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DATE - October 6, 1961

MODIFICATION OF ALLIED ENGINEERING CORPORATION MANIPULATOR TONG

F. L. Peishel

E. L. Hutto

ABSTRACT

A manipulator tong manufactured by the Allied Engineering and Production Corporation of Alameda, California was modified to include an alpha seal at the slave end.

This arrangement is used in conjunction with Castle manipulators in a lead-shielded glove box to obtain protection from both gamma and alpha radiation.

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A manipulator tong, Model 3650, manufactured by Allied Engineering and Production Corporation of Alameda, California, was supplied as a component of an alpha-gamma shielded glove box.

The existing O-ring seal shown on "Assembly Type B" of Drawing D-47110 is replaced by a rubber bellows and O-ring combination as shown on this same drawing. This new sealing arrangement will not transfer activity along the axis of the tube.

The internal motions of the manipulator are a reciprocating and a rotating movement of the central shaft and cable. The bellows was installed to prevent transfer of activity to the housing tube by the reciprocating motion. The O-ring, subject to rotation only, seals the contaminated end from the uncontaminated tube interior.

The bellows portion of the seal is made from a section of corrugated breathing tube, Mine Safety Appliance Company part number CS-10650. The remainder of the parts are as listed on Drawing D-47110 and detailed on Drawing D-44974.

A test conducted on this unit by applying 5 psig of air pressure to the slave end of the tube produced no detectable leakage with the outlet end of the tube submerged in 1/2-in. of water. The unit is normally operated at 0.35 in. of water with a possible surge to 3 in. of water.

The detailed design of this unit was performed by E. L. Hutto of the Engineering and Mechanical Division of Oak Ridge National Laboratory, with assistance from Chemical Technology Division personnel.

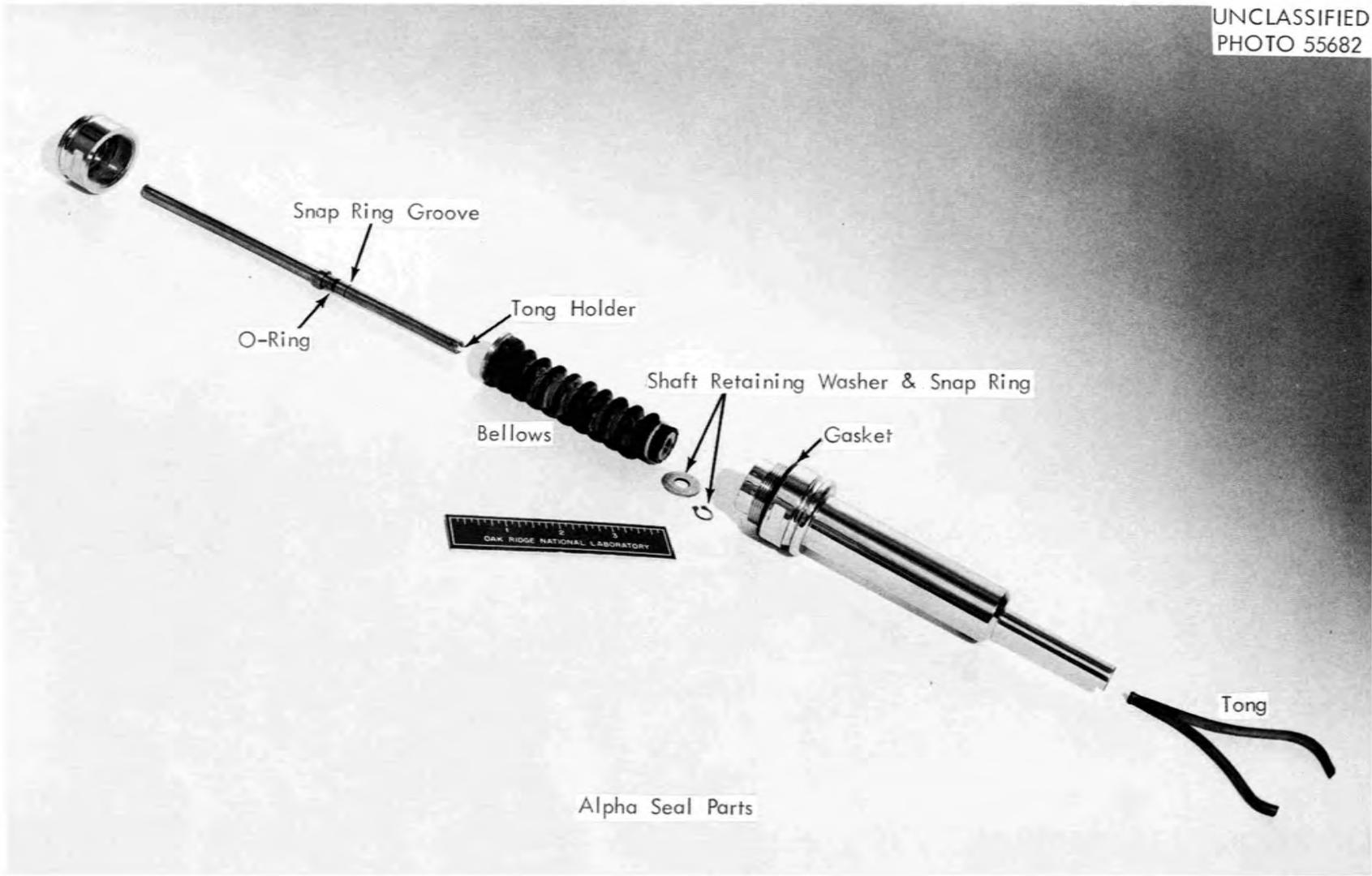
Frank L. Peishel

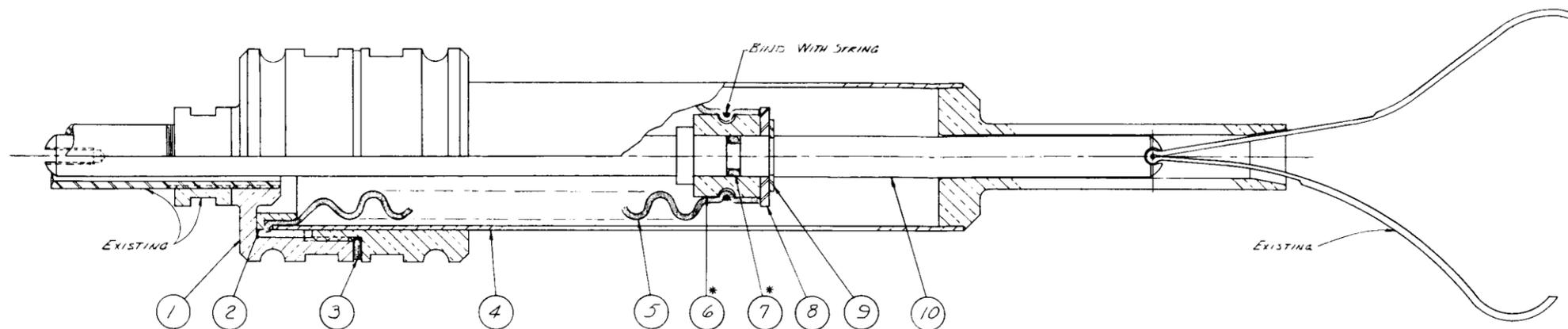
F. L. Peishel
Process Design Section
Chemical Technology Division

FLP:ELH/nr

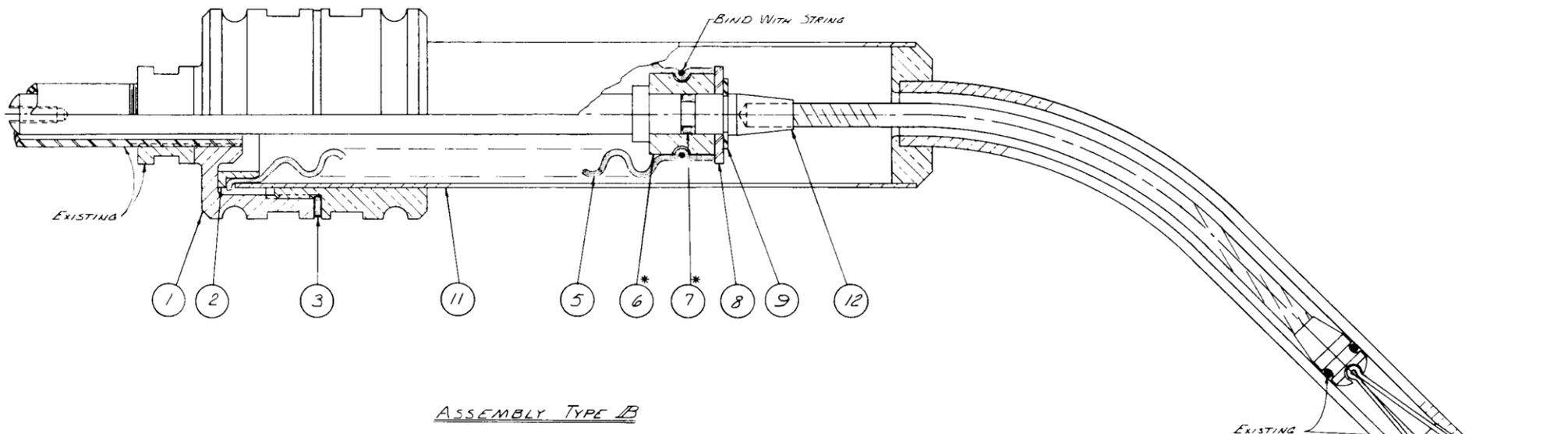


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ASSEMBLY TYPE A



ASSEMBLY TYPE B

PARTS LIST				
PART NO.	DWG. NO.	NO. REQD.	DESCRIPTION (NAME, SIZE, ETC.)	MATERIAL
TYPE A				
1	D-44974	1	NUT	BRASS
2	D-44974	1	BAND	BRASS
3	STOCK	1	GASKET 1 7/8 OD x 1 1/4 ID x 1/16 THK	NEOPRENE
4	D-44974	1	HOUSING	BRASS
5	D-44974	1	BOOT	NEOPRENE
6	D-44974	1	RING	BRASS
7	STOCK	1	O RING PARKER No. 5427-3	NEOPRENE
8	D-44974	1	WASHER	STL
9	STOCK	1	RETAINING RING TRUMC No. 5100-31	STL
10	D-44974	1	SHAFT	STL
TYPE B				
1	D-44974	1	NUT	BRASS
2	D-44974	1	BAND	BRASS
3	STOCK	1	GASKET 1 7/8 OD x 1 1/4 ID x 1/16 THK	NEOPRENE
5	D-44974	1	BOOT	NEOPRENE
6	D-44974	1	RING	BRASS
7	STOCK	1	O RING PARKER No. 5427-3	NEOPRENE
8	D-44974	1	WASHER	STL
9	STOCK	1	RETAINING RING TRUMC No. 5100-31	STL
11	D-44974	1	HOUSING	BRASS
12	D-44974	1	SHAFT	STL

* NOTE
LUBRICATE PART No. 7 AND I.D. OF PART No. 6 WITH
PETROLEUM JELLY AT ASSEMBLY

W. E. Long

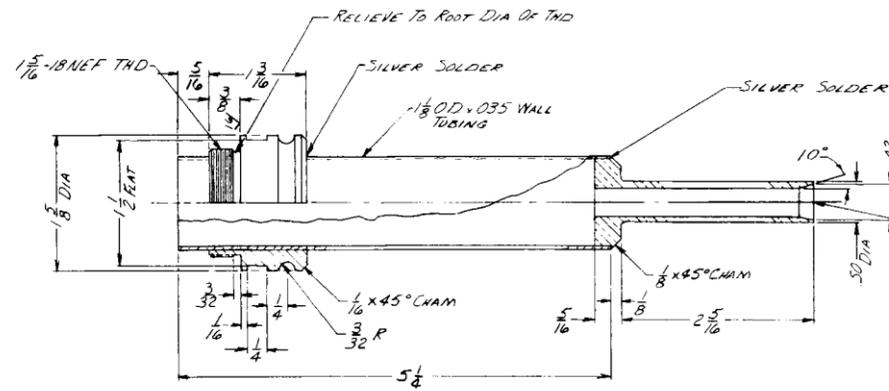
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DRAWN	DATE	CHECKED	DATE	APPROVED
REVISIONS	DATE	SUBMITTED	DATE	APPROVED
Hutto	10-6-61	FATE	10-1-61	H. G. Johnson

GENERAL SPECIFICATIONS:
1. Break all sharp edges 1/64 min., unless otherwise specified.
2. The fabricator may choose the type, grade or finish of material unless otherwise specified.
MACHINE FINISH SPECIFICATIONS:
1. Finish symbols are in accordance with ASA Standard B46.1-1958.
2. Roughness height values are the maximum arithmetical average deviation from the mean surface, expressed in microinches.
3. For surfaces not otherwise indicated, roughness height shall not exceed .

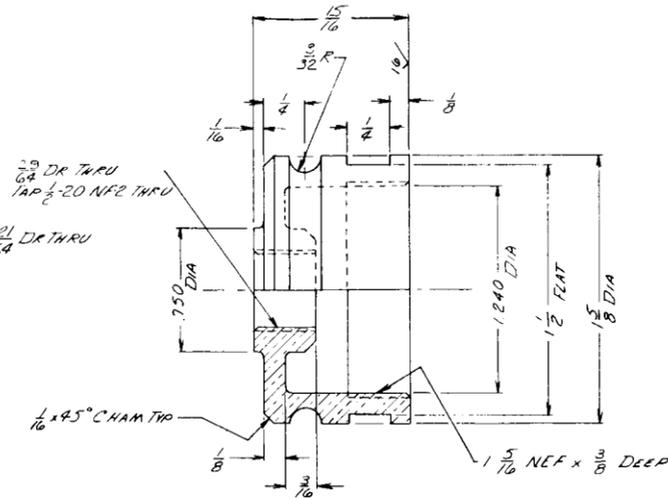
CLASSIFICATION
LIMITS ON DIMENSIONS UNLESS OTHERWISE SPECIFIED
FRACTIONS ±
DECIMALS ±
ANGLES ±
SCALE: 2"=1"

TYPE A AND TYPE B DETAILS	D-44974
REFERENCE DRAWINGS	DWG. NO.
ALSO MANIPULATOR ALPHA SEAL PQU PROGRAM 3508	
SEALED MANIPULATOR TONG ASSEMBLY TYPE A AND TYPE B	
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APPROVED	APPROVED
<i>W. E. Long</i>	<i>W. E. Long</i>
DATE: 10-23-61	DATE: 10-23-61
BY: G. E. Johnson	BY: G. E. Johnson
REV	REV
D-47110	

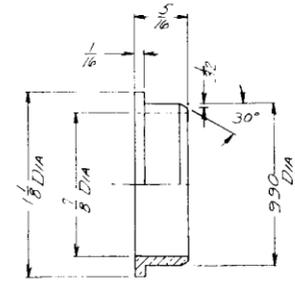
PARTS LIST				
PART NO.	DWG. NO.	NO. REQD.	DESCRIPTION (NAME, SIZE, ETC.)	MATERIAL



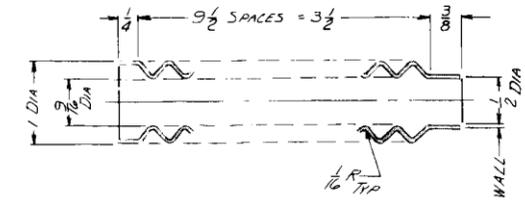
4 HOUSING
MATEL - BRASS (CHROME PLATE)
SCALE - 1:1



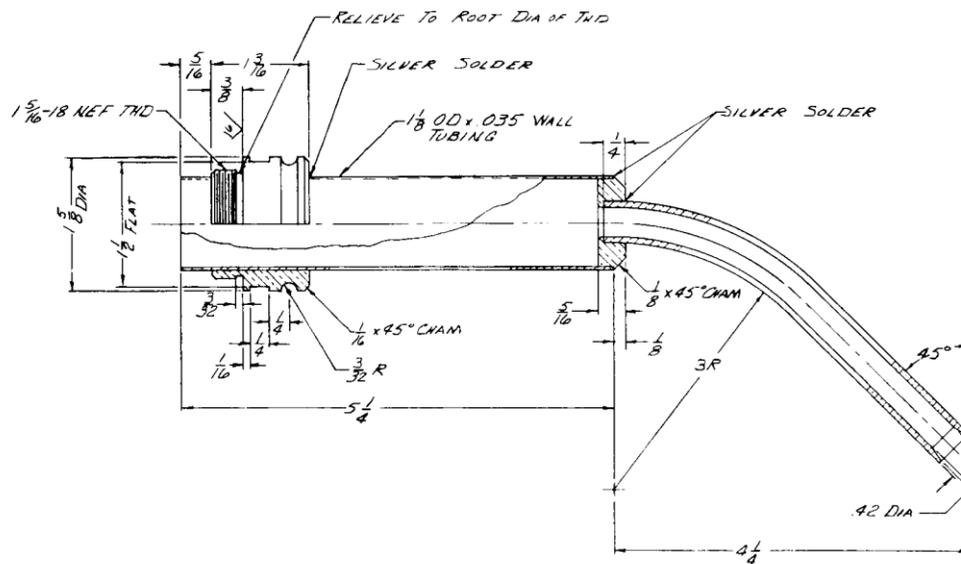
1 NUT
MATEL - BRASS (CHROME PLATE)
SCALE - 2:1



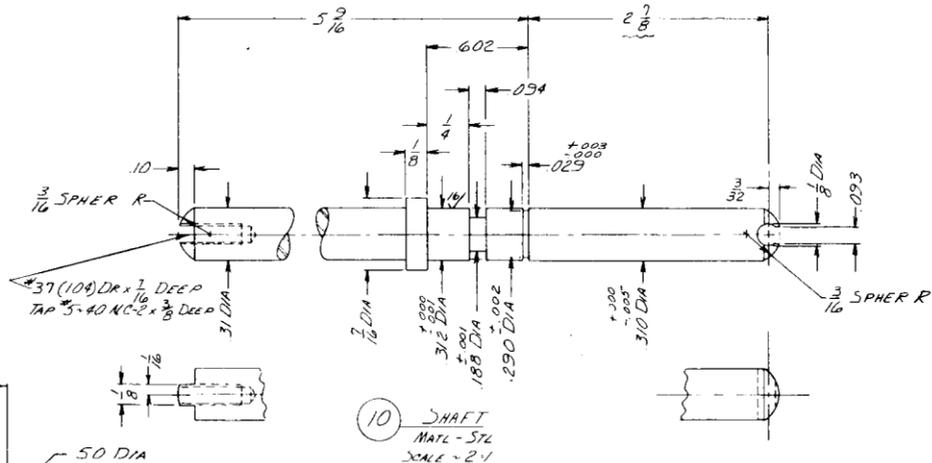
2 BAND
MATEL - BRASS
SCALE - 2:1



5 BOOT
MATEL - NEOPRENE
SCALE - 1:1

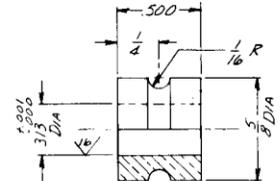


11 HOUSING
MATEL - BRASS (CHROME PLATE)
SCALE 1:1

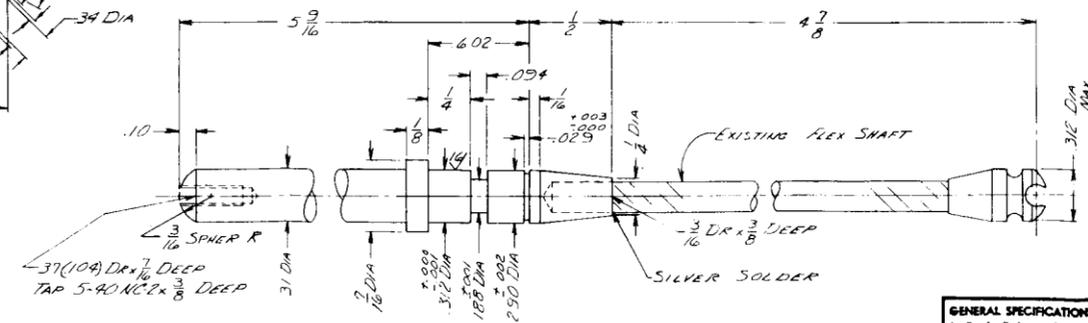


10 SHAFT
MATEL - STL
SCALE - 2:1

8 WASHER
MATEL - STL
SCALE 2:1



6 RING
MATEL - BRASS
SCALE - 2:1



12 SHAFT
MATEL - STL
SCALE - 2:1

REVISIONS					
DATE	APPD	APPD	DATE	APPD	APPD
3-4-61	Hutto	10-6-61	10-11-61		
10-8-61	Frantz	10-11-61	11-11-61		

GENERAL SPECIFICATIONS:
1. Break all sharp edges 1/64 min. unless otherwise specified.
2. The fabricator may choose the type, grade or finish of material unless otherwise specified.
MACHINE FINISH SPECIFICATIONS:
1. Finish symbols are in accordance with ASA Standard B46.1-1958.
2. Roughness height values are the maximum arithmetical average deviation from the mean surface, expressed in microinches.
3. For surfaces not otherwise indicated, roughness height shall not exceed 32.

CLASSIFICATION
LIMITS ON DIMENSIONS UNLESS OTHERWISE SPECIFIED
FRACTIONS: ± 1/64
DECIMALS: ± 0.001
ANGLES: ± 1/2°

TYPE A AND TYPE B ASSEMBLY		D-49710
REFERENCE DRAWINGS		DWG. NO.
MANIPULATOR ALPHA SEAL P&U PROGRAM		
SEALING MANIPULATOR TONG		
TYPE A AND TYPE B DETAILS		
OAK RIDGE NATIONAL LABORATORY		
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DIVISION OF UNION CARBIDE CORPORATION		
OAK RIDGE, TENNESSEE		
APPROVED	APPROVED	APPROVED
REVISIONS	DATE	BY
1	10-25-61	D-44974

W. E. Winger

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