as guide.

b. *Butt Grinding Using Micrometer Butt Grinding Attachment.* To grind valve butt, hold valve firmly on V-rest against grinding wheel and rotate valve. **FORD VALVE LIFTERS:** Can be ground as are the valve butts employing the V-rest.

c. *Dressing Butt Grinding Wheel.* Diamond dresser is positioned on stud located on side of V-block. Diamond point must not be above centerline between stud and face of wheel so that if diamond catches, point swings away from wheel, not into wheel. Diamond is fed into wheel with micrometer feed nut. Dressing is accomplished by oscillating diamond across face of wheel. Wheel should be dressed dry.

d. *Butt Grinding V-8 Valves.*

- (1) The K. O. Lee Depth Gauge which is a part of the micrometer butt grinding attachment is designed in a single unit to serve both Model 60 and larger V-8 engines. It is comprised of a steel shaft, an adjusting valve seat head, and two steel bushings sized to fit 60 and V-8 engine valve guides.
- (2) Use depth gauge to check length of

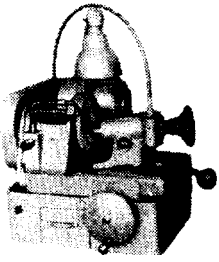
valve, by inserting gauge using end holding bushing that fits into valve guide hole to serve as valve guide. With cam shaft and valve lifter in lowest position, and valve seat ground, lower steel shaft on gauge to touch valve lifter. Set adjustable head against valve seat obtaining valve length, and screw adjustable head screw tight. Remove depth gauge, and place in butt grinder attachment as if valve to be ground. Set the butt end of the gauge so that it just touches highest point on wheel, and bring valve head fork into support position for the adjustable head on the depth gauge and tighten in place. Mark micrometer setting back off, removing depth gauge. Place valve to be ground in butt grinder, supporting valve head against valve head fork. Start wheel and feed valve into wheel by taking up on micrometer nut to mark position plus number of thousandths re-

quired for clearance. Repeat procedure for each valve to be ground.

14. Rocker Arm Grinding

a. The Universal (cone-type) rocker arm grinding attachment through its popularity has been made standard equipment with the K. O. Lee Valve Refacer. With two cones-the rocker arm is held firmly between the two angle surfaces.

b. To use, mount the Rocker arm attachment on forward stud on the table. Slip the top cone from attachment pin, and place rocker arm to be ground on pin, seating lower cone, replace top cone and tighten lock screw. Adjust the rocker arm to be ground to the wheel in such a way that the correct radius is obtained when the top table is traversed back and forth a short distance. Start machine and grind by moving table back and forth while holding rocker arm lightly against wheel. DO NOT REMOVE more than enough stock to clean up any pits or flat spots to avoid grinding off too much of the hard case.

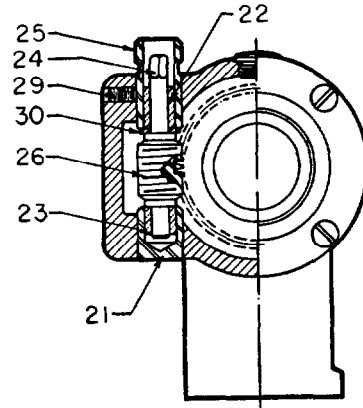
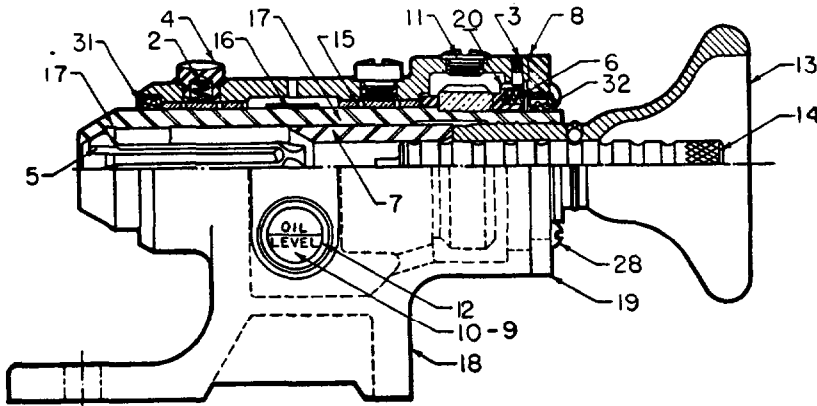


Lee Valve Refacer Repair Parts List

FOR MODELS

K403C, K403D, K403CM, K403DM

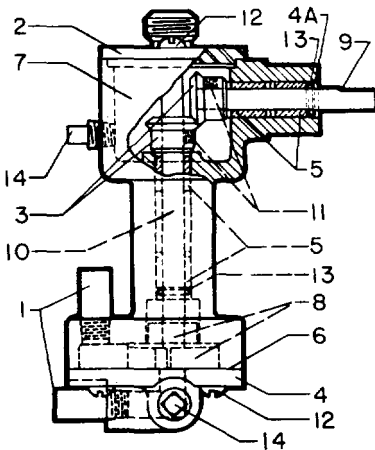
K403UC, K403UD, K403UCM, K403UDM



K443 Workhead Assembly

Index No.	Part No.	Description
	K443	Workhead Assembly
2	A260HS	Spring
3	A636P	Knurled Pin
4	B743H	Spring Plug
5	K43D	Collet
6	K43M	Comp. Spring
7	K43T	Cone Sleeve
8	K43Y	Gasket
9	K143HF	Reflector Plate
10	K143HL	Oil Level Gauge
11	K143HP	Oil Plug
12	K143HR	Retainer Ring
13	K143N	Hand Nut Assembly
14	K143NS	Stop
15	K443B	Spindle Bearing
16	K443F	Felt Oil Wick

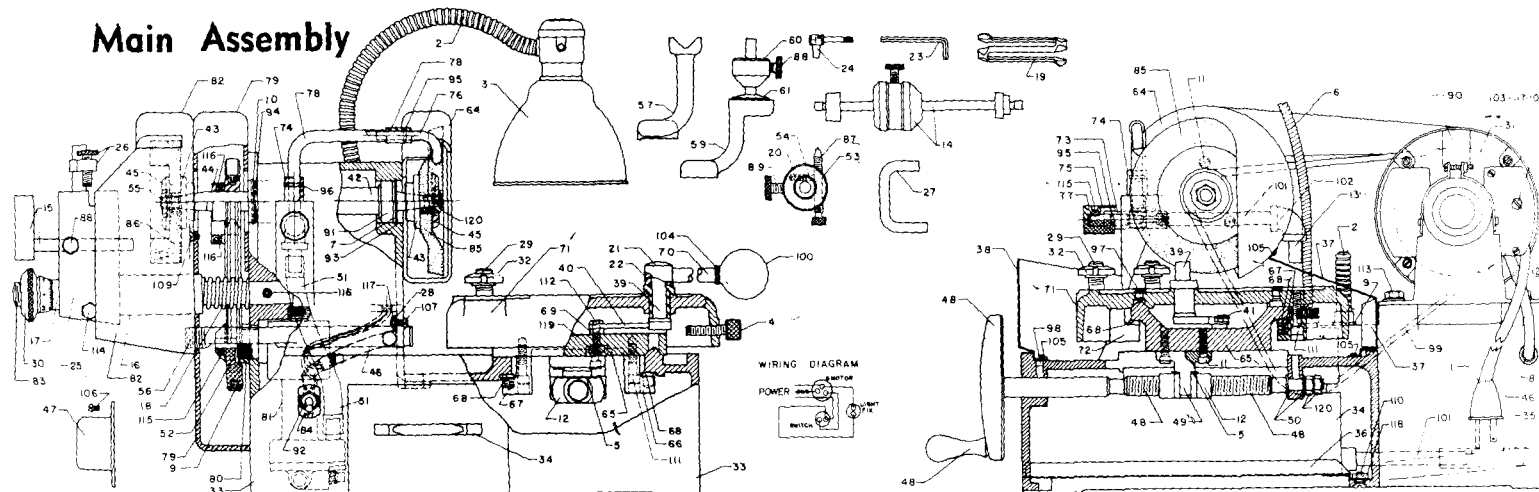
Index No.	Part No.	Description
17	K443GS	Gear & Spindle Assbly
18	K443H	Housing
19	K443J	Thrust Plate
20	K443L	Thrust Collar
21	K443P	Sleeve
22	K443RL	Worm Shaft Bushing
23	K443RS	Worm Shaft Bushing
24	K443S	Worm Shaft
25	K443T	Threaded Sleeve
26	K443W	Worm
28	10-32x $\frac{3}{8}$	Fill. Hd. Mach. Sc.
29	10-24x $\frac{3}{8}$	Hdls. Set Sc.
30	No. 12 SAE	Washer
31	2.x1.600x $\frac{3}{4}$	W. Seal
32	2.x1.500x $\frac{3}{4}$	W. Seal



K532A Fluid Pump Assembly

Index No.	Part No.	Description
	K532A	Fluid Pump Assembly (complete)
1	K32D	Pipe
2	K432C	Cover
3	K432G	Gear
4	K532C	Impeller Cover
4A	K532D	Quad. Ring Cage
5	K532E	Bushing
6	K532G	Gasket
7	K532H	Pump Housing
8	K532R	Impeller
9	K532S	Pulley Shaft
10	K532T	Impeller Shaft
11	10-32x $\frac{3}{8}$	Hex Socket Set Sc. (Cup Pt.)
12	10-32x $\frac{1}{2}$	Fill. Hd. Mach. Sc. (H.B.)
13	Q7	Quad. Ring
14	$\frac{1}{8}$	Pipe Plug

Main Assembly



Index No.	Part No.	Description
1	A127	Cord-115V
	A128	Cord-230V
2	A237LA	Flexible Arm
3	A237LS	Shade
4	A290AS	Adjusting Screw
5	A630H	Spacer
6	A3475Y	Flex Shaft (29")
7	B637W	Thrust Ring
8	K5G	Grommet
9	K5L	Collar
10	K13Y	Adjusting Washer
11	K21	Special Screw
12	K30N	Feed Nut
13	K32D	Pipe
14	K36D	Depth Ga. Ass'ly
15	K36F	Fork Ass'bly
16	K36K	Cover Tube
17	K36W	Keyed Washer
18	K36Y	Coil Spring
19	K43C	Collet (1/4 to 3/8)
	K43D	Collet (3/8 to 1/2)
	K43E	Collet (1/2 to 3/4)
20	K43M	Comp. Spring
21	K112C	Cap
22	K112H	Head
23	K112W	Hex Wrench
24	K115P	Pin Ass'bly
25	K136B	V-Block
26	K136C	Clamp Ass'bly
27	K136P	Stop
28	K143WC	Wire Clamp
29	K215T	Stud
30	K238N	Micrometer Nut
31	K125M	Pulley 3/8 Bore x 1 1/2 Dia. for Std. Mach. Univ. Motor

Index No.	Part No.	Description
	K314P	Pulley 1/2" Bore x 4 1/4" Dia. for Std. Machine
	K314T	Pulley 3/8" Bore x 4 1/4" Dia. for Std. Machine
32	K350N	Stud Nut
33	K405B	Base
34	K407	Fluid Tank
35	K407H	Hose (3/8-12 1/2)
36	K407S	Slide
37	K408G	Splash Guard
38	K409G	Splash Guard
39	K411	Hd. & Shaft Ass'bly
40	K411L	Link
41	K411P	Knurled Pin
42	K413	Spindle
43	K413F	Wheel Flange
44	K413P	Pulley (3/8" Bore x 1 1/2", for Std. Mach.)
	K413T	Pulley (3/8 Bore x 3" Dia. Used with Universal Motor)
45	K413W	Flange Washer
46	K414R	Motor Wire
47	K419C	Cap
48	K430	Feed Sc. Ass'bly
49	K430D	Fork
50	K430W	Thrust Washer
51	K432B	Hose (3/8x6)
52	K432N	Pulley (4 1/4" Dia. For Univ. Motor
	K432P	Pulley (3" Dia. for Std. Mach.)
53	K434C	Diamond Holder

Index No.	Part No.	Description
54	K434P	Plug
55	K436N	Special Nut
56	K463T	Drain Pipe
57	K436V	V-Rest
58	K443	Workhead Ass'bly
59	K450A	Swinging Arm
60	K450CT	Cone-Upper
61	K450CL	Cone-Lower
64	K508	Guard-Wheel
65	K510	Bottom Table
66	K510H	Hold Down
67	K510HS	Spring
68	K510P	Slide Strip Ass'bly
69	K511K	Pivot Bushing
70	K512A	Lever Arm
71	K515	Top Table
72	K515H	Hold Down
73	K518B	Valve Body
74	K518C	Collar
75	K518K	Control Knob
76	K518N	Nozzle
77	K518S	Valve Shaft
78	K518T	Nozzle Tube
79	K519	Belt Gd. Std. Mach. Belt Gd. Univ. Mtr.
80	K530L	Lock Nut
81	K532A	Fluid Pump
82	K536G	Guard
83	K536S	Micrometer Shaft
84	KO-19	Plate (Off-On)
85	OV5GH80W	Gr. Wheel
86	RV4KH46	Gr. Wheel
87	P176D	Diamond Screw
88	S1S	Thumb Screw
89	S2S	Thumb Screw

Index No.	Part No.	Description
90	Motor	Motor 115V, 1 Ph.-60 Cycle
	Motor	Motor 230V, 1 Ph., 60 Cycle
	K425CM	Motor 115 or 230V
91	202KLL3-FS50000	Ball Brg.
92	21705	Toggle Switch
93	137	Truarc Ring - Int.
94	7Z	Adjusting Spring
95	Dr. S-7, Dash No. 6	O-Ring
96	Dr. S-7, Dash No. 8	O-Ring
97	501	1/4 Gits Oiler
98	521	1/4 Gits Oiler
99	1030	V-Belt
100	44E	Ball for Handle
101	1/4 Pipe	4" Long Nipple
102	1/4 Pipe	90° Elbow
103	3/8 Std.	Lock Washer
104	3/8 Std.	Lock Washer
105	10-32x1/4	Rd. Hd. Mach. Sc. H.B.
106	10-32x3/8	Rd. Hd. Mach. Sc. H.B.
107	10-32x3/4	Rd. Hd. Mach. Sc. H.B.
108	10-32x3/2	Rd. Hd. Mach. Sc. Br.
109	10-32x1 1/2	Flat Hd. Sc.
110	1/4-20x1 1/2	U.S.S. Fl. Mach. Sc.
111	1/4x1 S.A.E.	Hex Sock. Cap Sc.
112	1/4x1 S.A.E.	Hex Cap Sc.
113	3/8x3/4 U.S.S.	Hex Cap Sc. H.B.
114	1/4x1 U.S.S.	Hex Cap Sc. (H)
115	10-32x3/8	Socket Set Sc.
116	3/8x3/4 U.S.S.	Hex Sock. Set Sc.
117	10-32	Hex Nut
118	1/4 U.S.S.	Nut
119	1/4 S.A.E.	Hex Nut-Jam
120	3/8 S.A.E.	Hex Nut-Jam H.B.
121	3/8 S.A.E.	Washer (H.B.)

APPENDIX I

BASIC ISSUE ITEMS LIST

Section I. INTRODUCTION

1. General

This appendix is a list of basic issue items. It is composed of those items which makeup the major end item of equipment and the operator's tools and equipment that are issued with the equipment and are required for stockage.

2. Requisition Notes

a. Repair Part Identified by Federal Stock Number.

- (1) If the exact item requisitioned is not furnished, or if other action is necessary, the exact nature of the action taken by the commodity command will be indicated by standard symbols on prescribed forms.
- (2) When requisitioning an item, the requesting agency will order the *listed* item. However, the commodity command will take necessary action to issue the exhaust stock item until stock is exhausted, whether it be an individual item, kit, set, or assembly.
- (3) Requisition for replacement of items that are the responsibility of commodity commands will be submitted to the commodity command indicated in column 1a, Materiel Code Number.

b. Part to Which FSN Has Not Been Assigned. When requisitioning a C source (local procurement) item identified only by a manufacturer's part number, it is mandatory that the following information be furnished the supply officer:

- (1) Manufacturer's code number (5 digit No. preceding the colon in the descriptive column).
- (2) Manufacturer's part number (the No. and sometimes letters, following the colon, (1) above). Dashes, commas,

or other marks must be included exactly as listed.

- (3) Nomenclature exactly as listed herein, including dimensions, if necessary.
- (4) Name of manufacturer of end item (from cover of TM or manufacturer's nameplate).
- (5) Federal stock number of end item (from TM).
- (6) Manufacturer's model number (from TM or name/data plate, preferably name/data plate).
- (7) Manufacturer's serial number (from name/data plate).
- (8) Any other information such as type, frame number, and electrical characteristics, if applicable.
- (9) If DD Form 1348 is used, fill in all blocks except 4, 5, 6, and Remarks field in accordance with AR 725-50. Complete form as follows:
 - (a) In blocks 4, 5, and 6, list manufacturer's code, and manufacturer's part number (as listed in description column).
 - (b) In Remarks field, list noun name (repair part), end item application (FSN of end item), manufacturer, model number (end item), serial number (end item), and any other pertinent information such as frame number, type, etc.

3. Explanation of Columns

a. Source, Maintenance, and Recoverability Code (col. 1).

- (1) *Materiel numerical codes (col. 1a).* This column indicates the responsible commodity command for the materiel. The commodity commands responsible

for supply of items in this list are-

Code	Type materiel
9_	Ordnance materiel
10_	Quartermaster materiel
11_	Signal materiel

- (2) *Source* (col. 1b). This column indicates the selection status and source for the listed item. Source code used in this list is-

Code	Explanation
C_	Obtain through local procurement. If not obtainable from local procurement, requisition through normal supply channels with a supporting statement of non-availability from local procurement.

- (3) *Maintenance level* (col. 1c). This column indicates the category of maintenance authorized to install the listed item. Maintenance level code used in this list is-

Code	Explanation
O/ C_	Operator or crew maintenance.

- (4) *Recoverability* (col. 1d). This column indicates whether unserviceable items should be returned for recovery or salvage. When no code is indicated, the item will be considered expendable. Recoverability code used in this list is-

Code	Explanation
R_	Items which are economically repairable at direct and general support maintenance activities and normally are furnished by supply on an exchange basis.

b. Federal Stock Number (col. 2). This column indicates the Federal stock number which has been assigned by the Cataloging Division, Defense Logistics Services Center.

c. Description (col. 3). This column indi-

cates the Federal item name and any additional description required for supply operations. The manufacturer's code and part number are also included for reference.

Code	Explanation
35472_	K. O. Lee Co.
74545_	Hubbell Harvey, Inc.

d. Unit of Issue (col. 4). This column indicates the quantity to be requisitioned.

e. Quantity Authorized (col. 5). This column indicates the quantity of the listed item authorized for stockage to constitute the prescribed load.

f. Illustration (col. 6). This column indicates the figure number of the illustration that depicts the listed item. When more than one item appears on an illustration, the item number is also indicated.

4. Abbreviations and Symbols

a. Abbreviations.

dia_	diameter
hex_	hexagon(al)
fl_	flat
lg_	long (length)
sight	straight
w/_	with

b. Symbol.

Symbol	Explanation
x_	by(as in 2 x 4)

5. Suggestions and Recommendations

The direct reporting, by the individual user, of errors, omissions, and recommendations for improving this manual is authorized and encouraged. DA Form 2028 (Recommended Changes to DA Publications) will be used for reporting these improvements. This form will be completed in triplicate, using pencil, pen, or typewriter, and forwarded direct to Commanding General, U. S. Army Weapons Command, ATTN: AMSWE-SMM-P, Rock Island Arsenal, Rock Island, Ill. 61202.

Section II. BASIC ISSUE ITEMS

(1) Source maintenance and recoverability code				(2)	(3)	(4)	(5)	(6) Illustration	
(a) Material code	(b) Source	(c) Maintenance level	(d) Recover-	Federal stock No.	Description	Unit of issue	Quantity	(a) Figure No.	(b) Item No.
9	---	---	F	4910-540-4679	<p>MAJOR COMBINATION</p> <p>The following item is to be requisitioned for initial issue only.</p> <p>GRINDING MACHINE, VALVE FACE: (35472 :K403 CM).</p> <p>COMPONENTS OF MAJOR COMBINATION</p> <p>None authorized.</p> <p>REPAIR PARTS</p> <p>None authorized.</p> <p>TOOLS AND EQUIPMENT FOR :</p> <p>GRINDING MACHINE, VALVE FACE: (35472 :K403 CM)</p>	ea	1	1 and 2.	1 through 7 and 1 through 4.
11	C	O/C		5935-552-4372	ADAPTER, CONNECTOR: 2 connector mating ends, stght shape, 5 contacts, 1 female, U-hollow, 2 female, fl at one end, 2 male, fl at other end, nonlocking 1.078 lg x 1.438 dia in. (74545 :5273 L).	ea	1	2	1
9	C	O/C		-----	COLLET, VALVE REFACER: $\frac{3}{32}$ to $\frac{1}{16}$ (35472:K43D).	ea	1	2	3
9	C	O/C	---	-----	COLLET, VALVE REFACER : $\frac{1}{2}$ to $1\frac{1}{16}$ (35472:K43E).	ea	1	2	3
9	C	O/C	---	-----	BUTT GRINDING ATTACHMENT: micrometer (35472 :K436C).	ea	1	1	2
9	C	O/C	---		GAUGE ASSEMBLY: depth (35472:K436D).	ea	1	1	1
9	C	O/C	---	-----	GRINDING ATTACHMENT: rocker arm (35472:K450).	ea	1	1	3
9	C	O/C	---		HOLDER: diamond w/ P176D diamond screw (35472:K534).	ea	1	1	4
10	C	O/C	---	5120-686-2051	KEY, SOCKET HEAD SCREW: hex type, L-type handle, $\frac{1}{8}$ x 3.	ea	1	1	6
9	C	O/C	---	-----	STOP : (35472 :K136P) -----	ea	1	1	5
9	C	O/C	---	-----	WHEEL: grinding (35472 :OV5GH80W)	ea	2	2	4
9	C	O/C	---	-----	WHEEL: grinding (35472 :OV5GH80S)	ea	2	2	2

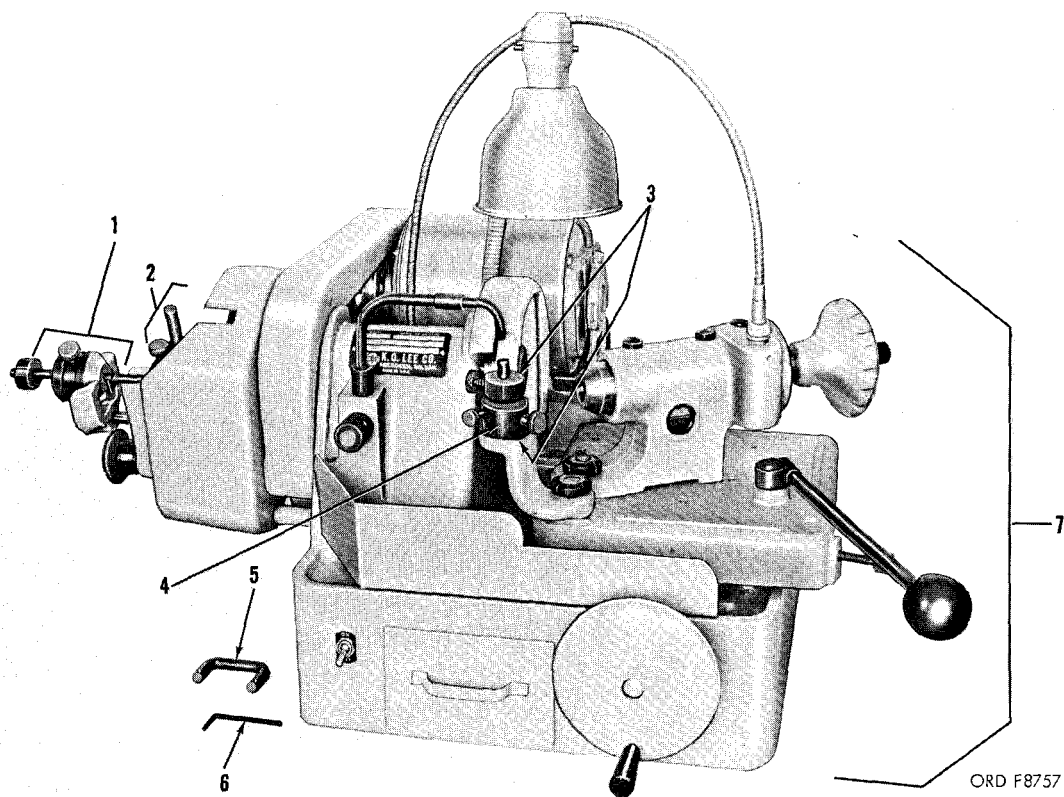


Figure 1. Grinding Machine w/ attached equipment.

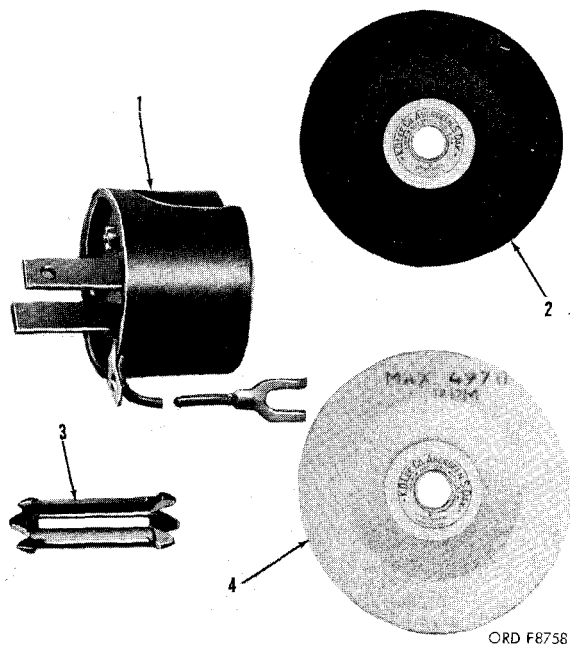


Figure 2. Equipment.

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Units org under fol TOE:
 5-278 (2)

NG: None.

USAR: None.

For explanation of abbreviations used, see AR 320-50.

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The Metric System and Equivalents

Linear Measure

1 centimeter = 10 millimeters = .39 inch
 1 decimeter = 10 centimeters = 3.94 inches
 1 meter = 10 decimeters = 39.37 inches
 1 dekameter = 10 meters = 32.8 feet
 1 hectometer = 10 dekameters = 328.08 feet
 1 kilometer = 10 hectometers = 3,280.8 feet

Weights

1 centigram = 10 milligrams = .15 grain
 1 decigram = 10 centigrams = 1.54 grains
 1 gram = 10 decigrams = .035 ounce
 1 dekagram = 10 grams = .35 ounce
 1 hectogram = 10 dekagrams = 3.52 ounces
 1 kilogram = 10 hectograms = 2.2 pounds
 1 quintal = 100 kilograms = 220.46 pounds
 1 metric ton = 10 quintals = 1.1 short tons

Liquid Measure

1 centiliter = 10 milliliters = .34 fl. ounce
 1 deciliter = 10 centiliters = 3.38 fl. ounces
 1 liter = 10 deciliters = 33.81 fl. ounces
 1 dekaliter = 10 liters = 2.64 gallons
 1 hectoliter = 10 dekaliters = 26.42 gallons
 1 kiloliter = 10 hectoliters = 264.18 gallons

Square Measure

1 sq. centimeter = 100 sq. millimeters = .155 sq. inch
 1 sq. decimeter = 100 sq. centimeters = 15.5 sq. inches
 1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. feet
 1 sq. dekameter (are) = 100 sq. meters = 1,076.4 sq. feet
 1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47 acres
 1 sq. kilometer = 100 sq. hectometers = .386 sq. mile

Cubic Measure

1 cu. centimeter = 1000 cu. millimeters = .06 cu. inch
 1 cu. decimeter = 1000 cu. centimeters = 61.02 cu. inches
 1 cu. meter = 1000 cu. decimeters = 35.31 cu. feet

Approximate Conversion Factors

To change	To	Multiply by	To change	To	Multiply by
inches	centimeters	2.540	ounce-inches	newton-meters	.007062
feet	meters	.305	centimeters	inches	.394
yards	meters	.914	meters	feet	3.280
miles	kilometers	1.609	meters	yards	1.094
square inches	square centimeters	6.451	kilometers	miles	.621
square feet	square meters	.093	square centimeters	square inches	.155
square yards	square meters	.836	square meters	square feet	10.764
square miles	square kilometers	2.590	square meters	square yards	1.196
acres	square hectometers	.405	square kilometers	square miles	.386
cubic feet	cubic meters	.028	square hectometers	acres	2.471
cubic yards	cubic meters	.765	cubic meters	cubic feet	35.315
fluid ounces	milliliters	29.573	cubic meters	cubic yards	1.308
pints	liters	.473	milliliters	fluid ounces	.034
quarts	liters	.946	liters	pints	2.113
gallons	liters	3.785	liters	quarts	1.057
ounces	grams	28.349	liters	gallons	.264
pounds	kilograms	.454	grams	ounces	.035
short tons	metric tons	.907	kilograms	pounds	2.205
pound-feet	newton-meters	1.356	metric tons	short tons	1.102
pound-inches	newton-meters	.11296			

Temperature (Exact)

°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C
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