

# Instructions for use of

## PM-825 PORTA-MATIC (ST-1168)

**READ CAREFULLY BEFORE USING THIS MACHINE**

The "PM-825" PORTA-MATIC can be used to salvage a cylinder block which has a damaged or cracked counterbore ledge. The original block liner counterbore ledge is machined out and a repair bushing which forms a new counterbore is installed. The bores can be enlarged and a new bushing installed in about five minutes per bore. This time does not include checking and finish machining the counterbore ledge. Finish cutting the counterbore ledge after rebushing takes about three to five minutes a bore, with the "CBU-900" Counterbore Tool.

The counterbore salvage bushings, Parts No's. 202226 (NH, V-12, 5½ inch bore) and 203873 (V6-200, V8-265, cutting is required except cutting the counterbore ledge to depth. When installed, the bushing counterbore must be cut 0.005 inch to 0.010 inch deeper to meet Cummins specifications.

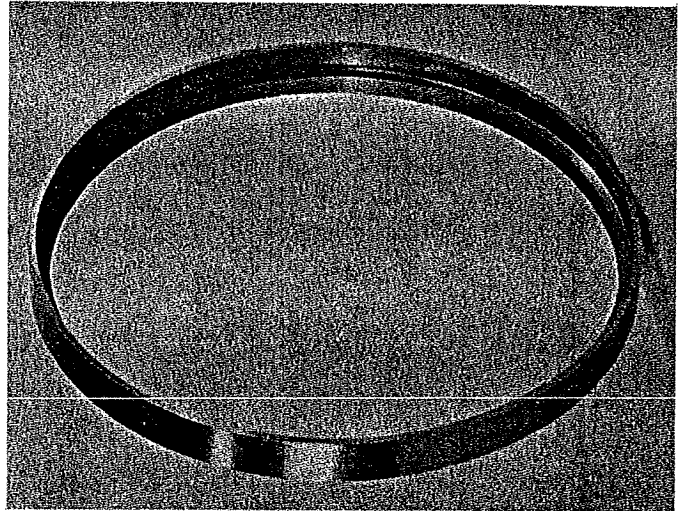


Fig. 1 Repair Bushing

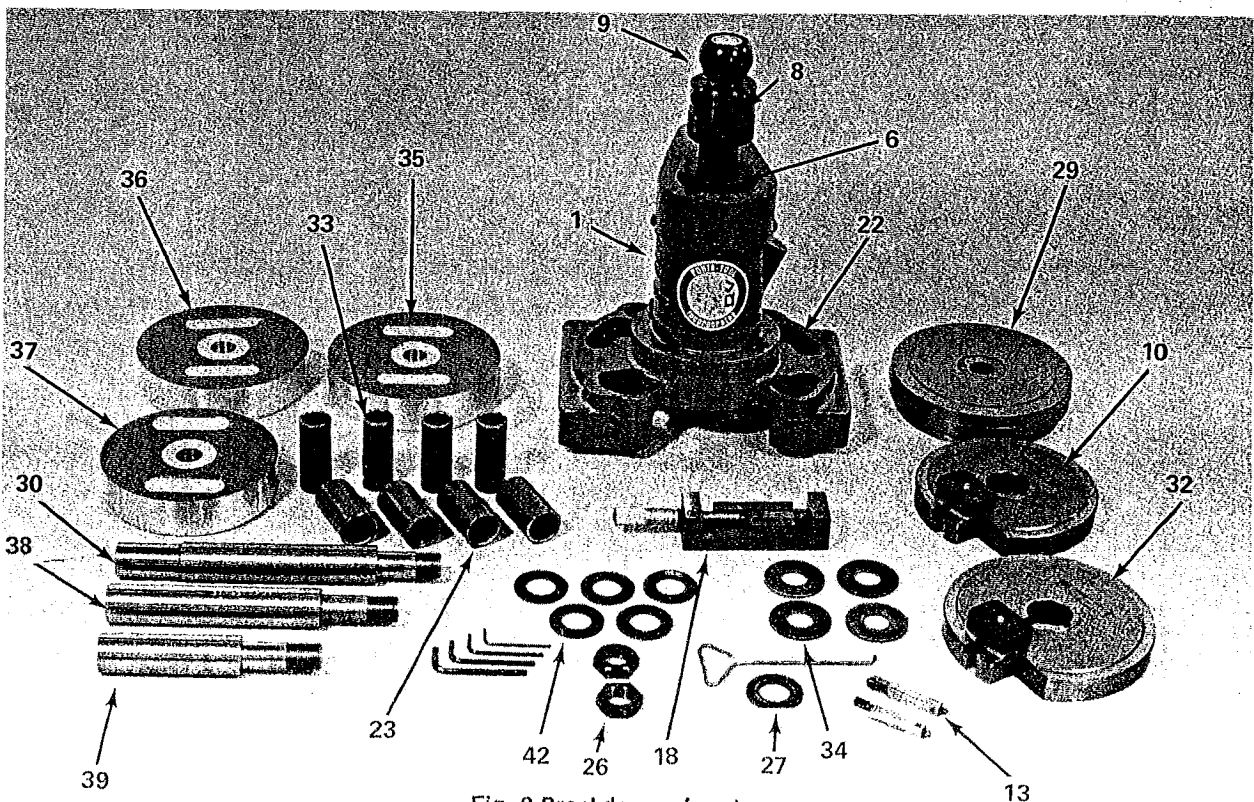


Fig. 2 Breakdown of parts.

# PARTS BREAKDOWN FOR "PM-825" PORTA-MATIC:

DET. #	PART #	PART DESCRIPTION	AMT.	DET. #	PART #	PART DESCRIPTION	AMT.
1	PM-1	Main Housing Assy.	1	23	PM-29	1" Stud Adapters	4
2	PM-2	Drive Bracket (NS)	1	24	PM-31	Soc. Hd. Cap Scr. (NS)	2
3	PM-3	Drive Shaft (NS)	1	25	PM-32	Nut (NS)	2
4	PM-5	Drive Sprocket (NS)	1	26	PM-33	Jam Nut	1
5	PM-107	Drive Chain (NS)	1	27	PM-34	Cutoff Washer	1
6	PM-10	Spline Sprocket	1	28	PM-35	Soc. Hd. Cap Scr. (NS)	4
7	PM-11	Spline Washer (NS)	1	29	PM-36	Bushing Driver	1
8	PM-12	Depth Set Collar	1	30	PM-37	Bushing Driver Handle	1
9	PM-14	Needle Valve Knob	1	31	PM-38	Jam Nut (NS)	1
10	PM-15	Cutter Plate (5½ Bore)	1	32	PM-39	Cutter Plate (5½ Bore)	1
11	PM-17	Cutter Holder Plate (NS)	1	33	PM-40	¾" Stud Adapter	4
12	PM-18	Soc. Hd. Cap Scr. (NS)	2	34	PM-41	Washer (7/8 S.A.E.)	4
13	PM-19	Cutter	2	35	PM-43	Guide Plate (5-1/8 Bore)	1
14	PM-20	Swivel Pad Set Scr. (NS)	1	36	PM-44	Guide Plate (5½ Bore)	1
15	PM-21	Cutter Adj. Pin (NS)	1	37	PM-45	Guide Plate (V-903)	1
16	PM-22	Cutter Adj. Spring (NS)	1	38	PM-46	Bushing Driver Shaft (long)	1
17	PM-23	Soc. Set Scr. (NS)	1	39	PM-47	Bushing Driver Shaft (short)	1
18	PM-24	Micrometer Block	1	40	PM-105	Universal Drive Adapter (NS)	1
19	PM-25	Micrometer (NS)	1	41	PM-52	Setting Standard (NS)	1
20	PM-26	Soc. Hd. Cap Scr. (NS)	2	42	PM-50	Washer (¾ STD.)	4
21	PM-27	Cutter Stop (NS)	1	43	PM-13	Soc. Hd. Cap Scr. (NS)	1
22	PM-28	Base Plate	1				

\*Denotes Items not shown in breakdown picture.

## THE MICROMETER BLOCK

The MICROMETER BLOCK is preset at the factory with a direct reading micrometer (19); the reading on the micrometer directly corresponds to the bore size to be cut. However, due to shipping the MIKE BLOCK may be out-of-adjustment.

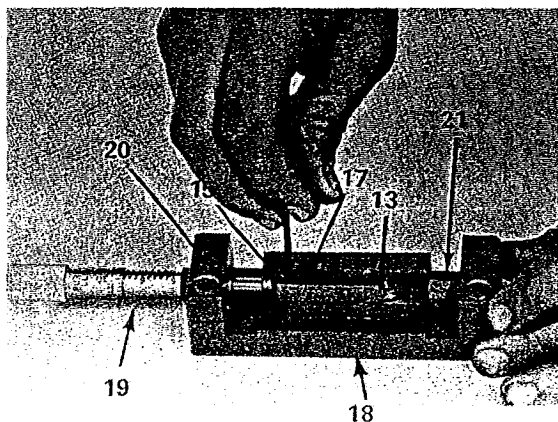
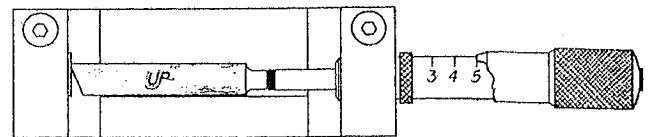


Fig. 3 Micrometer Block with Cutter

## CHECKING THE MIKE BLOCK

1. Using the SETTING STANDARD (41) to check the micrometer reading, place the setting standard with side stamped "UP" on top between the cutter stop (21) and the micrometer spindle. Turning the thimble move the spindle snugly against the setting standard (41). Micrometer reading should be 5.000. See Dwg. #1.



Dwg. 1 Adjusting Micrometer

2. If adjustment is necessary loosen socket head set screw (20) and set micrometer (19) at 5.000.
3. Slide micrometer (19) snugly against setting standard (41) and tighten socket head set screw (20).
4. As a further check, back-off thimble on micrometer (19) and recheck reading.

## SETTING THE CUTTER

1. Loosen socket set screw (17) in back-end of cutter (13) and push spring-loaded adjusting pin (15) all-the-way in. Tighten socket set screw (17).

2. Using the Micrometer Block (18) set the micrometer to the following sizes depending on the block you are to bore:

MH & V12, 5-1/2 bore	6.750 dia.
Vim-Vine, V-903	6.625 dia.
H, NH, V12, 4-7/8 or 5-1/8 bore	6.275 dia.

**NOTE:** Final cut inside diameter must be within plus or minus .001 inch of above dimensions.

3. Place cutter (13) in MIKE Block (18) as shown in Dwg. 1 firmly against cutter stop (21).

4. Loosen cutter socket set screw (17) and allow adjusting pin (15) to snap out against micrometer spindle. Lock socket set screw (17).

5. As a further check, back-off thimble on micrometer and recheck cutter length again. Back off on micrometer to remove cutter.

## PREPARING THE BLOCK

1. Steam clean the block and remove all top deck dowels.
2. Remove all burrs and high spots from top deck with a large mill file. Finish dress with a flat stone.
3. Remove all dents or burrs from the counterbore inside diameter to be cleaned with an emery cloth. This area is used to locate the tool.

## ASSEMBLING THE TOOL

1. Select the correct cutter plate (10 or 32) to be used.
2. Assemble cutter plate (10 or 32) on shaft of the main housing (1) and secure with nut (26) and washer (27). See Fig. 4.

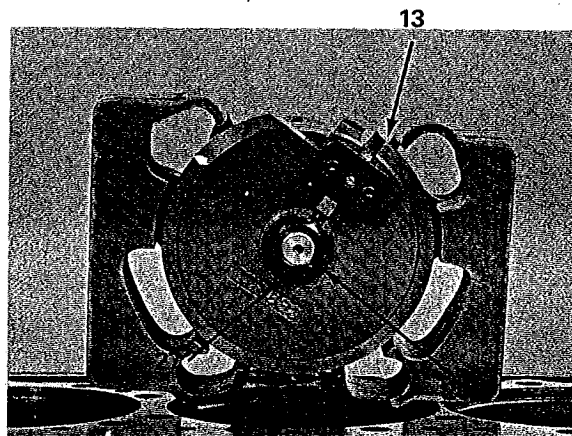


Fig. 4 Attaching the Cutter Plate

## MACHINING THE BLOCK

1. Making sure the cutter (13) is removed from the cutter plate (10 or 32), place the boring machine on the cylinder block above the bore to be cut and start mounting the head cap screws, leave loose. The stud adapter (23 or 33) must be on the cap screws. (See Fig. 5).

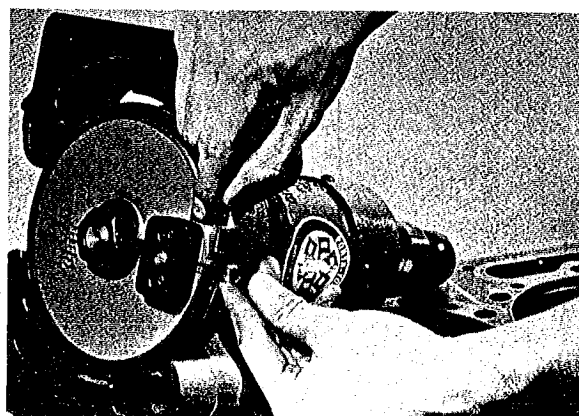


Fig. 5 Preparing to Install Cutter

2. Lower the cutter plate (10 or 32) into the bore by turning the valve knob (9) counter-clockwise while pushing down.

3. The cutter plate lower diameter is used to center the boring machine in the counterbore. Push cutter plate lower locating diameter into the counterbore and now tighten the four head cap screws alternately to 50 ft. lbs. torque. (See Fig. 6).

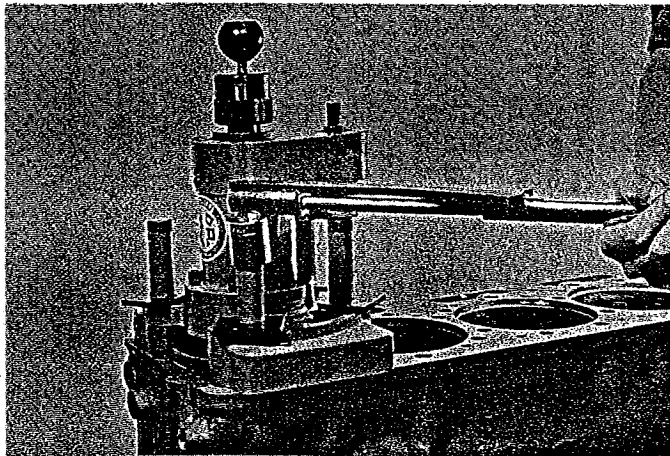


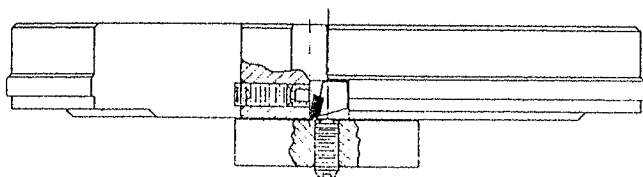
Fig. 6 Mounting Porta-Matic on Block

4. Retract cutter plate (10 or 32) by pulling up on the needle valve knob (9). Once the cutter plate (10 or 32) is at its highest position lock in place by turning the valve knob (9) clockwise till snug.

5. Insert cutter (13) into cutter plate (10 or 32) and tighten cutter plate swivel pad set screw (14). The cutter (13) must be held all the way in against the main shaft of the boring tool. (See Dwg. 2).

**NOTE:** The sharp tip of the cutter must be inserted into the slot in the cutter holder with the tip in the lower left side of the slot.

**NOTE:** The cutters have a shallow hole in them. This must face downward when the cutter is inserted in the slot.



Dwg. 2 Inserting Cutter

6. Place a 0.004 inch feeler gauge between the block and the cutter (13). Lower the cutter (13) onto the feeler gauge by turning the needle valve knob (9) while pushing down very gently. (See Fig. 7).

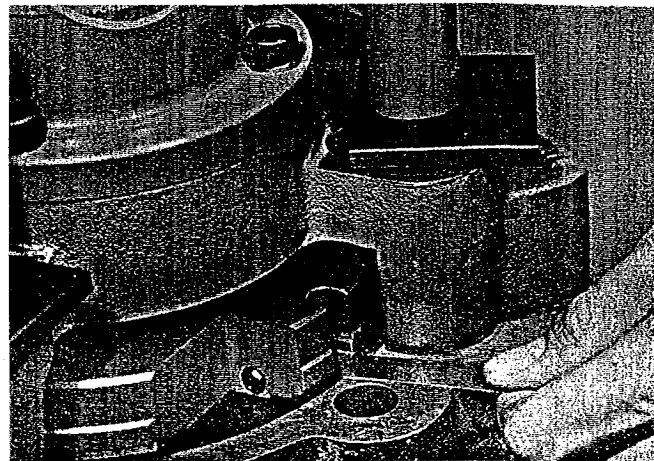


Fig. 7 Use of Feeler Gauge to Set Depth of Cut

7. Loosen the socket set screw (43) on the depth set collar and back-off the depth set collar (8) counterclockwise. Place the bushing to be used between the depth set collar and the sprocket and adjust depth set collar down to bushing, tighten socket set screw.

This spaces the depth set collar (8) to cut to a depth 0.004 inch less than the total height of the salvage bushing to be used.

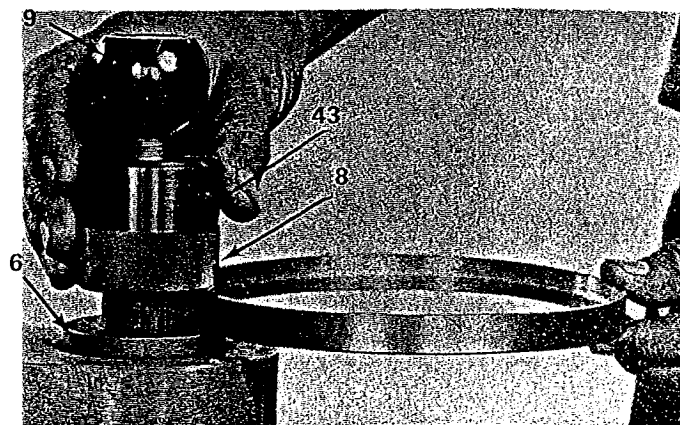


Fig. 8 Setting Length of Cut

8. Remove the feeler gauge from below cutter (13) and pull up on needle valve knob to return cutter to top position. Turn needle valve to right to close valve to hold it in "UP" position.

9. Chuck the 1/2 inch universal drive adapter (40) in a 1/2 or 3/4 inch heavy duty (10 amp. or more) hand drill.

10. With the hand drill on the universal drive adapter (40) commence boring the machine freewheels (approx. 2 minutes). About half-way down during the cut the cutter begins cutting out the old counterbore ledge. The operator should have a firm grip on the hand drill to be prepared for the increased load on the hand drill from the added metal being cut. Stop immediately when the cutter freewheels or some chatter may occur. (See Fig. 9).

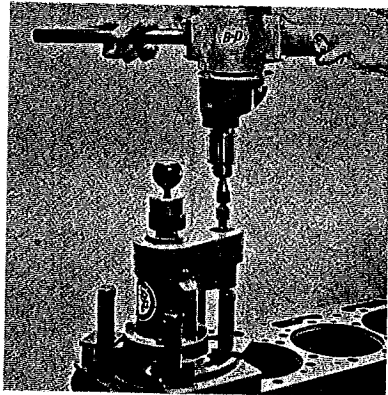


Fig. 9 Starting the Bore Cut

11. Retract the cutter plate (10 or 32) by turning the needle valve knob counter-clockwise and pulling up. Turn needle valve knob to right to close valve to hold it in the up position. Remove the cutter (13) from the cutter plate and then remove the boring machine. (See Fig. 10).

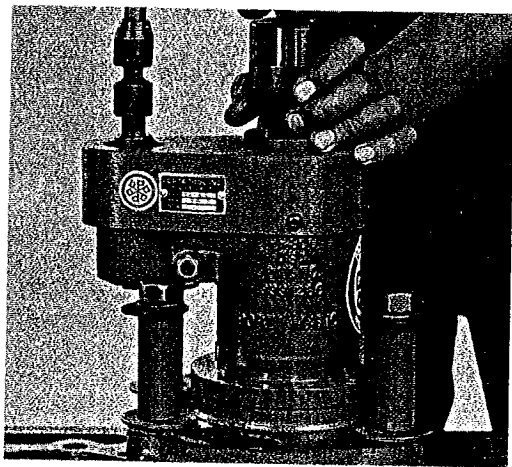


Fig. 10 Retracting Cutter Plate

12. Clean away all shavings and deburr the bore with emery cloth.

13. Clean the cutter recess in the cutter plate (10 or 32) and remove all chips and material. Also there is an access area where the cutter contacts the main shaft; it is easy to clean this area with a "Q" Tip so you don't bore oversize by accident. However, we do stock oversized repair bushings—just in case you should ever overbore. All we need to know is exactly what size hole you've bored. We can then send you a bushing to fit your bore.

14. **IMPORTANT!** It is imperative that you bore your hole and install the repair bushing before going on to the next hole. Never bore all the cylinder bores and then expect to install the repair bushings.

15. If the block is to be resurfaced, the rebushing operation should be done first — and at least four hours should elapse before resurfacing the block; this gives the Loctite time to set-up.

16. Rebushing the counterbore is a very successful operation if the job is done correctly; over 50,000 blocks have been saved in this manner since 1967.

## INSTALLING THE SALVAGE BUSHING

1. Clean the bore and bushing outside diameter thoroughly with PTP-20 PRIMER-T. (See Fig. 11).



Fig. 11 Cleaning Bore with Primer-T

2. Coat the outside diameter of the bushing lightly with PTL-40 LOCTITE COMPOUND and drive it into the bore with the bushing driver (29 through 31) using a soft hammer until it bottoms. A solid sound can be heard when the bushing bottoms. (See Fig. 12). Also see Fig. 14 on back side (this page) which shows bushing driver assembled.

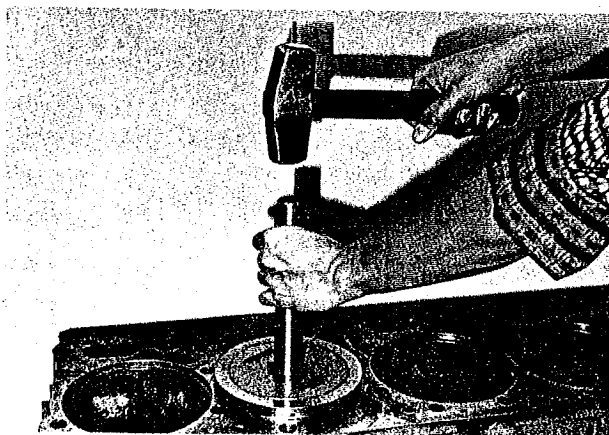
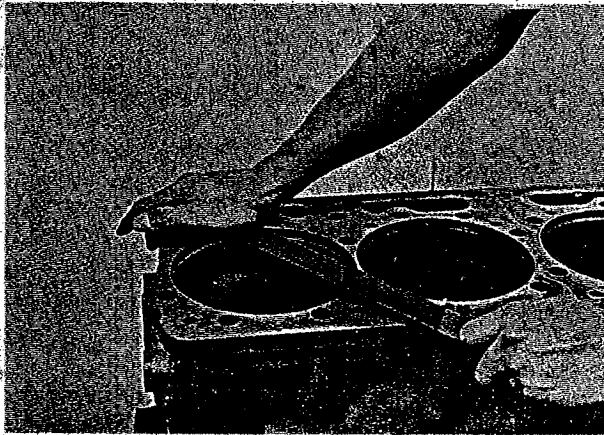


Fig. 12 Driving the bushing into the bore.

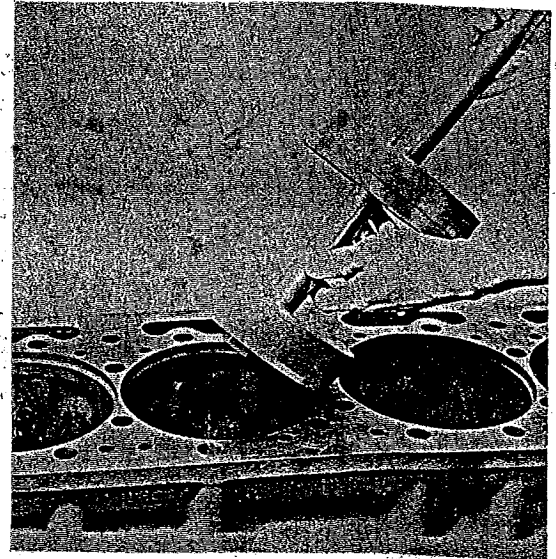


3. The bushing will protrude above the top of the block approximately 0.004 inch and must be filed even with the top deck. Remove all burrs with emery cloth. (See Fig. 13).



**Fig. 13 Finishing The Block**

4. Check counterbore depth and cut to depth per normal procedures. The salvage bushing is designed to be 0.005 to 0.010 inch shallow of required counterbore depth. This means it must be cut 0.005 to 0.351 in on NH 5½ inch bore). Refer to "SHOP MANUALS" to get correct depth of counterbore for other engine models. Use the "CBU-900" COUNTERBORE TOOL for this operation.



**Fig. 14 Assembled Bushing Driver**

**CARE OF HYDRAULIC FEED HOUSING:** A periodic check should be made to see if the main housing is completely full of 30 W Non-detergent oil. If low on oil the tool will chatter. To check oil level turn the valve knob counterclockwise and press the tool down to it's lowest position then add oil if necessary.

PTP-20 PRIMER-T and PTL-40 LOCTITE COMPOUND  
are available from:

**PORTA-TOOL INC.**

P. O. BOX 647  
827 JEFFERSON AVE.  
CLOVIS, CALIFORNIA 93612  
(209) 299-4351

