

OTTO TOOL

**MODEL TSM-4500M
TUBE SQUARING
MACHINE**

OPERATING INSTRUCTIONS



OTTO TOOL, INC

REV 6/2007

**OTTO TOOL
TUBE SQUARING MACHINE**

MODEL TSM-4500M

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TSM-4500M TUBE SQUARING MACHINE

INTRODUCTION

The information in this manual is up to date at time of printing. Otto Tool is committed to continued product improvement, the machine you receive may be slightly different than the one described herein.

Warning:

Moving machine parts can seriously injure untrained operators. Understand all instructions before operating this machine. This manual describes how to use your Model TSM-4500M Tube Squaring Machine. This machine tool is designed for facing short tubing and elbows from 1" to 4-1/2" diameter and piping from 1" to 4" with lengths greater than .550". For maximum safety and performance, read the entire instruction manual before operating this machine.

Applications:

This model Tube Squaring Machine can be used in a wide variety of applications but is specifically designed for facing tubing. The modular design and versatile setup allow you to be creative in solving difficult machine problems, however, it is very important to follow the operating manual and maintain integrity of the machine. Do not modify it in any unspecific manner.

When you receive it:

Inspect the machine for shipping damage. Be sure you received the parts listed on the invoice. Contact Otto Tool immediately if there are any errors or questions regarding this machine.

SAFETY PRECAUTIONS

The following is a list of general safety guidelines to be considered when operating this tool. Standard safe machining practices should always be followed when operating Otto Tools Machines.

Before operating this machine, read the entire Operating Instructions.

Inspect machine, cord and accessories for any damage.

Wear Safety glasses, ear plugs, and safety shoes while operating the machine. Keep your equipment clean and in good condition for maximum protection. Follow company and OSHA safety rules when operating equipment.

The motor should always be disconnected from the power source whenever servicing the machine or changing cutting inserts, collets, or other components.

SAFETY INFORMATION

WARNING!

MOVING PARTS. Keep hands, loose clothing, and Hair away from rotating or moving parts. Unplug all Equipment prior to adjusting or servicing.

WARNING!

ELECTRICAL SHOCK. Possible shock if not handled properly.

WARNING!

KEEP DRY. Keep all equipment and components away from any water source.

WARNING!

EYE PROTECTION.

Eye protection must be worn while operating or working near Facing equipment.

WARNING!

EAR PROTECTION.

Ear protection should be worn while operating or working near loud equipment.

TSM-4500M TUBE SQUARING MACHINE

DESCRIPTION

The TSM-4500M Tube Squaring Machine is designed for facing short tubing and elbows from 1” to 4-1/2” diameter and piping from 1” to 4” with lengths greater than .550”. The latch assembly is a self aligning, so it will work with out of round tubing or pipe. This feature will let you take an out-

of-round tubing or pipe and face a square end. This machine is portable, or may be mounted on a bench for high volume operations.

The collets are made from hard anodized aluminum and are designed so the integrity of electro-polished tubing is not affected by their use. There is come in a three piece set. Two types of collets are available: 1) **standard style for short elbows and 2) extended style** for better grip on longer tubing. Our tool bits are designed to work in the following materials: stainless steel, iconel, hastelloy, carbon steels, aluminum, and a variety of other alloys.

The standard TSM-4500M-10 package includes:

- Operating tool (main body)
- Electric drive unit with variable speeds
- Custom carrying case
- Two facing tool bits
- Tool kit
- Operating manual

Specifications:

- Weight (with motor, without collets): 23.4 lbs. (10.6 kg)
- Overall length: 17-1/2 inches (444.5mm)
- Overall height: 10-1/2 inches (266.7 mm)
- Overall width 9-1/2 inches (241.3 mm)
- Motor: 120VAC 60Hz-US style
220VAC 50 Hz-CE complaint

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SET UP AND OPERATION

COLLET

1. When you decided which sizes tubing or pipe that you are going to use, take collets and put them in the latch assembly, 3 pieces
2. Take your 3/16 Allen head wrench and inserts one of the collect into the latch assembly and tighten screw

in the collect to latch assembly. Then take the second & third collet and do the same.

- Now take a piece of tubing or pipe and put into the collets, you will then adjust the screw of the clamp latch to make the clamp down secure.

STANDARD TUBE AND PIPE COLLETS				
PART #	SIZE		PART #	SIZE
TSM-7101	1"		TSM-7108	4" (3-1/2" P)
TSM-7102	1-1/4"		TSM-7109	4-1/2" (4" P)
TSM-7103	1-1/2"		TSM-7110	3/4" PIPE
TSM-7104	2"		TSM-7111	1" PIPE
TSM-7105	2-1/2"		TSM-7112	1-1/2" PIPE
TSM-7106	3"		TSM-7113	2" PIPE
TSM-7107	3-1/2" (3"P)		TSM-7114	2-1/2" PIPE

EXTENDED TUBE AND PIPE COLLETS				
PART #	SIZE		PART #	SIZE
TSM-7201	1"		TSM-7208	4" (3-1/2" P)
TSM-7202	1-1/4"		TSM-7209	4-1/2" (4" P)
TSM-7203	1-1/2"		TSM-7210	3/4" PIPE
TSM-7204	2"		TSM-7211	1" PIPE
TSM-7205	2-1/2"		TSM-7212	1-1/2" PIPE
TSM-7206	3"		TSM-7213	2" PIPE
TSM-7207	3-1/2" (3"P)		TSM-7214	2-1/2" PIPE

TSM-4500M TUBE SQUARING MACHINE

FEED HANDLE & FEED DIAL INDICATOR

- For the comfort and convenience of the operator, the feed handle is located at the back of the machine. Rotate the feed handle clock was to move tool bit toward tubing.
- On the inside of the feed handle is a feed dial indicator to control the distant travel with the feed handle. When using this feature, make sure the motor is off; use the feed handle to

advance the tool bit forward just until it contacts the work piece/tubing.

3. Then move the indicator to zero position, and then turn the tool bit back away from the tubing.
4. Now you can start the motor and feed the handle in clockwise, cutting the tubing to desire length. Each mark is .015 increments

ELECTRIC DRILL MOTOR

The electric motor can be rotated 360 degrees to allow for comfortable machine operation.

To rotate machine:

1. Loosen the socket head cap screw on the split collar.
2. Rotate the motor to the most comfortable and or convenient position.
3. Tighten the socket head cap screw before turning on the machine.

TOOL BIT SELECTION

Select the right tool bit for your application. Note that using the wrong type of tool bit or using dull bits may result in poor performance.

You have to remember that these tool bits are design to move the chip away from the tubing so not to scratch the inside of the EP Tubing.

TSM-4500M TUBE SQUARING MACHINE

This is done by have angle that cause the chip to flow away from the tubing by the radius angle built into the tool bit. This is important to understand, because of the design of the tool bit; you want to set the cutting bit closes to the inside of the tool bit as possible. This will give you the best cutting edge on the tool bit.

To change bits:

1. Unplug the motor from the power source before installing the tool bits.
2. Insert the tool bit into the slot and look at the top of the cutter head and align the tool bit to the size of tubing or piping to the marking on the cutter head. This will give you a starting point.

3. Make sure the cutting edge is facing counterclockwise and set screws are facing away from cutting edge.
4. Tighten down the set screws.

NOTE

**Slower speeds produce minimum burrs when working
With Electropolished Stainless Tubing.**

CAUTION

**Running the drill to fast will work harden the stainless steel
tubing and quickly damage the tool bits**

TOOL BITS FOR TSM-4500M	
PART #	
TB-1506	Standard Tool Bit for SS Material
TB-1506-TIN	Tin-Coated Tool Bit for SS Material
TB-1506-LC	Laser Coated Tool Bit for SS Material
TB-1506-C	Carbide Tip for use on High Nickel Material
TB-1479	Left Handed Tool Bit for SS Material
TB-0205	Heavy Duty for Larger Wall thickness
TB-0167	37-1/2 Degree Bevel Bit

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FEED DIAL INDICATOR

The feed dial indicator is only used when a certain amount of travel is needed. Typically, just giving the tube end a 100% clean up is enough.

To use feed dial indicator:

1. With the motor off, use the feed handle to advance the tool bit forward just until it contacts the work piece.
2. Holding the cutter against the work piece, rotate feed dial indicator to any reference mark on the feed dial. The feed dial is stamped in .015" increments.
3. Back the tool bit away from the work piece.
4. Start the motor and feed as before using the referenced feed dial setting as a depth of cut guide.

MAINTENANCE

GENERAL MACHINE MAINTENANCE

During heavy operation, regularly use a brush to clean chips away from the machine. Wipe the machine down thoroughly when you are through with the machine. Do not spray anything into the electric motor body.

ELECTRIC MOTOR MAINTENANCE

Periodically check the motor brushes for excess wear or damage. Replace as needed. Check the power cord for cuts, tears, or abrasions.

COLLET MAINTENANCE

Keep clamp collets together in their respective sets. When not in use, store in case. Collet repair kits are available from your retailer.

TOOL BIT MAINTENANCE

When possible, leave unused tool bits in their packages to prevent them from being damaged if dropped. Store tool bits that have been taken from their original package in a safe place.

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OTTO TOOL

TSM-4500M TUBE SQUARING MACHINE

WARRANTY

EVERY OTTO TOOL IS THOROUGHLY INSPECTED AND TESTED BEFORE LEAVING OUR MANUFACTURING FACILITIES. ALL PRODUCTS MANUFACTURED BY OTTO TOOL COMPANY ARE WARRANTED TO THE ORIGINAL PURCHASER TO BE FREE FROM DEFECTS IN MATERIAL AND WORKMANSHIP UNDER NORMAL USE, FOR A PERIOD OF ONE YEAR FROM THE DATE OF PURCHASE. THIS DOES NOT INCLUDE TOOL BITS OR OTHER CONSUMABLE ITEMS. SHOULD ANY TROUBLES DEVELOP, RETURN THE COMPLETE TOOL PREPAID TO OTTO TOOL OR THE NEAREST AUTHORIZED SERVICE CENTER. IF INSPECTION SHOWS THE TROUBLE IS CAUSED BY DEFECTIVE WORKMANSHIP OR MATERIAL, OTTO TOOL AT ITS OPTION WILL REPAIR OR REPLACE WITHOUT CHARGE FOR EITHER

PARTS OR LABOR. THE PRODUCT WILL BE RETURNED TO THE PURCHASER FREIGHT PREPAID AND BILLED TO THE PURCHASER.

THIS WARRANTY DOES NOT APPLY WHERE:

- A) REPAIRS OR ATTEMPTED REPAIRS HAVE BEEN MADE BY PERSONS OTHER THEN OTTO TOOL PERSONAL, OR AUTHORIZED SERVICE REPAIR PERSONAL.
- B) REPAIRS ARE REQUIRED BECAUSE OF NORMAL WEAR.
- C) THE TOOL HAS BEEN ABUSED OR INVOLVED IN AN ACCIDENT.
- D) MISUSE IS EVIDENT, SUCH AS CAUSED BY OVERLOADING THE TOOL BEYOND IT RATED CAPACITY.

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OTTO TOOL

TSM-4500M TUBE SQUARING MACHINE

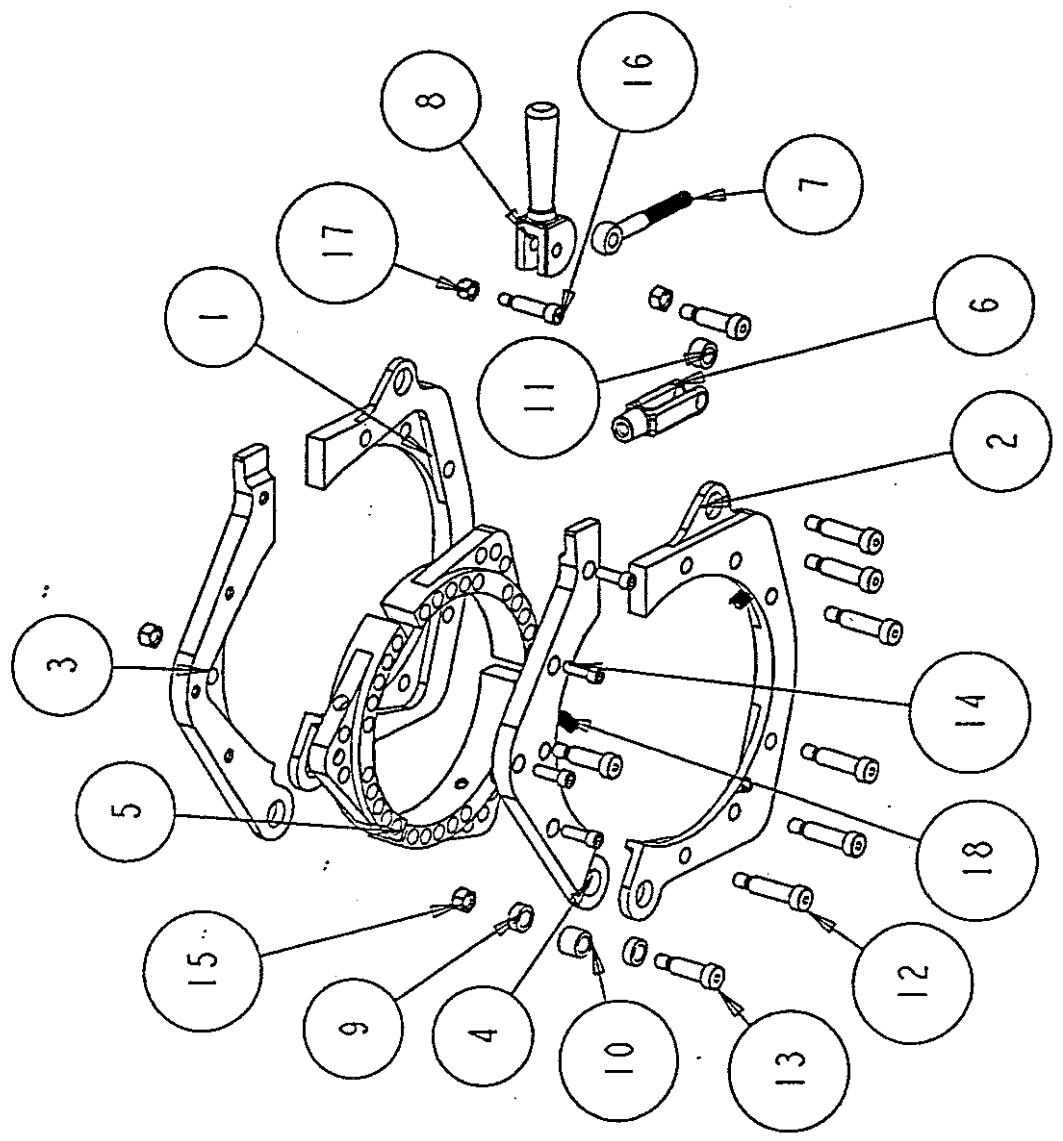
- E) THE TOOL HAS BEEN USED AFTER PARTIAL FAILURE, OR THE TOOL HAS BEEN USED WITH AN IMPROPER ACCESSORY.
- F) AIR MOTOR WILL NOT BE COVER IF DAMAGE IS CAUSED BY NOT USING OILER/MISER WHILE USING.

NO OTHER WARRANTY EITHER WRITTEN OR VERBAL IS AUTHORIZED.

**EXPLODED
VIEWS
AND
PARTS LISTS**

TSM-4500M PART NUMBERS 7/30/97
TSM-7001 RING GEAR
TSM-7002 WORM GEAR
TSM-7003 BEARING
TSM-7004 BEARING
TSM-7005 BEARING
TSM-7006 FRONT SEAL
TSM-7007 BEARING
TSM-7008 THRUST NEEDLE BEARING
TSM-7009 THRUST WASHER
TSM-7010 THRUST NEEDLE BEARING
TSM-7011 THRUST WASHER
TSM-7012 WORM SPACER
TSM-7013 RETAINING SPRING RING
TSM-7014 MACHINE SUPPORT
TSM-7015 MACHINE BASE
TSM-7016 KEENSERT
TSM-7017 O-RING
TSM-7018 O-RING
TSM-7019 O-RING
TSM-7020 MAIN HOUSING
TSM-7021 WORM SHAFT RETAINER CAP NUT
TSM-7022 WORM SHAFT
TSM-7023 MOTOR COUPLING
TSM-7024 FRONT SPACER
TSM-7025 REAR SPACER
TSM-7026 CUTTER SHAFT
TSM-7027 BACK COVER
TSM-7028 FEED SCREW
TSM-7029 FEED KNOB
TSM-7030 SCALE RING
TSM-7031 LOWER BACK HALF HOUSING
TSM-7032 LOWER FRONT HALF HOUSING
TSM-7033 UPPER BACK HALF HOUSING
TSM-7034 UPPER FRONT HALF HOUSING
TSM-7035 COLLET CARRIER
TSM-7036 YOKE
TSM-7037 ROD END
TSM-7038 DOUBLE CAM LOCK
TSM-7040 BUSHING PIVOT OUTER
TSM-7041 BUSHING PIVOT INTER
TSM-7042 BUSHING PIVOT YOKE
TSM-7043 3/8" SHOULDER BOLT 1.25 LONG
TSM-7044 3/8" SHOULDER BOLT 1.00 LONG
TSM-7045 10-32 X 1 1/2" SHCS
TSM-7046 1/4-20 X 3/4" SHCS
TSM-7047 5/16-18 LOCK NUT
TSM-7048 5/16 SHOULDER BOLT 1" LONG
TSM-7049 1/4-20 LOCK NUT
TSM-7050 1/4-20 X 4" SHCS
TSM-7051 SPRING
TSM-7052 1/4-20 X 3/8" SET SCREW
TSM-7053 1/4-20 X 1" SHCS
TSM-7054 WORM KEY

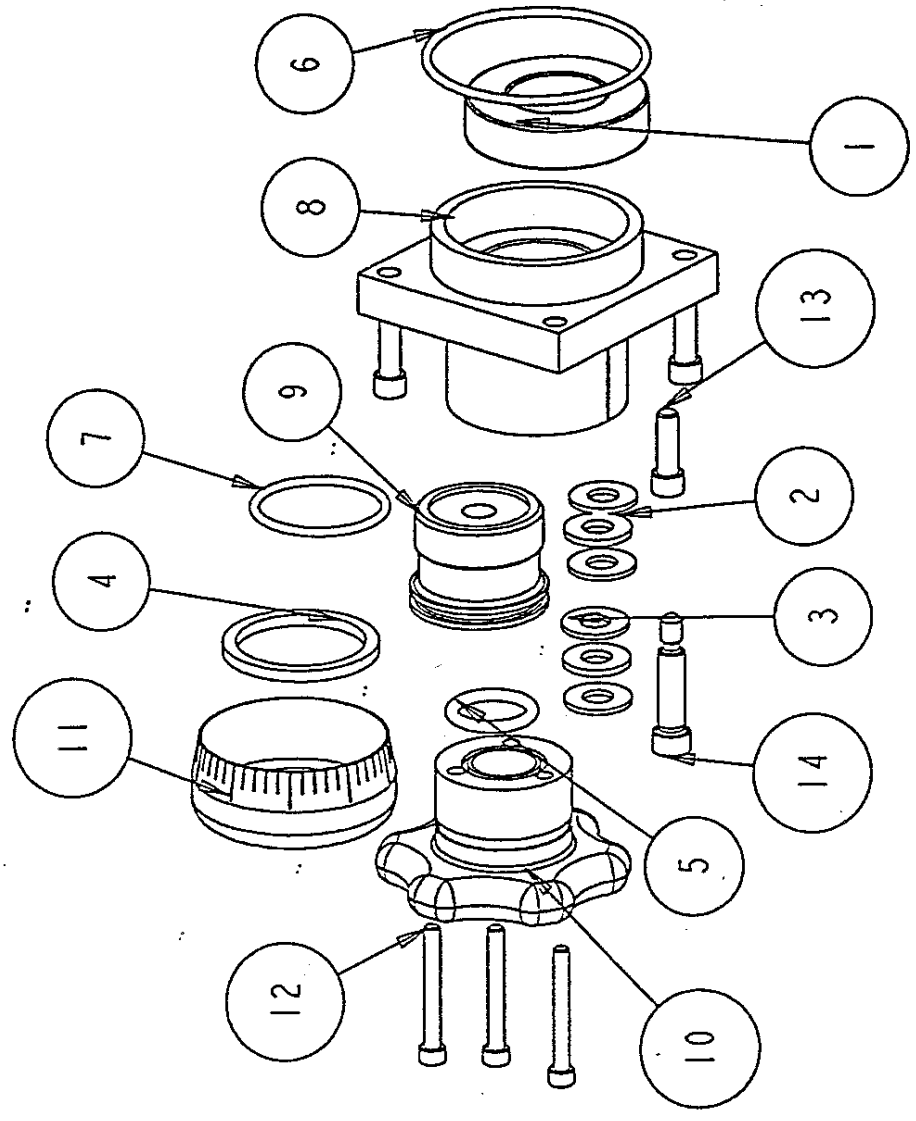
REV	DESCRIPTION	DATE	APPROVED



ITEM NO	ITEM	QUANTITY
1	TSM7031	1
2	TSM7032	1
3	TSM7033	1
4	TSM7034	1
5	TSM7035	3
6	TSM7036	1
7	TSM7037	1
8	TSM7038	1
9	TSM7040	2
10	TSM7041	1
11	TSM7042	1
12	TSM7043	6
13	TSM7044	3
14	TSM7046	4
15	TSM7047	3
16	TSM7048	1
17	TSM7049	1
18	TSM7051	3

TITLE:	CLAMP ASSY	0
PROJECT:	TSM-4500H	24-JUN-97
	CLAMP ASSY	
	OTTO TOOL	

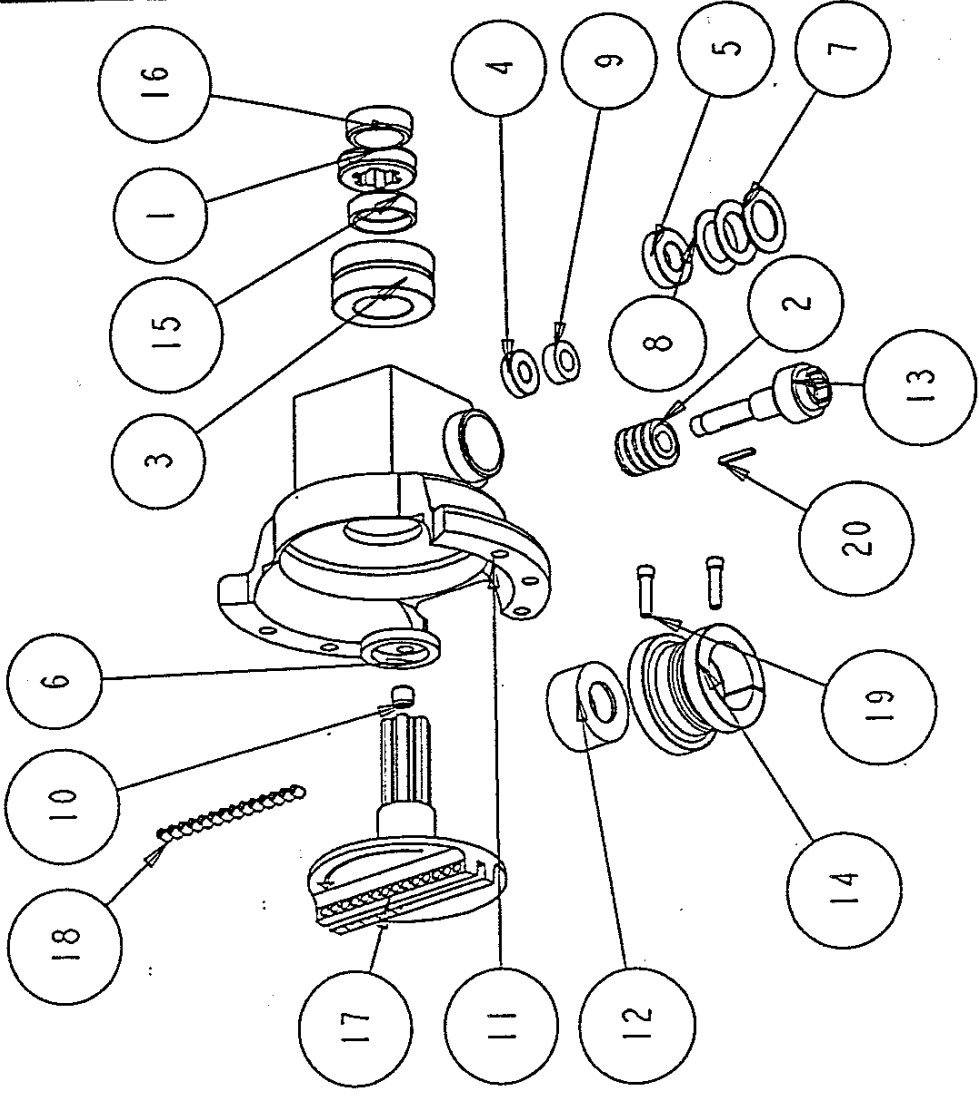
REV	DESCRIPTION	DATE	APPROVED



QTY	DESCRIPTION	QTY
1	TSM7007	1
2	TSM7010	2
3	TSM7011	4
4	TSM7013	1
5	TSM7017	1
6	TSM7018	1
7	TSM7019	1
8	TSM7027	1
9	TSM7028	1
10	TSM7029	1
11	TSM7030	1
12	TSM7045	3
13	TSM7046	4
14	TSM7048	1

TITLE: FEED KNOB ASSEMBLY
 PROJECT: TSM-4500H
 FEEDKNOBASSY
 0
 18-JAN-91
OTTO TOOL

REV	DESCRIPTION	DATE	APPROVED

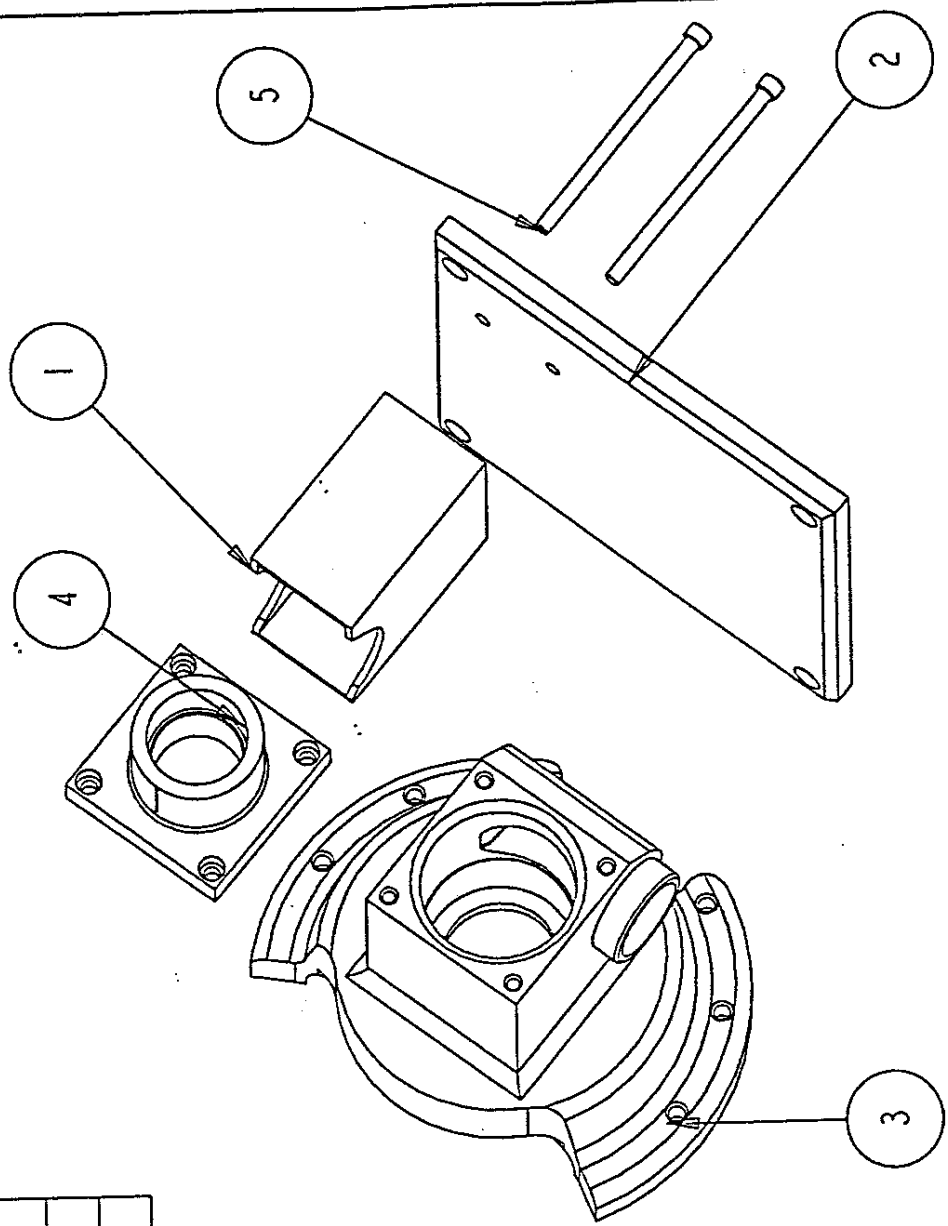


INDIA	NAME	QUANTITY
1	TSM7001	1
2	TSM7002	1
3	TSM7003	2
4	TSM7004	1
5	TSM7005	1
6	TSM7006	1
7	TSM7008	1
8	TSM7009	2
9	TSM7012	1
10	TSM7016	1
11	TSM7020A	1
12	TSM7021	1
13	TSM7022	1
14	TSM7023	1
15	TSM7024	1
16	TSM7025	1
17	TSM7026	1
18	TSM7052	14
19	TSM7053	2
20	TSM7054	1

TITLE	MAIN BODY ASSEMBLY	MAIN_BODY	0
PROJECT	TSM-45004	30-Jan-97	
		OTTO TOOL	

REV	DESCRIPTION	DATE	APPROVED

INDEX	NAME	QUANTITY
1	TSM7014	1
2	TSM7015	1
3	TSM7020A	1
4	TSM7027	1
5	TSM7050	2



TITLE: BASE ASSEMBLY	BASE_ASSEMBLY	0
PROJECT: TSM-4500H	3P-Jnt-97	
OTTO TOOL		