

MUELLER[®] GAS

No-Blo[®] Operations Using D-4 Drilling Machine

⚠ WARNING:

1. Read and follow instructions carefully. Proper training and periodic review regarding the use of this equipment is essential to prevent possible serious injury and/or property damage. The instructions contained herein were developed for using this equipment on fittings of Mueller manufacturer only, and may not be applicable for any other use.
2. Do not exceed the pressure ratings of any components or equipment. Exceeding the rated pressure may result in serious injury and/or property damage.
3. Safety goggles and other appropriate protective gear should be used. Failure to do so could result in serious injury.
4. Pressure test, check for and repair leaks in all fittings and components each time one is installed or any joint or connection is broken. Failure to find and repair a leak from any source in the fittings, bypass lines or equipment could result in an explosion and subsequent serious injury and/or property damage.
5. Mueller[®] Drilling Machines and Equipment have been carefully designed and engineered to work together as a unit. The use of equipment manufactured by someone other than Mueller Co. may cause excessive wear or a malfunction of the Mueller machines.

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Reliable Connections[™]

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All warranties, expressed or implied, for Mueller Drilling Machines are rendered null and void if the machines are used with shell cutters or equipment manufactured by someone other than Mueller Co.

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NOTE—For drilling 1½" and 2" Line Stopper Fittings, see "OPERATING INSTRUCTIONS FOR LINE STOPPER UNIT NO. 1."

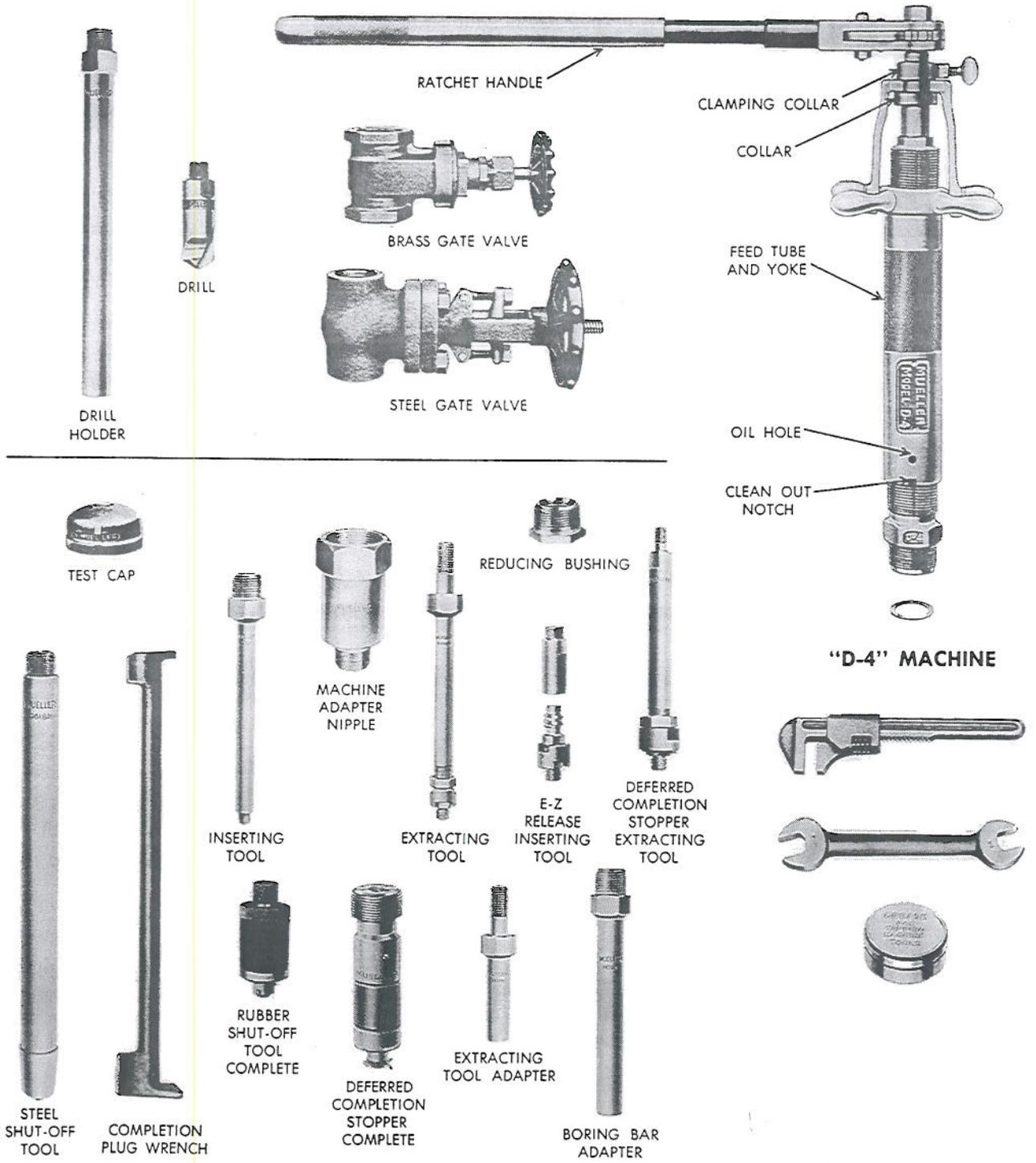
GENERAL INSTRUCTIONS

Use pipe thread "dope" on the threads of machines or equipment if required to make a pressure tight threaded connection without using a gasket or "O" ring seal.

Examine rubber shut-off tools and replace rubbers if excessively worn or damaged. Lubricate the inside and all metal parts of rubber shut-off tool with a semi-liquid mixture of graphite and glycerin. When not in use, store rubber shut-off tools away from sunlight in a cool damp location.

Keep all machined and threaded surfaces of machines and equipment well lubricated with oil at all times. DO NOT USE OIL TO LUBRICATE RUBBER SHUT-OFF TOOLS.

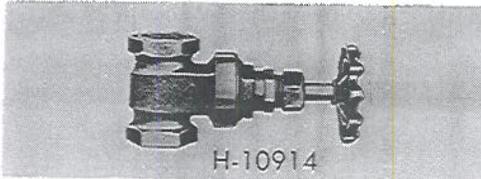
"D-4" DRILLING MACHINE



The "D-4" Drilling Machine Equipment shown above is for use with NO-BLO Tees, NO-BLO Valves, and NO-BLO Save-A-Valve Drilling Nipples. The proper selection of this equipment is arranged by "D-4" Machine Tool Kits. The required drilling tools and valve are listed separately with each tool kit; however, they are not a part of the tool kit.

"D-4" DRILLING MACHINE

INSTALLING SERVICE TEES, VALVE TEES AND CURB VALVE TEES



H-10914



H-10916

FIGURE 1

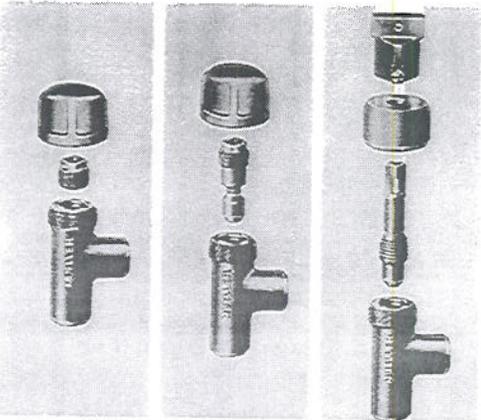


FIGURE 2

FIGURE 3

FIGURE 4

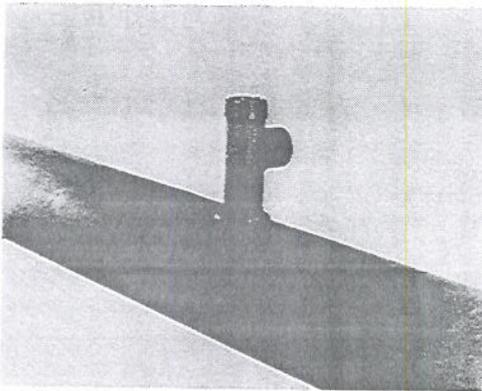


FIGURE 5

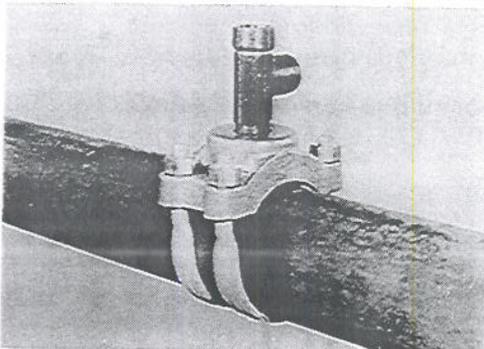


FIGURE 6

These instructions are for doing the following NO-BLO operations using the "D-4" Drilling Machine. Also see "OPERATING INSTRUCTIONS for MUELLER "D-4" DRILLING MACHINE."

Item	Size of Inlet	NO-BLO Operations
NO-BLO Tees	¾" 1" 1¼" 1½" 2"	Drill the Main Insert the Plug Extract the Plug Make Stop-Off
NO-BLO Valve Tees	¾" 1" 1¼"	Drill the Main Insert Stem and Bushing Extract Stem and Bushing Recondition Body Seat
NO-BLO Curb Valve Tees	¾" 1" 1¼" 1½" 2"	Drill the Main Insert the Stem Extract the Stem Recondition Body Seat

Rubber shut-off tools have a maximum working pressure of 100 p.s.i. Except for rubber shut-off tools, the following table lists the maximum working pressure of the machine and its equipment. During the use of this equipment, the line pressure must not exceed the amount indicated.

Catalog No. of Drilling Machine	Type of Valve To Be Used	Maximum Working Pressure	Maximum Temperature Rating
"D-4"	H-10914	125 p.s.i. at 100°F.	250°F. at 100 p.s.i.
	H-10916	500 p.s.i. at 100°F.	250°F. at 375 p.s.i.

A—SELECT THE EQUIPMENT REQUIRED

1. Determine the catalog number of the valve to be used. See table above and Figure 1.

2. Select the proper "D-4" Machine Tool Kit according to the following:

- Size and catalog number of the Tee to be installed.
- Catalog number of the valve to be used.

The required tool kit number is listed in the GAS DISTRIBUTION PRODUCTS CATALOG along with the cataloging of the Tees. Each page of Tees includes the corresponding tool kit numbers. The contents of the Tool Kit are listed with the cataloging of the "D-4" Drilling Machine.

3. Select the drilling tools to be used. The maximum size of drilling tools which can be used is listed in the GAS DISTRIBUTION PRODUCTS CATALOG directly under the proper Tool Kit. Also listed are alternate smaller drilling tools.

4. Select the proper size of valve. This is listed in the CATALOG in the same column as the Tool Kit being used and directly under the drilling tools.

INSTALLING SERVICE TEES, VALVE TEES AND CURB VALVE TEES

"D-4" DRILLING MACHINE

B—ATTACH THE TEE TO THE MAIN

1. Thoroughly clean the surface to which the Tee is to be attached.
 - 2a. For Service Tees. Remove completion cap and completion plug. **Figure 2.**
 - 2b. For Valve Tees. Remove completion cap and stem and bushing as a unit. **Figure 3.**
 - 2c. For Curb Valve Tees. Remove tee handle, cap and stem. **Figure 4.**
 - 3a. For Tees having welding inlet. Place Tee in desired position and weld to pipe line. **Figure 5.**
 - 3b. For Tees having an outside I.P. thread inlet. Attach Service Clamp at the desired position. Apply non-hardening pipe thread "dope" to the inlet threads of the tee and screw it into the body of the Service Clamp. **Figure 6.**
- NOTE: When using a Tee having a threaded inlet, it may be necessary to reduce the working pressure and temperature to that of the clamp or fitting to which the Tee is attached.
4. Connect service pipe to the outlet of the Tee and extend this piping to the first shut-off in the service line such as a curb stop or meter stop. Close this curb stop or meter stop.
 5. If installing a $\frac{3}{4}$ " , 1" or 1 $\frac{1}{4}$ " Service Tee or Valve Tee the H-17615 Center Locating Punch may be used to punch mark the pipe in the center of the Tee to aid in starting the drill. Screw the Center Locating Punch into the Tee and strike the head of the pin a solid blow. **Figure 7.**

C—TEST THE INSTALLATION

1. Screw test cap on Tee.
2. Apply air pressure and test for leaks with soapsuds (add glycerin in freezing weather) or bubble type leak detection fluid. **Figure 8.**
3. Remove test cap.
- 4a. If installing a $\frac{3}{4}$ " , 1" or 1 $\frac{1}{4}$ " Service Tee or Valve Tee the H-17618 Test Fitting may be used instead of the test cap. Screw the Test Fitting into the top of the Tee. The fitting has a handle and does not require a wrench. Attach air hose to one of the $\frac{1}{4}$ " I.P. tapped openings and a gauge or plug to the other $\frac{1}{4}$ " I.P. tapped opening. **Figure 9.**
- 4b. If installing a $\frac{3}{4}$ " , 1" or 1 $\frac{1}{4}$ " Service Tee or Valve Tee the H-17617 Center Locating Punch and Test Fitting may be used. This is one item which performs the same functions as both the H-17615 Center Locating Punch and the H-17618 Test Fitting.

D—ATTACH GATE VALVE

1. Attach gate valve to top of Tee. **Figure 10.** (If installing a $\frac{3}{4}$ " Service Tee, first attach the 1 $\frac{1}{4}$ " x 1" bushing to the tee and then attach the gate valve to the bushing.)
2. Open gate valve fully.

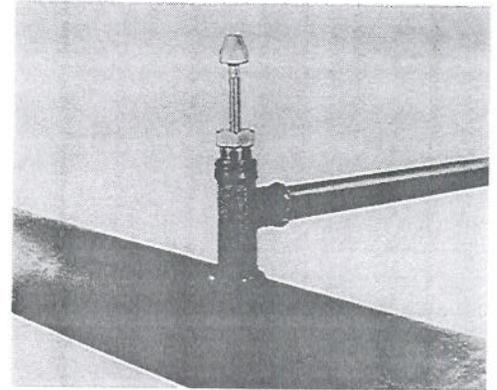


FIGURE 7

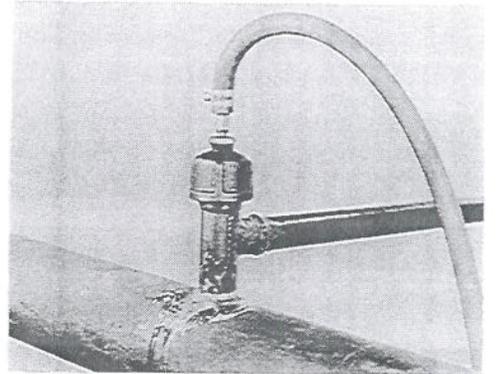


FIGURE 8

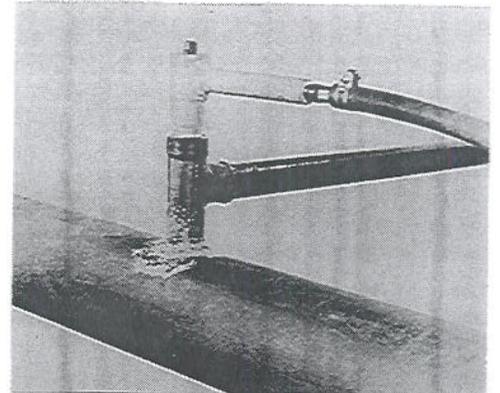


FIGURE 9

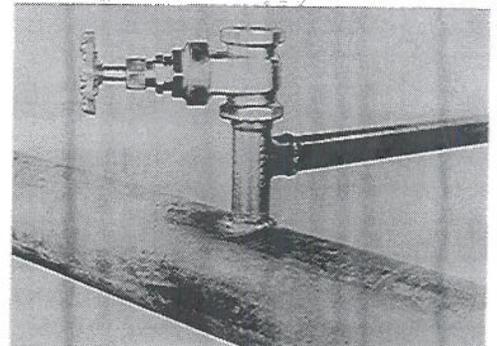


FIGURE 10

"D-4" DRILLING MACHINE

INSTALLING SERVICE TEES, VALVE TEES AND CURB VALVE TEES

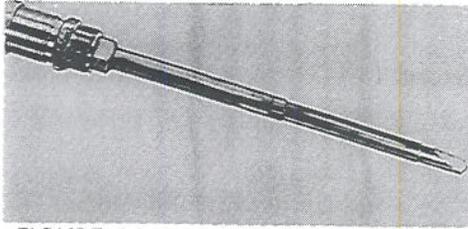


FIGURE 11

E—ATTACH DRILLING MACHINE

NOTE: When using the "D-4" Machine with small size tees (as shown in accompanying illustration) it is necessary to attach the tools to the boring bar before attaching the machine adapter nipple to the machine. It is also necessary to remove the machine adapter nipple from the machine before removing tools from the boring bar.

1. Attach machine adapter nipple to the body of the machine. Be sure the gasket is in good condition and in place.
2. Assemble proper size drill and drill holder, combined drill and holder or shell cutter, cutter arbor and pilot drill to the boring bar of the machine. When using a combined drill and holder, a boring bar adapter (part no. 36324) must be used between the combined drill and holder and the boring bar.
3. Coat drill or shell cutter and pilot drill thoroughly with MUELLER Cutting Grease. **Figure 11.**
4. Retract boring bar to its rearmost position.
5. Place the drilling machine on gate valve and tighten machine adapter nipple into gate valve. **Figure 12.**

F—DRILL THE MAIN

1. Slowly advance boring bar until point of drill contacts the pipe. Then retract boring bar a slight amount.
2. Adjust feed tube and yoke so that the yoke engages the collar on boring bar. Tighten clamping collar against top of feed yoke.
3. Drill the hole by operating the ratchet handle **clockwise** and turning the feed tube and yoke **clockwise** a little at a time. **Figure 13.** Use a light even feed at the start, then a heavier feed and finish with a light even feed. To prevent over-feeding when drilling small holes and also when starting to drill larger holes, apply the feed by gripping the knurled section of the feed tube instead of the feed handles.
4. Continue drilling until a hole is drilled in the pipe. This can be determined by the feel of the feeding mechanism and the pull of the ratchet handle.

G—REMOVE THE DRILLING MACHINE

1. When the drilling operation is completed, retract the boring bar to its rearmost position. Be sure the point of the drill is above the valve gate. **CAUTION: DO NOT REVERSE THE ROTATION OF THE RATCHET HANDLE WHEN RETRACTING THE BORING BAR.** — PRESSURE INSIDE THE "D-4" DRILLING MACHINE WILL TEND TO RAISE THE BORING BAR. HOLD DOWN ON BORING BAR OR USE THE FEED YOKE TO CONTROL THE UPWARD MOTION OF THE BORING BAR THEREBY PREVENTING SHOCK OR DAMAGE TO THE DRILLING MACHINE.
2. Close gate valve.
3. Remove drilling machine and machine adapter nipple from gate valve as a unit.
4. Advance boring bar.
5. Remove drilling tools.

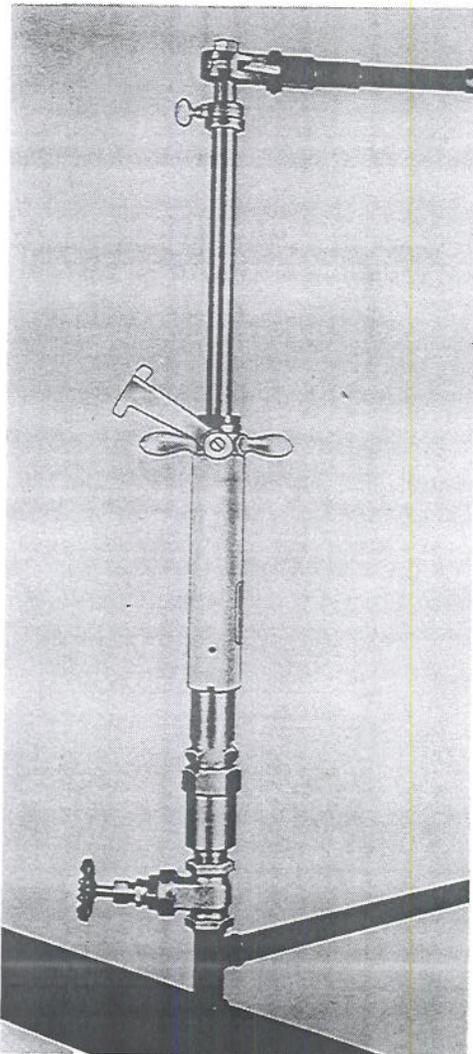


FIGURE 12

INSTALLING SERVICE TEES, VALVE TEES AND CURB VALVE TEES

"D-4" DRILLING MACHINE

H—INSERT PLUG, STEM AND BUSHING OR STEM

See NOTE on page 8.

1. Assemble plug inserting tool to the right hand threads in the end of the boring bar of the drilling machine. When using an E-Z Release Inserting tool, a boring bar adapter must be used between the E-Z Release Inserting tool and the boring bar.
- 2a. For Service Tees. Attach the completion plug to the plug inserting tool. Lubricate the threads on the tool and be sure that they screw together freely. Check to be sure the threads on the plug and tee are clean. Apply non-hardening pipe thread "dope" to the completion plug threads.
- 2b. For Valve Tees. Unscrew stem approximately half way out of the bushing, then attach the bushing to the plug inserting tool. Lubricate the threads on the tool and be sure they screw together freely. Check to be sure threads on the bushing and tee are clean. **Screw stem into bushing as far as possible by hand then back it out one half of a turn. Figure 15.**
- 2c. For Curb Valve Tees. Curb Valve Tees use an E-Z Release type inserting tool. Lubricate the acme threads between the two parts of this tool and be sure they screw together freely without binding. Screw the end of the tool into the end of the stem and secure in place by lowering the fork over the squared section of the stem. **Figure 16.**
3. Retract boring bar to its rearmost position.
4. Attach drilling machine to gate valve.
5. Open gate valve **fully**.
6. Advance boring bar until the completion plug, bushing or stem (Curb Valve Tee) contacts the top thread in the Tee. Hold the boring bar down with the feed yoke if desired.
7. Rotate the ratchet handle **clockwise** until the completion plug, bushing or stem (Curb Valve Tee) is firmly screwed into the Tee.
8. Reverse ratchet and turn the ratchet handle **counter-clockwise** to take up the slack. Hold in this position with one hand and strike the end of the ratchet handle a sharp blow **counter-clockwise** with the other hand. **Figure 17.**
9. Rotate the boring bar **counter-clockwise** until the inserting tool is free from the completion plug or bushing. If installing a Curb Valve Tee, the upper part of the E-Z Release inserting tool will unscrew from the lower part.

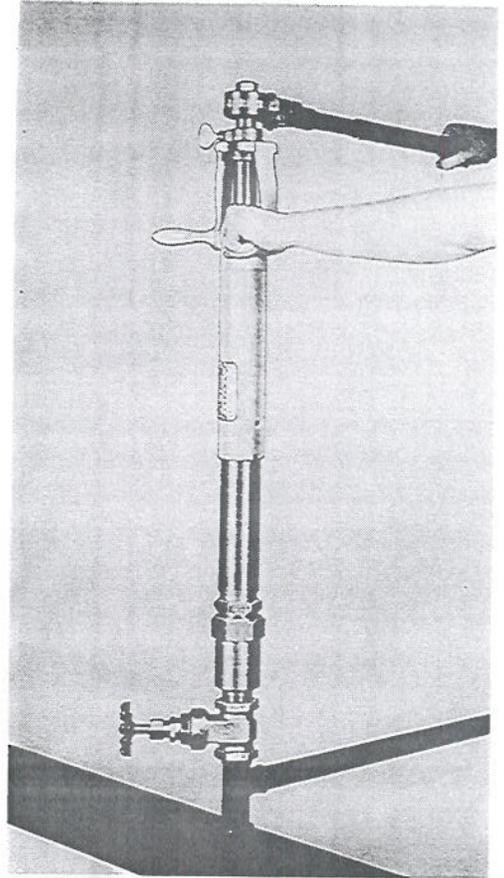


FIGURE 13

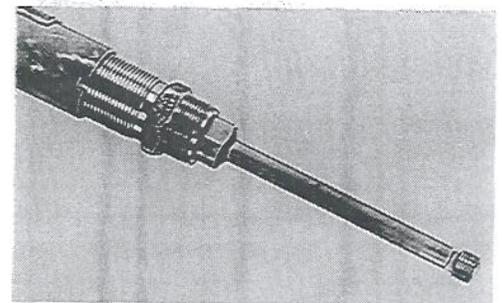


FIGURE 14

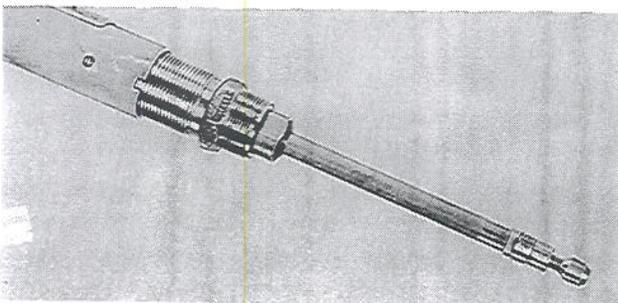


FIGURE 15

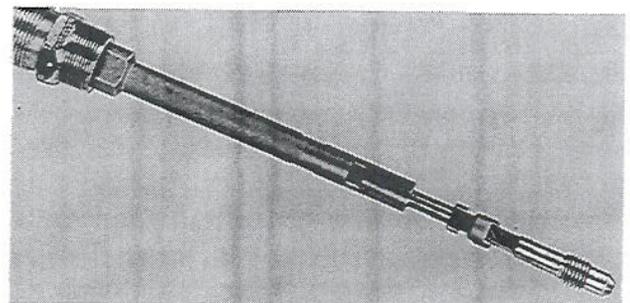


FIGURE 16

"D-4" DRILLING MACHINE

INSTALLING SERVICE TEES, VALVE TEES AND CURB VALVE TEES

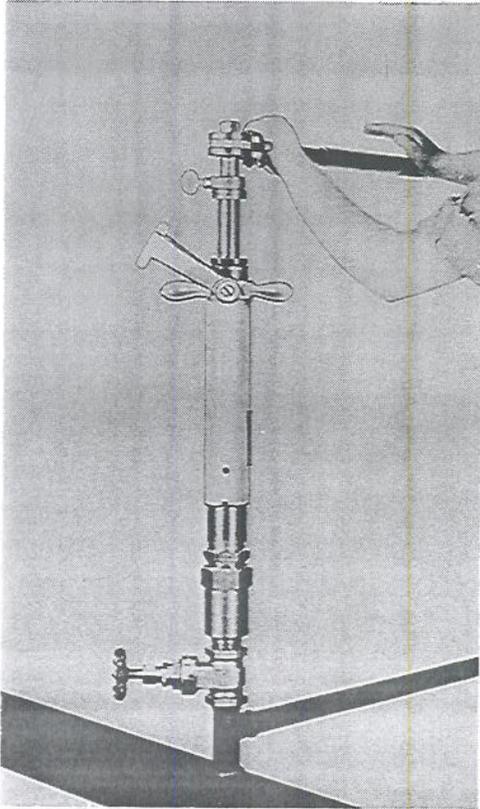


FIGURE 17

10. Remove drilling machine and gate valve.
- 11a. For Service Tees. **Figure 18.**
 - (1) Tighten completion plug with completion plug wrench.
 - (2) Apply non-hardening pipe thread "dope" to completion cap threads and screw cap tightly on Tee.
- 11b. For Valve Tees. **Figure 19.**
 - (1) Tighten bushing with completion plug wrench.
 - (2) With screw driver turn stem **counter-clockwise** to back seat against the bottom of the bushing.
 - (3) Apply non-hardening pipe thread dope to completion cap threads and screw cap tightly on Tee.
- 11c. For Curb Valve Tee. **Figure 20.**
 - (1) Lubricate both "O" rings and tighten cap tightly on Tee.
 - (2) Replace tee handle.
 - (3) Open the valve by turning tee handle **counter-clockwise**.
12. Test the entire Tee with soapsuds.

NOTE—TO USE A DEFERRED COMPLETION STOPPER

A Deferred Completion Stopper provides a stop-off in the threaded Inlet Service Tee and also screws into the top of the Tee. This permits the drilling machine and the gate valve to be removed while maintaining a stop-off in the line.

The Deferred Completion Stopper may be installed by following instruction "H" page 7 using E-Z Release type inserting tool and machine adapter nipple listed for use with Deferred Completion Stopper. Lubricate the rubber with soapsuds. **Figure 21.**

The Deferred Completion Stopper may be removed from the fitting by following instructions "J" page 9 for removing completion plug from Service Tees. (Use extracting tool adapter, part no. 36198, **Figure 25.**)

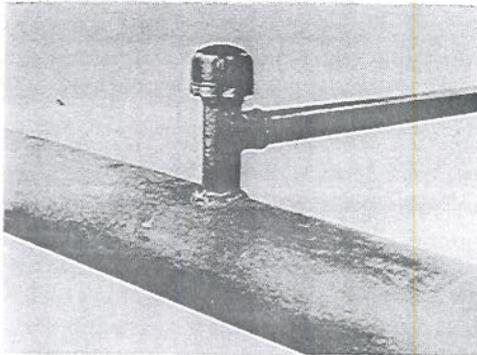


FIGURE 18

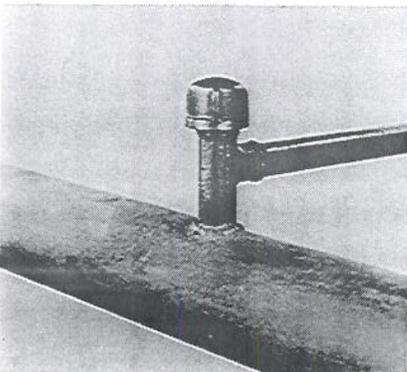


FIGURE 19

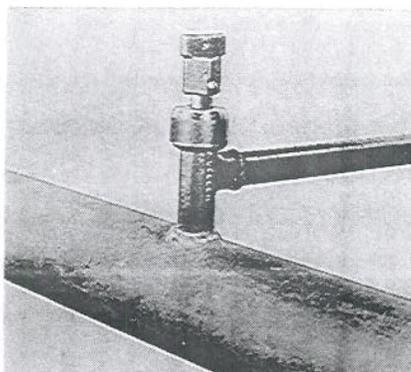


FIGURE 20

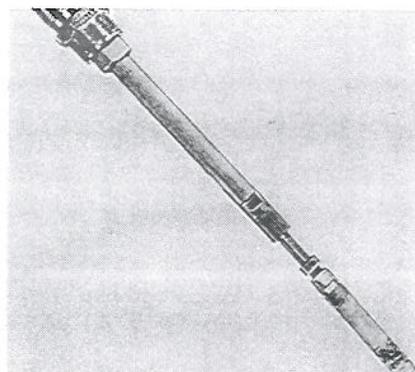


FIGURE 21

INSTALLING SERVICE TEES, VALVE TEES AND CURB VALVE TEES

"D-4" DRILLING MACHINE

I—TO OPERATE A VALVE TEE

1. Remove completion cap.
2. Screw stem into tee as far as possible using a 4" screw driver.
3. Polish the seat by turning the stem back and forth several times against the seat.
4. Hold the stem in the closed position with the screw driver in one hand and BACK OFF the bronze bushing with a wrench held in the other hand. (Do not permit the stem to turn, however, turn the bushing approximately two full turns **counter-clockwise**.) Differential threads provide the seating force. **Figure 22.**
5. The Valve Tee is now shut off. Proceed with the work on the service line.
6. To open the valve hold the stem in the closed position with the screw driver in one hand and tighten the bushing into the tee with a wrench held in the other hand. (Do not permit the stem to turn, however, turn the bushing as far as it will go **clockwise**.) This relieves the force created by the differential threads.
7. Open valve by rotating the stem **counter-clockwise** with the screw driver. Continue rotating in this direction until the stem backseats against the bottom of the bushing.
8. Apply non-hardening pipe thread "dope" to the completion cap threads and screw cap tightly on tee.
9. Test the entire tee with soapsuds.

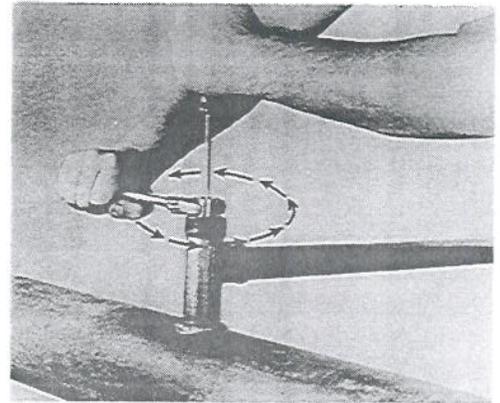


FIGURE 22

J—TO REMOVE COMPLETION PLUG, STEM AND BUSHING OR STEM (CURB VALVE TEE)

- 1a. For Service Tees. Remove completion cap and loosen completion plug slightly with the completion plug wrench.
 - 1b. For Valve Tees. Remove completion cap, close valve approximately halfway and loosen bushing slightly with completion wrench.
 - 1c. For Curb Valve Tees. Close valve tightly, remove tee handle and remove cap.
2. Attach extracting tool to completion plug, bushing or stem (Curb Valve Tee).
NOTE: For certain sizes of tees it is necessary to place the extracting tool through the machine adapter nipple and the opened gate valve before attaching the extracting tool to the completion plug, bushing or stem (Curb Valve Tee). **Figure 23.** When using extracting tool adapter (part no. 36198) attach it to the boring bar of the machine.
 - a. Move the fork away from the threads on the end of the tool.
 - b. Screw the end of the tool into the threads in the top of the completion plug, bushing or stem.
 - c. Slide the fork downward so that it bears against the flats on the completion plug, bushing or stem.
 - d. If extracting tool has a lock nut, tighten the lock nut against the extracting fork.
 3. **Fully** open gate valve if it has not been necessary to do so previously.

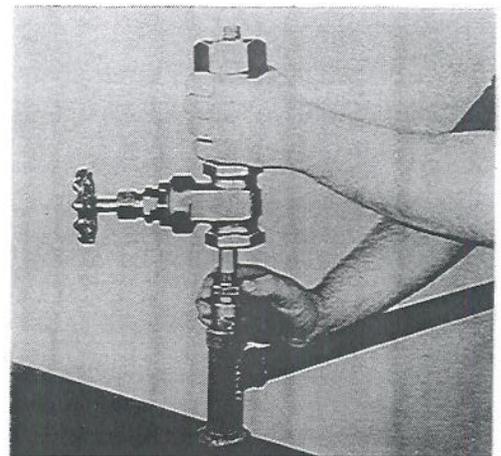


FIGURE 23

"D-4" DRILLING MACHINE

INSTALLING SERVICE TEES, VALVE TEES AND CURB VALVE TEES

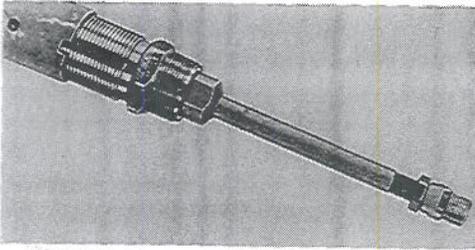


FIGURE 24

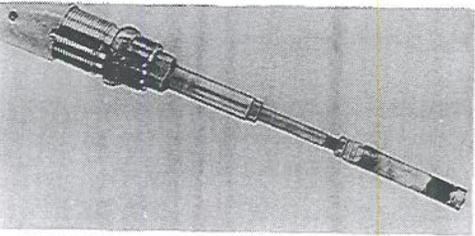


FIGURE 25

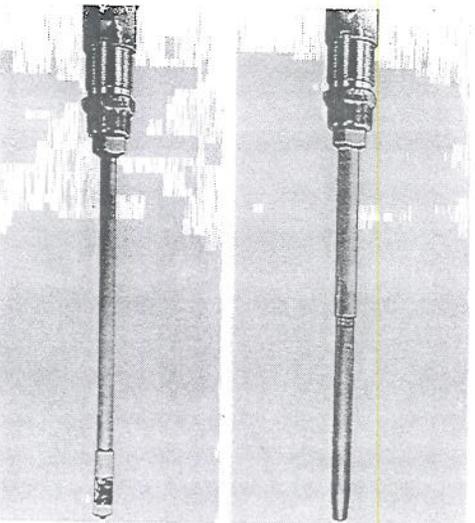


FIGURE 26

FIGURE 27

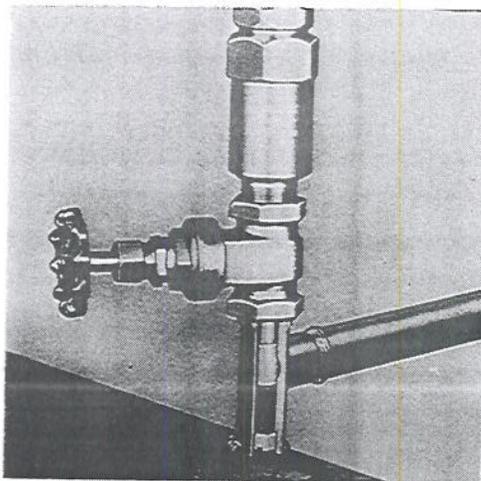


FIGURE 28

4. Attach gate valve. See instruction "D" page 5.
5. Attach machine adapter nipple to the drilling machine. See instruction "E-1" page 6.
6. Attach drilling machine to gate valve.
7. Lower the boring bar of the drilling machine until it (or the extracting tool adapter) contacts the top of the extracting tool.
8. Rotate the boring bar **counter-clockwise**. The boring bar (or the extracting tool adapter) will first engage the left hand threads on top of the extracting tool. When these threads are fully engaged continue rotating in a **counter-clockwise** direction which will unscrew the plug, bushing or stem from the tee.
9. Retract boring bar to its rearmost position. CAUTION: THE PRESSURE INSIDE THE "D-4" MACHINE WILL TEND TO RAISE THE BORING BAR. HOLD DOWN ON THE RATCHET HANDLE TO CONTROL THE UPWARD MOTION OF THE BORING BAR THEREBY PREVENTING SHOCK OR DAMAGE TO THE DRILLING MACHINE.
10. Close gate valve.
11. Remove drilling machine from gate valve.
12. Advance boring bar. **Figure 24**.
13. Remove extracting tool from the boring bar. NOTE: Left hand threads between the extracting tool (or extracting tool adapter) and the boring bar.
14. Remove the completion plug, bushing or stem (Curb Valve Tee) from the extracting tool.

K—TO STOP-OFF SERVICE TEE

A rubber shut-off tool is used to provide a positive shut-off in a service line at the tee. It should not be used for repair welding on either the inlet or outlet connections of the tee. (To use a deferred completion stopper to stop-off threaded inlet Service Tees, see **NOTE** on page 8.)

A steel shut-off tool is used to provide a temporary shut-off in a service line at the tee. It should be used for repair welding on either the inlet or outlet connections of the tee.

1. Assemble shut-off tool to the boring bar of the drilling machine.
 - a. A rubber shut-off tool uses a drill holder between it and the boring bar. Lubricate the rubber with soap-suds. **Figure 26**.
 - b. A steel shut-off tool attaches directly to the end of the boring bar or by means of a boring bar adapter (part no. 36324). **Figure 27**.
2. Retract boring bar to its rearmost position.
3. Attach the drilling machine to the gate valve.
4. Open gate valve **fully**.
5. Advance boring bar.
 - a. If using a Service Tee with welding inlet. Advance boring bar until the lower end of the shut-off tool contacts the pipe. **Figure 28** or **Figure 29**.
 - b. If using a Service Tee with Outside I. P. Thread on inlet. Advance boring bar until the lower end of the shut-off tool contacts a ledge or shoulder on the inside and at

INSTALLING SERVICE TEES, VALVE TEES AND CURB VALVE TEES

"D-4" DRILLING MACHINE

the bottom of the tee. A machined groove around the body of the tee just below the completion cap indicates that the threaded inlet tee has the ledge on the inside.

Figure 30. Previous design threaded inlet Tees did not have the ledge or the identifying groove and require special tools.

6. Adjust the feed tube and yoke so that the yoke engages the collar on the boring bar.
7. Turn feed yoke handles **clockwise** until the shut-off tool effectively shuts off the pressure. The boring bar should not rotate during this operation.
8. Proceed with the work on the service line.
9. When the work on the service line is completed relax the shut-off tool.
10. Turn feed yoke handles **counter-clockwise** relaxing the downward force on the shut-off tool.
11. Disengage the feed yoke and retract boring bar to its rearmost position.
12. Close gate valve.
13. Remove drilling machine from gate valve.
14. Advance boring bar and remove shut-off tool.
15. Insert completion plug. See instruction "H" page 7.

L—TO RECONDITION BODY SEAT IN VALVE TEE OR CURB VALVE TEE

1. Remove stem and bushing from Valve Tee or stem from Curb Valve Tee. See instruction "J" page 9.
2. Attach drill holder to boring bar of drilling machine by means of boring bar adapter (part no. 36324).
3. Attach reseating reamer to drill holder. **Figure 31.**

Size of Tee	1"	1¼"
Reseating Reamer - Part Number	72240	72241
Drill Holder - Part Number	61981	78736
Boring Bar Adapter - Part Number	36324	36324

4. Retract boring bar to its rearmost position.
5. Attach the drilling machine to gate valve.
6. Open gate valve **fully**.
7. Advance boring bar until the reamer contacts the body seat.
8. Adjust the feed tube and yoke so that the yoke engages the collar on the boring bar.
9. Rotate the boring bar **clockwise** in continuous circles and at the same time apply a very light feed by turning the feed handle **clockwise** a very small amount.
10. When the reaming operation is completed, disengage the feed yoke, and retract boring bar to its rearmost position.
11. Close gate valve.
12. Remove drilling machine from gate valve.
13. Advance boring bar and remove reamer, drill holder and boring bar adapter.
14. Insert bushing or stem (Curb Valve Tee). See instruction "H" page 7.

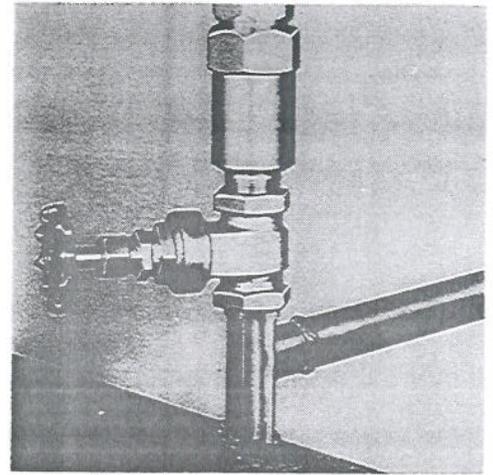


FIGURE 29

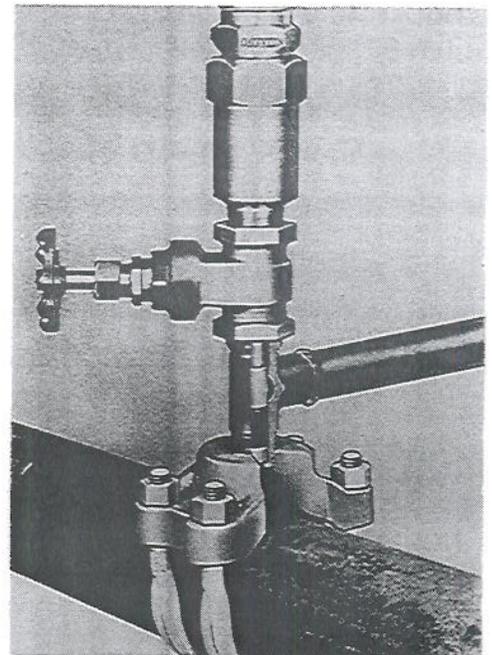


FIGURE 30

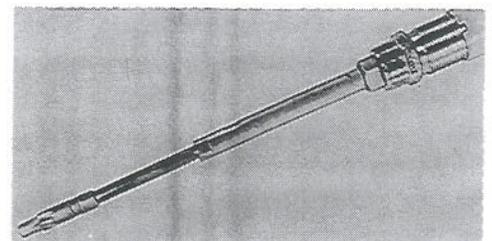


FIGURE 31

"D-4" DRILLING MACHINE

RECONDITIONING NO-BLO STEEL VALVES AND NO-BLO CAPPED STEEL VALVES

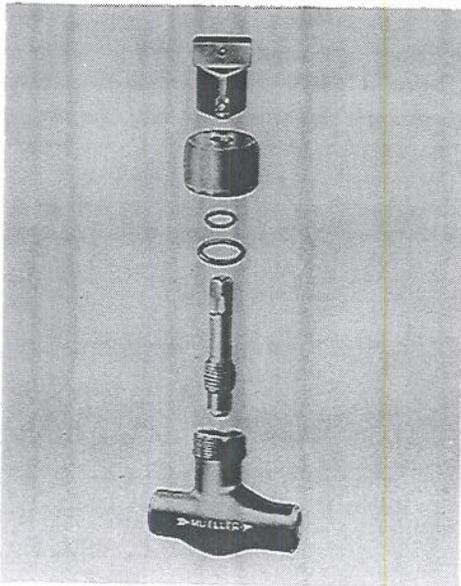


FIGURE 32

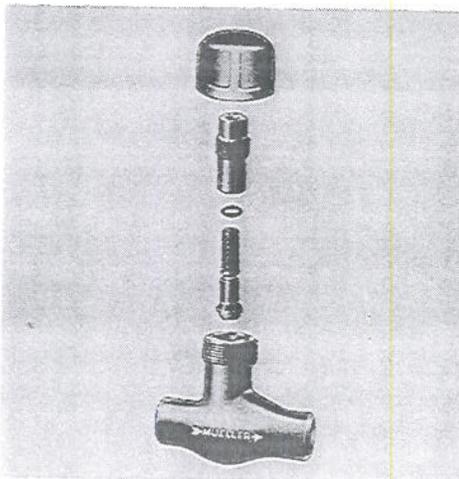


FIGURE 33

These instructions are for doing the following NO-BLO operations using the "D-4" Drilling Machine. Also see "OPERATING INSTRUCTIONS for MUELLER "D-4" DRILLING MACHINE."

Item	Sizes	NO-BLO Operations
NO-BLO Steel Valves	3/4" 1"	Insert Stem Extract Stem Recondition Body Seat
NO-BLO Capped Steel Valves	3/4" 1"	Insert Stem and Bushing Extract Stem and Bushing Recondition Body Seat

During the reconditioning operations the pressure and temperature must not exceed the amounts indicated in the table below.

Catalog No. of Drilling Machine	Type of Valve To Be Used	Maximum Working Pressure	Maximum Temperature Rating
"D-4"	H-10914	125 p.s.i. at 100°F.	250°F. at 100 p.s.i.
	H-10916	500 p.s.i. at 100°F.	250°F. at 375 p.s.i.

The reconditioning of a NO-BLO Steel Valve is the same as corresponding operations for a Curb Valve Tee and uses the same equipment. **Figure 32.**

The reconditioning of a NO-BLO Capped Steel Valve is the same as corresponding operations for a Valve Tee and uses the same equipment. **Figure 33.**

A—SELECT THE EQUIPMENT REQUIRED

1. Determine the catalog number of the valve to be used with the "D-4" Drilling Machine. See table above and **Figure 1.**
2. Select the proper "D-4" Machine Tool Kit according to the following:
 - a. Size and catalog number of the NO-BLO Steel Valve or NO-BLO Capped Steel Valve that is to be reconditioned.
 - b. Catalog number of the valve to be used with the "D-4" Machine (H-10914 or H-10916).

The required tool kit number is listed in the GAS DISTRIBUTION PRODUCTS CATALOG along with the cataloging of the NO-BLO Steel Valves and NO-BLO Capped Steel Valves. Each page of

**RECONDITIONING
NO-BLO STEEL VALVES AND
NO-BLO CAPPED STEEL VALVES**

"D-4" DRILLING MACHINE

NO-BLO Steel Valves and NO-BLO Capped Steel Valves includes the corresponding tool kit numbers. The contents of the Tool Kit are listed with the cataloging of the "D-4" Drilling Machine.

3. Select the size of the gate valve to be used (H-10914; H-10916). This is listed in the CATALOG in the same column as the Tool Kit being used.
4. Select the reseating reamer and drill holder from the following table.

Size of NO-BLO Valve	¾" & 1"
Reseating Reamer - Part Number	72240
Drill Holder - Part Number	61981
Boring Bar Adapter - Part Number	36324

B—REMOVE STEM OR STEM AND BUSHING

- 1a. For NO-BLO Steel Valves. Close the valve tightly, remove tee handle and remove cap. Remove the stem by following instructions "J" page 9 for removing the stem from the Curb Valve Tee.

- 1b. For NO-BLO Capped Steel Valves. Remove completion cap, close valve approximately half way and loosen bushing slightly with completion wrench. Remove the bushing (including the stem) by following instructions "J" page 9 for removing the bushing from a Valve Tee.

C—RECONDITION THE VALVE

1. Recondition the body seat. See instruction "L" page 11.
2. Replace worn or damaged parts. Every part can now be replaced except the body.
3. Lubricate all "O" rings.

D—INSERT STEM OR BUSHING

- 1a. For NO-BLO Steel Valves. Follow instructions "H" page 7 for inserting stem into Curb Valve Tee. Replace cap and tee handle.
- 1b. For NO-BLO Capped Steel Valves. Follow instructions "H" page 7 for inserting bushing into Valve Tee. Open or close valve as required and replace completion cap.

E—TO OPERATE NO-BLO CAPPED STEEL VALVES

1. Follow instructions "I" page 9.

"D-4" DRILLING MACHINE

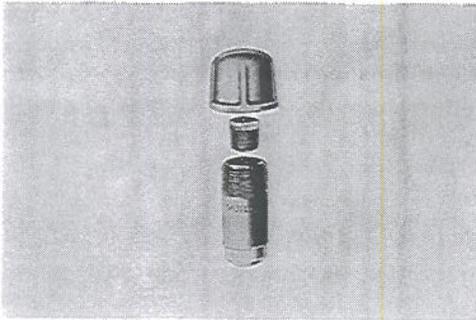


FIGURE 34

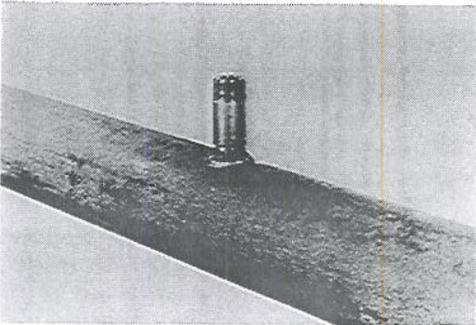


FIGURE 35

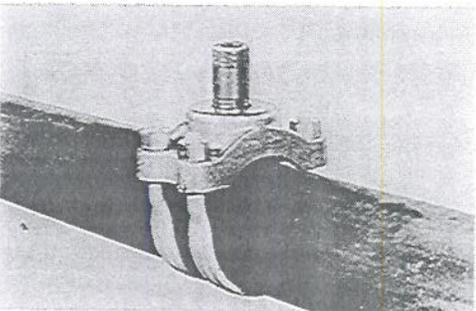


FIGURE 36

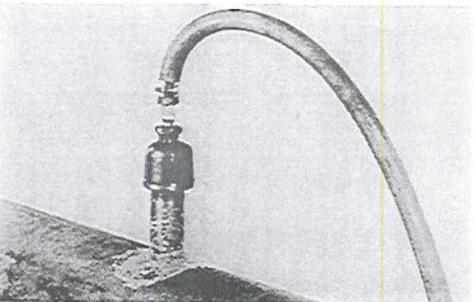


FIGURE 37

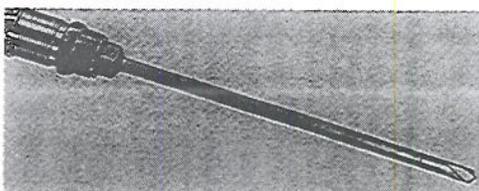


FIGURE 38

These instructions are for doing the following NO-BLO operations using the "D-4" Drilling Machine. Also see "OPERATING INSTRUCTIONS" for the MUELLER "D-4" DRILLING MACHINE.

Item	Sizes	NO-BLO Operations
Save-A-Valve Drilling Nipples	1" 1 1/4" 1 1/2" 2" 2 1/2" 3"	Drill the Pipe Insert Plug Extract Plug

The following table lists the maximum working pressure and temperature rating of the machine and its equipment. The line pressure must not exceed the amounts indicated while drilling the main, inserting the completion plug or extracting the completion plug.

Catalog No. of Drilling Machine	Catalog No. of Valve To Be Used	Maximum Working Pressure	Maximum Temperature Rating
"D-4"	H-10914	125 p.s.i. at 100°F.	250°F. at 100 p.s.i.
	H-10916	500 p.s.i. at 100°F.	250°F. at 375 p.s.i.

If using a H-10916 Gate Valve, the line pressure and temperature may be increased to the following amounts during the use of the nipple after the drilling operation is completed and the drilling machine removed. The pressure and temperature must again be reduced to the amounts shown in the table above before the drilling machine is re-assembled to the gate valve for inserting or extracting the completion plug.

1200 p.s.i. Maximum Working Pressure at 100°F.

500°F. Maximum Temperature Rating at 1000 p.s.i.

A—SELECT THE EQUIPMENT REQUIRED

1. Determine the catalog number of the gate valve to be used according to the working pressure and temperature of the line to which the nipple is to be attached. See table above and **Figure 1**.
2. Select the proper "D-4" Machine Tool Kit according to the following:
 - a. Size and catalog number of the Save-A-Valve Drilling Nipple to be installed.
 - b. Catalog number of the valve to be used.

The required tool kit number is listed in the GAS DISTRIBUTION PRODUCTS CATALOG along with the cataloging of the Save-A-Valve Drilling Nipples. The contents of the Tool Kit are listed with the cataloging of the "D-4" Drilling Machine.
3. Select the drilling tools to be used. The maximum size of the drilling tools which can be used is listed in the GAS DISTRIBUTION PRODUCTS CATALOG directly under the listing of the contents of each tool kit. Also listed are alternate smaller drilling tools.
4. Select the proper size of gate valve. This is listed in the CATALOG in the same column as the Tool Kit being used and directly under the drilling tools.

B—ATTACH THE NIPPLE TO THE PIPE

1. Thoroughly clean the surface to which the nipple is to be attached.
2. Remove completion cap and completion plug. **Figure 34**.
- 3a. For nipples having welding inlet. Place nipple in desired location and weld to pipe line. **Figure 35**.

INSTALLING SAVE-A-VALVE DRILLING NIPPLES

"D-4" DRILLING MACHINE

- 3b. For nipples having threaded inlet. Attach Service Clamp at the desired position. Apply non-hardening pipe thread "dope" to the inlet thread of the nipple and screw it into the body of the Service Clamp. **Figure 36.** NOTE: When using a Save-A-Valve Drilling Nipple having a threaded inlet, it may be necessary to reduce the working pressure and temperature to that of the clamp or fitting to which the nipple is attached.

C—TEST THE INSTALLATION

1. Screw test cap on nipple.
2. Apply air pressure and test for leaks with soapsuds (add glycerin in freezing weather) or bubble type leak detection fluid. **Figure 37.**
3. Remove test cap.
4. If installing a 1", 1¼" or 1½" nipple the following additional equipment may be used if desired.
 - a. H-17615 Center Locating Punch. See instruction "B-5" page 5.
 - b. H-17618 Test Fitting. See instruction "C-4a" page 5.
 - c. H-17617 Center Locating Punch and Test Fitting. See instruction "C-4b" page 5.

D—ATTACH DRILLING MACHINE

1. Attach gate valve to top of nipple. (If installing a 1" nipple, first attach proper bushing to top of nipple and then attach gate valve to bushing.)
2. Open gate valve **fully**.
NOTE: When using the "D-4" Machine with small size nipples, attach tools before attaching machine adapter nipple. See NOTE in instruction "E" page 6.
3. Attach machine adapter nipple to the body of the machine. Be sure the gasket is in good condition and in place.
4. Assemble proper size drill and drill holder, combined drill and holder or shell cutter, cutter arbor and pilot drill to the boring bar of the machine. When using a combined drill and holder, a boring bar adapter (part no. 36324) must be used between the combined drill and holder and the boring bar.
5. Coat drill or shell cutter and pilot drill thoroughly with MUELLER Cutting Grease. **Figure 38.**
6. Retract boring bar to its rearmost position.
7. Place drilling machine on gate valve and tighten machine adapter nipple into gate valve. **Figure 39.**

E—DRILL THE MAIN

1. Slowly advance boring bar until point of drill contacts the pipe. Then retract boring bar a slight amount.
2. Adjust feed tube and yoke so that the yoke engages the collar on boring bar. Tighten clamping collar against top of feed yoke.
3. Drill the hole by operating the ratchet handle **clockwise** and turning the feed tube and yoke **clockwise** a little at a time. **Figure 40.** Use a light even feed at the start, then a heavier feed and finish with a light even feed. To prevent over-feeding when drilling small holes and also when starting to drill larger holes, apply the feed by gripping the knurled section of the feed tube instead of the feed handles.
4. Continue drilling until a hole is drilled in the pipe. This can be determined by the feel of the feeding mechanism and the pull of the ratchet handle.

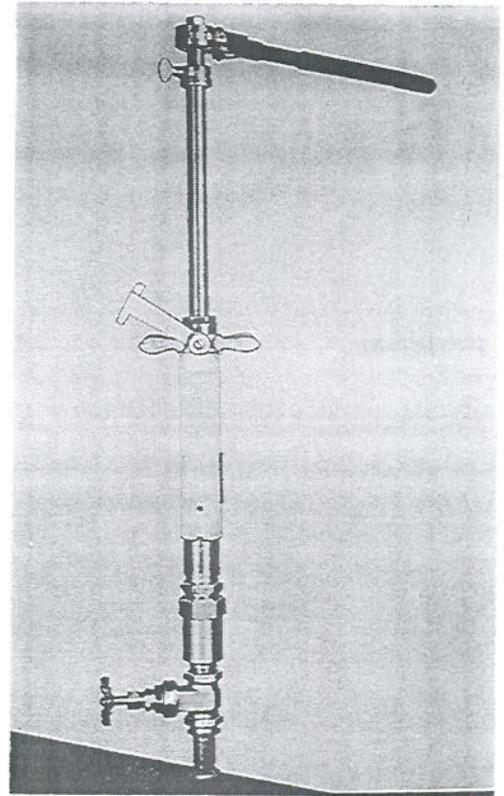


FIGURE 39

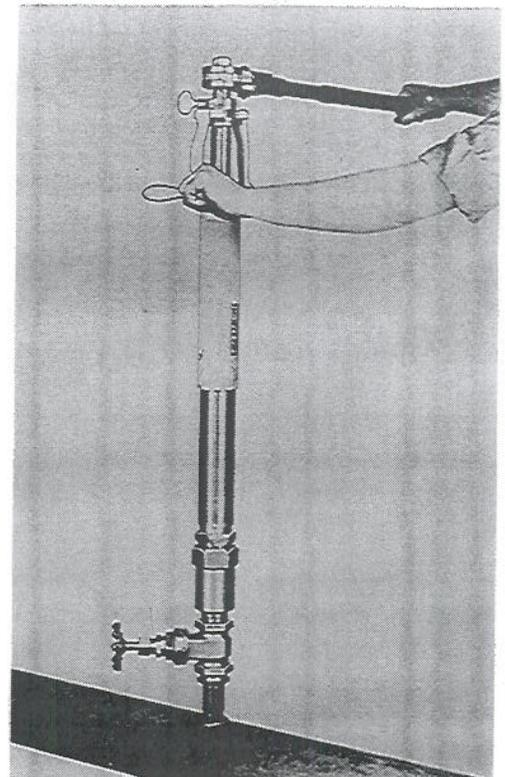


FIGURE 40

"D-4" DRILLING MACHINE

INSTALLING SAVE-A-VALVE DRILLING NIPPLES

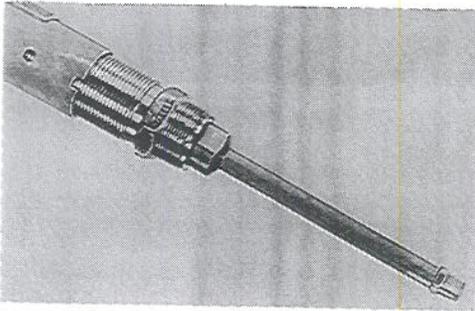


FIGURE 41

F—REMOVE THE DRILLING MACHINE

1. When the drilling operation is completed, retract the boring bar to its rearmost position. Be sure the point of the drill is above the valve gate of the gate valve. **CAUTION: DO NOT REVERSE THE ROTATION OF THE RATCHET HANDLE WHEN RETRACTING THE BORING BAR.**—PRESSURE INSIDE THE "D-4" MACHINE WILL TEND TO RAISE THE BORING BAR. HOLD DOWN ON BORING BAR OR USE THE FEED YOKE TO CONTROL THE UPWARD MOTION OF THE BORING BAR THEREBY PREVENTING SHOCK OR DAMAGE TO THE DRILLING MACHINE.
2. Close gate valve.
3. Remove drilling machine and machine adapter nipple as a unit.
4. Advance boring bar.
5. Remove drilling tools.
6. Attach required piping to gate valve.
7. Open gate valve when ready for flow through the Save-A-Valve Drilling Nipple connection.

G—INSERT COMPLETION PLUG AND REMOVE GATE VALVE

1. When flow through Save-A-Valve Drilling Nipple connection is no longer required, close the gate valve.
2. Remove piping from gate valve.
3. Assemble plug inserting tool to the right hand threads in the end of the boring bar of the drilling machine.
4. Attach completion plug to the plug inserting tool. Lubricate the tool threads and be sure the tool and plug thread together freely. Check to be sure threads on the plug and nipple are clean. Apply non-hardening pipe thread "dope" to the completion plug threads. **Figure 41.**
5. Retract boring bar to its rearmost position.
6. Attach drilling machine to gate valve.
7. Open gate valve **fully.**
8. Advance boring bar until the completion plug contacts the top thread in the nipple. Hold the boring bar down with the feed yoke if desired.
9. Rotate the ratchet handle **clockwise** until the completion plug is firmly screwed into the nipple.
10. Reverse ratchet and turn the ratchet handle **counter-clockwise** to take up the slack. Hold in this position with one hand and strike the end of the ratchet handle a sharp blow **counter-clockwise** with the other hand. **Figure 42.**
11. Rotate the boring bar **counter-clockwise** until the inserting tool is free from the completion plug.
12. Remove drilling machine and gate valve.
13. Tighten completion plug with completion plug wrench.
14. Apply non-hardening pipe thread "dope" to completion cap threads and screw cap tightly on nipple. **Figure 43.**
15. Test the entire nipple with soapsuds.

H—TO RE-USE SAVE-A-VALVE DRILLING NIPPLE

1. Remove completion plug. Follow instruction "J" page 9 for removing completion plug from Service Tees.
2. Attach required piping to gate valve.
3. Open gate valve when ready for flow through the Save-A-Valve Drilling Nipple connection.

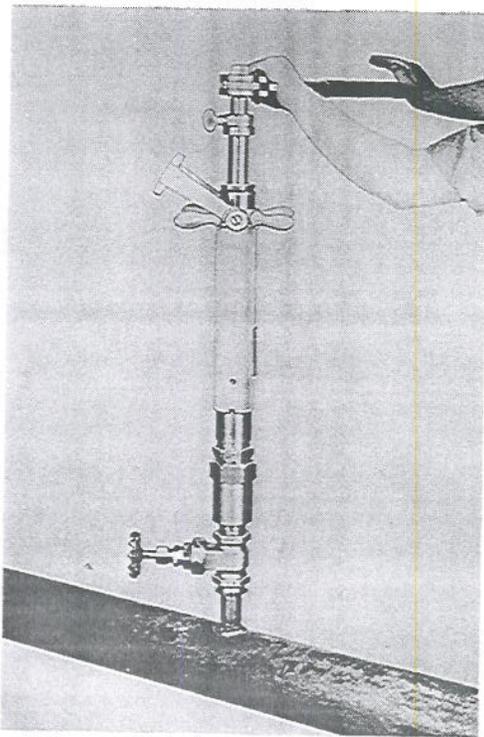


FIGURE 42

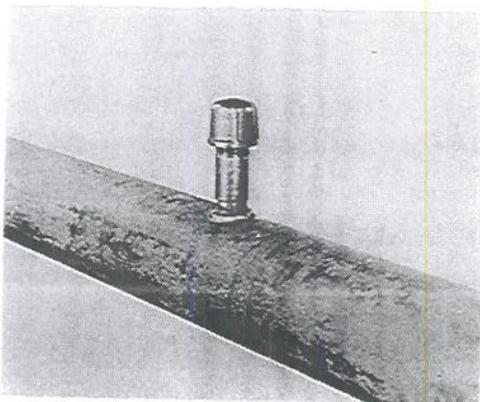


FIGURE 43



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