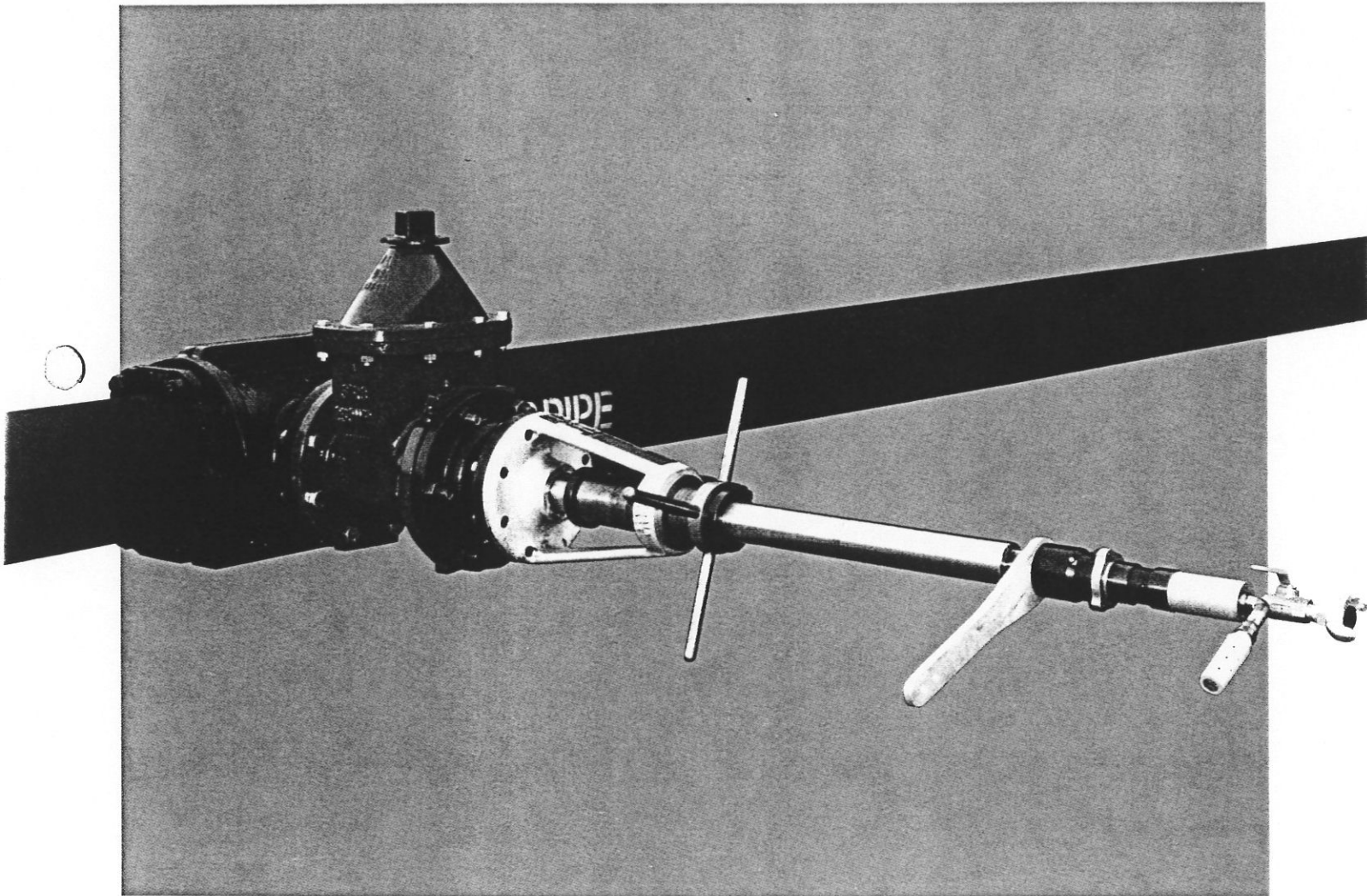


U . S . P I P E - - M O D E L S - 9 4

1995 EDITION

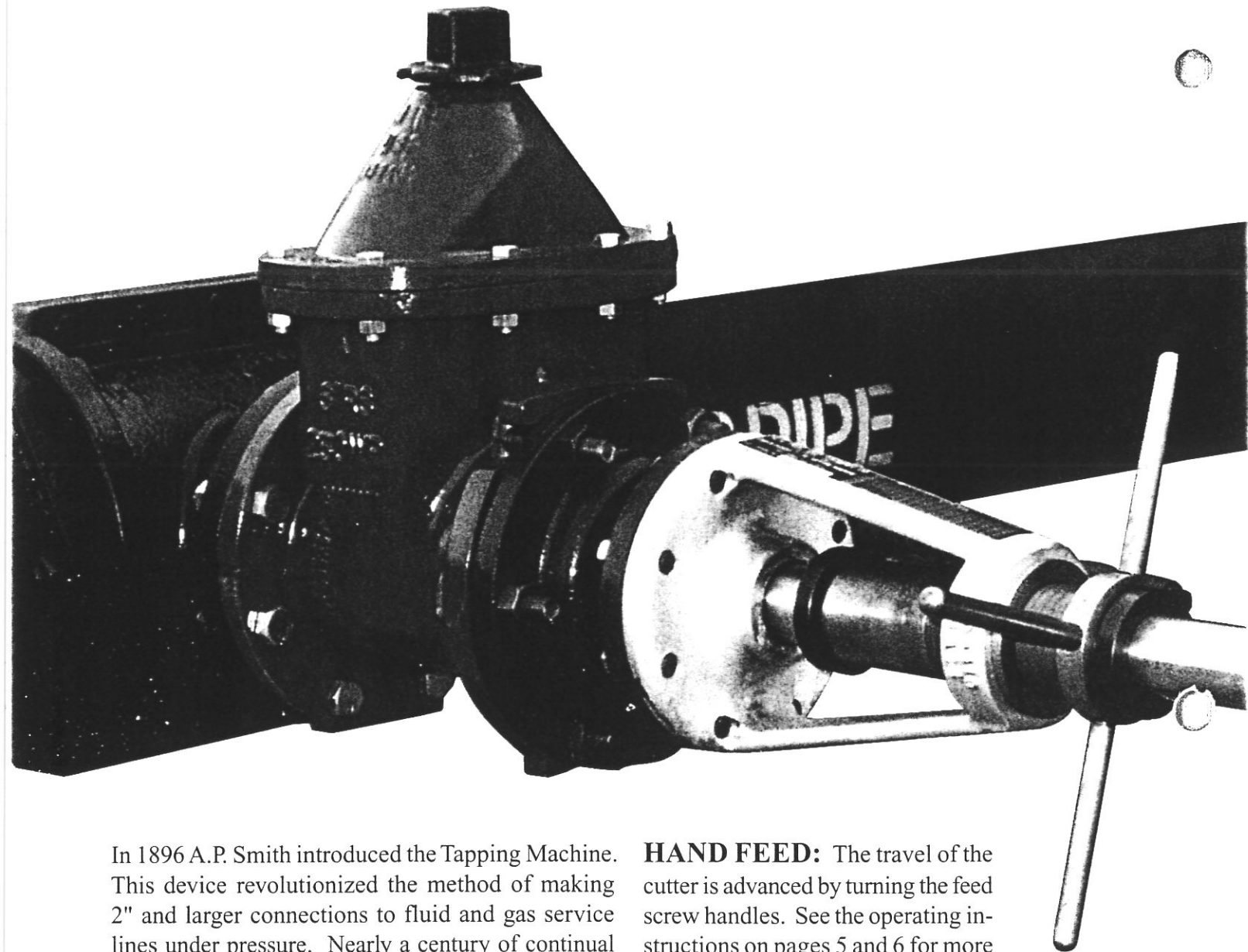
TAPPING MACHINES

For Pressure Connections 2" - 12" Diameter



**U.S.
PIPE**

U.S. PIPE AND FOUNDRY COMPANY



In 1896 A.P. Smith introduced the Tapping Machine. This device revolutionized the method of making 2" and larger connections to fluid and gas service lines under pressure. Nearly a century of continual development has resulted in the new S-94 Tapping Machine. The S-94 is the most versatile, efficient and economical machine available. The S-94 Tapping Machine can be used with tapping sleeves and saddles, welded on flanges and tapping valves to make connections 2" to 12" inclusive (under pressure) to Ductile Iron, gray iron, cement-asbestos, steel reinforced concrete and other types of pipes, tanks or pressure vessels.

TWO MODELS: Available in two styles, both models have 25 inches of travel for taps 2" through 12". The S-Model uses U.S. Pipe's standard S-54 cutters, drill and adapters as detailed on page 4 of this document. The M-Model is equipped to use Mueller CL-12 cutting equipment. Special adaptations will be considered.

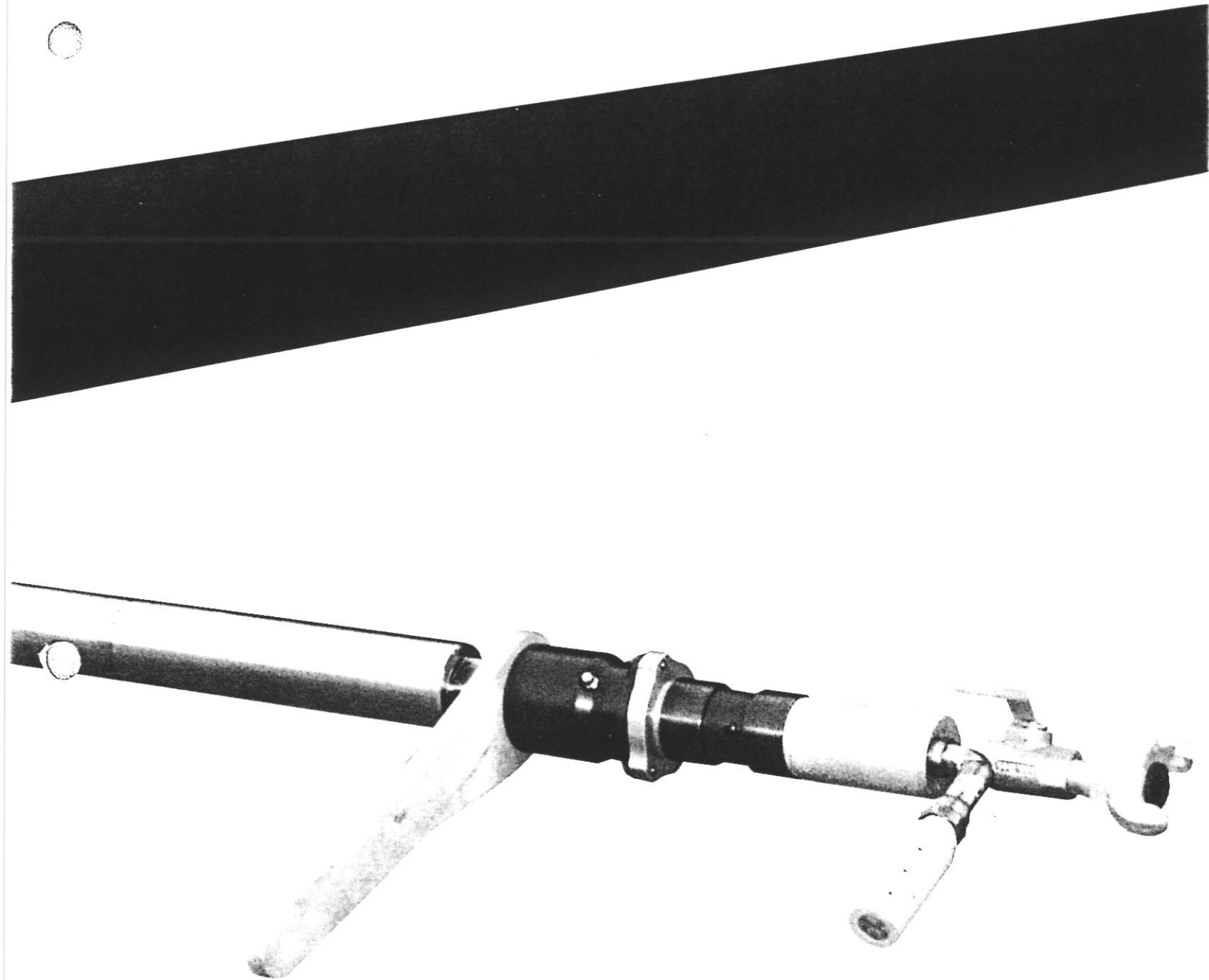
HAND FEED: The travel of the cutter is advanced by turning the feed screw handles. See the operating instructions on pages 5 and 6 for more details.

TRAVEL INDICATOR: A chart attached to the machine indicates the travel required to complete tap.

SHAFT SEALS: Accessible without disassembling machine. Equipped with pressure energized seals. Line pressure cannot enter the machine case.

S-94 PRESSURE & TEMPERATURE RATINGS:

Standard Seals: 350 psi maximum at 250° F
Special Seals: On application



DRILLS: Fewer pilot drills required. One size drill for 4" through 12" shell cutters and one drill for the 3" cutter. Two inch taps are made with 2" drill only and no shell cutter is used.

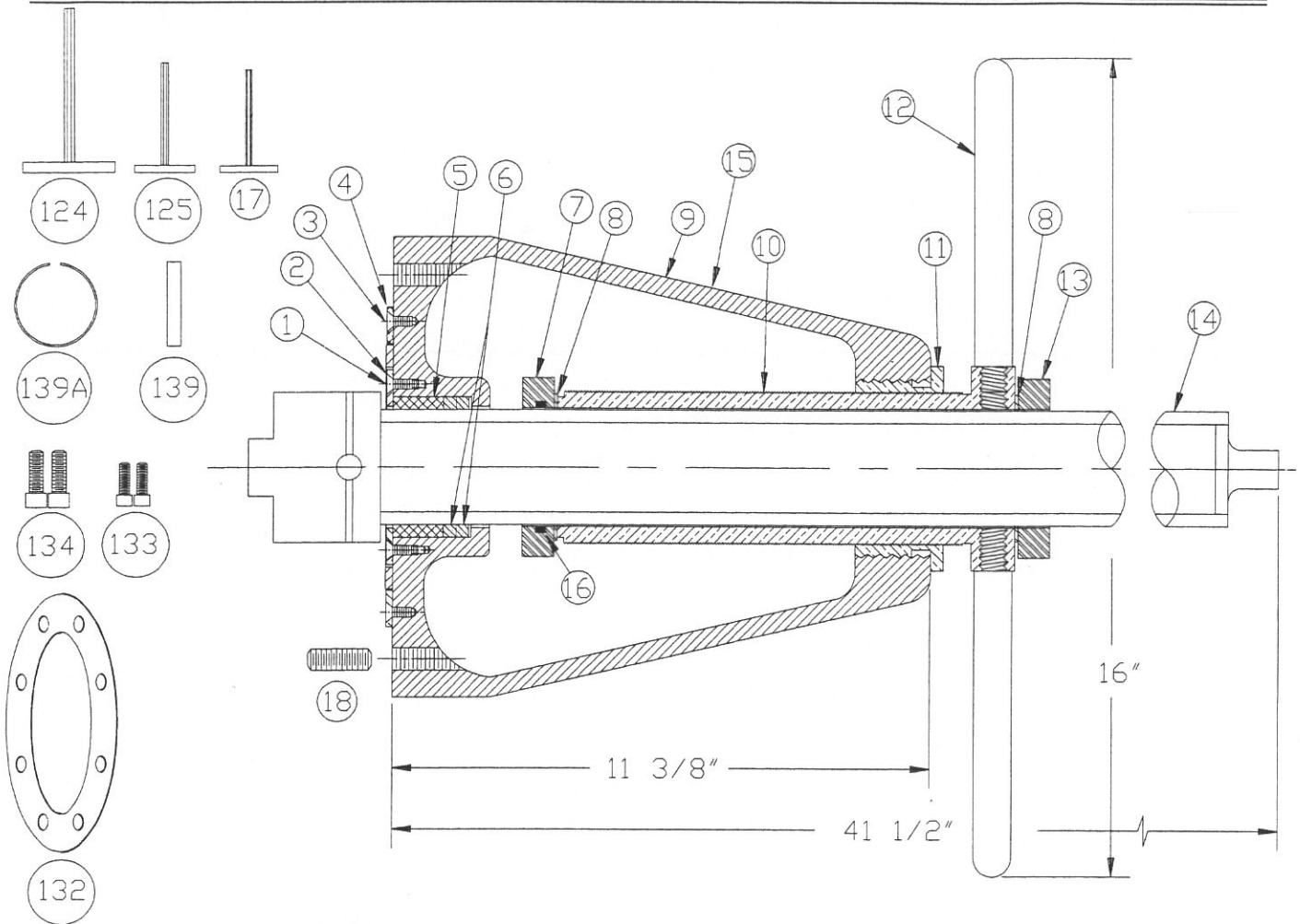
CUTTERS: One piece shell cutters have replaceable flat and semi-V alternate teeth of tool steel or carbide.

LIGHT WEIGHT: The machine, without cutting equipment attached, weighs 48 pounds.

AIR MOTOR: The motor attaches directly to the power operated machine without a bracket, holder or adapter.

ELECTRIC MOTOR OPTION: Attached directly to the drive shaft. A ground fault plug is recommended for additional safety. See "CAUTION" on page 6.

BILL OF MATERIAL FOR S-94 TAPPING MACHINE



NO.	PART NO.	QTY.	DESCRIPTION
1	009040	4	FL.HD.MACHINE SCREW
2	300641	1	SEAL RETAINER
3	009040	4	FL.HD. MACHINE SCREW
4	300651	1	ADAPTER RING
5	010716	1	SHAFT BEARING
6	011029	2	SHAFT SEALS
7	011286	1	CLAMP COLLAR/BREAK
8	300232	2	FRICTION WASHER
9	300811	1	FRAME
10	300831	1	FEED SCREW
11	300821	1	FEED SCREW BUSHING
12	300026	4	FEED SCREW HANDLES
13	011285	1	CLAMP COLLAR
14	300239	1	CUTTER SHAFT
15	301144	1	TRAVEL CHART
16	010013	1	"O" RING, SPLIT
17	011120	1	1/4" HEX WRENCH
18	006725	8	5/8"X2 1/2" STUD
124	011107	1	3/8" HEX WRENCH
125	011108	1	5/16" HEX WRENCH
132	301146	1	MACHINE ADAPT. GSKT.
133	008364	2	3/8"X1 1/4" SCHD CAP. SCR.
134	008365	2	1/2"X1 1/2" SCHD CAP. SCR.
139	301078	1	RETAINER PIN - SOLID
139A	301353	1	DRILL PIN RET. SPRING

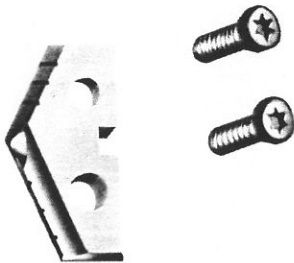


Shell Cutter 3"-12"

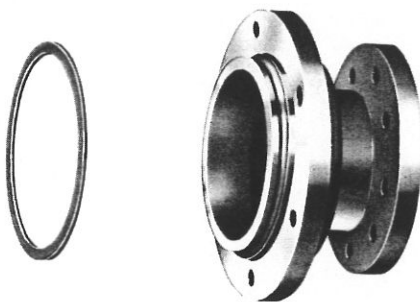
#162 tool steel #163 carbide tipped
For 3"-12" specify full size or 1/2" undersize



Pilot drill with replaceable tip and latch. 4"-12" size



Field replaceable spade-type drill tip



Mechanical Joint Adapter

SHELL CUTTERS

Shell cutters are used to make taps 3"-12" and are available either carbide tipped or tool steel tipped. Carbide tip shell cutters are used for cement lined iron or steel pipe, concrete pipe or asbestos cement pipe. Carbide tips will stay sharp longer when cutting abrasive materials. Tool steel cutters may be used on iron or steel pipe, not cement lined. Tips are flat and semi-V shape placed alternately on the cutter. They are attached to the cutter by brazing and are replaceable. 3"-12" shell cutters can be ordered full size or 1/2" undersize. Special "Indexible" shell cutters are also available in place of the regular shell cutters shown. Contact factory sales office (615-752-3700) for detailed information.

PILOT DRILLS

Only two sizes of pilot drills are needed: 4"-12" shell cutters use the same pilot drill. This drill has two retainer pin holes. One hole setting is for use with 4", 6" & 8" cutters. The other pin hole is for 10" & 12" cutters. Each pin hole is marked for the cutter size range. Separate pilot drills are used for 3" shell cutters. This size has a single pin hole.

Coupon retention: The 4"-12" pilot drill is provided with an integral latch assembly for positive coupon retention. This is especially valuable when tapping pipe above the horizontal center line. Latch assemblies are field replaceable.

Replaceable drill tips: All pilot drills and the 2" drill utilize a spade-type field replaceable drill tip of either carbide or tool steel. The tips are secured with special torx head screws. A torx head driver is supplied with drills and replacement tip kits. The drill tips can be resharpened locally as required.

TWO INCH DRILLS

Two inch holes are made with a 2" drill as this size is too small for a shell cutter.

ADAPTERS

Adapters are required to connect the tapping machine to the various joints and sizes of tapping valves. Mechanical Joint Adapters #166 are furnished with "O" ring gasket #169. Flanged Adapters #167 fit ANSI/AWWA C110/A21.10 flanges or ASME B16.1 Class 125 flanges. They are furnished with gasket #170 and bolts and nuts #174. Push-on (TYTON® Fittings) adapters # 176 are furnished with gasket # 168 and bolts and nuts #171. Adapters are available in sizes 2"-12"; indicate part number and size.

STANDARD EQUIPMENT FURNISHED WITH EACH MACHINE (see parts list):

- Two double end wrenches
- Three tee handle Allen key wrenches
- Machine to adapter bolts, nuts and gasket
- Machine with above equipment is shipped in a substantial wooden chest.

EQUIPMENT TO BE SELECTED

- Adapters
- Shell cutters
- Pilot drills
- Air or electric operators

S-94 TAPPING MACHINE OPERATING INSTRUCTIONS

U.S.
PIPE

Test the valve and tapping sleeve/saddle assembly mounted on the pipe before connecting the tapping machine to the valve. Test the tapping sleeve and valve assembly by removing the test plug in the tapping sleeve and attaching a pressure line from a convenient source or from a portable test pump. Test with water only and do not exceed the working pressure of the valve. After completing the test, replace the test plug, applying pipe dope or Teflon thread sealant.

1. Examine the shell cutter tips and pilot drill to be sure they are sharp and in satisfactory condition, i.e., that they are not rounded off (indicating dullness), chipped or broken.

2. Examine adapter and gasket for damage. Bolt proper size adapter to the machine.

3. Loosen the clamping collars, front (#7) and rear (#13). Push the cutter shaft (#14) forward until the drill pinhole projects beyond the adapter and is accessible.

4. Insert the pilot drill into the shell cutter and place it onto the boring bar, with Allen screws slightly loose (two Allen head cap screws and a tee handle wrench are provided). Push the pilot drill into the boring bar and align the correct hole (each drill is marked indicating cutter size or sizes with which it should be used). Insert retaining pin (#139) and lock it in place with retainer spring (#139A); rotate the retainer spring so that the open end of the ring is at a right angle to the retaining pin. Tighten the Allen screws to hold the shell cutter. Pull the shaft rearward to bring the cutter into contact with the adapter. Snug the rear collar (#13) to prevent the shaft and cutter from sliding forward during the assembly process.

NOTE: FOR S-94 MACHINES EQUIPPED WITH A CL-12 STYLE SHAFT, REMOVE THE ADAPTER RING (#4). MOUNT THE CUTTING EQUIPMENT AS YOU WOULD FOR A MUELLER CL-12 MACHINE.

5. Completely open the tapping valve. Some types of valves may not be suitable for tapping because of insufficient distance between the gate and valve face. This will cause the gate to hit the pilot drill

and the valve cannot be closed. To verify that the valve has sufficient clearance, measure the distance from the face of the adapter flange to the tip of the pilot drill with the adapter mounted on the tapping machine and the shell cutter and pilot drill fully retracted. This distance must be less than the distance from the gate of the closed valve to the face of the valve outlet which connects to the adapter flange.

6. Examine and position the tapping valve gasket. Attach adapter/machine assembly to the tapping valve. Tapping machine travel chart should face upwards for convenient reading. Support the assembly by blocking under the tapping valve.

7. Push the cutter shaft (#14) forward until the pilot drill just touches the pipe. Care must be used to insure the drill does not forcibly strike the pipe which could damage the drill point.

8. Rotate feed screw handles (#12) counterclockwise to back out the feed screw to the desired travel depth which is found on the travel chart (#15), i.e., a 6" tap on a 6" main would require 4 ¾" of travel. Measure the travel distance with a ruler as shown in Figure 1. After travel is set, slide the clamping collars to each side of the feed screw and tighten. Rotate screw handle (#12) one turn counterclockwise to allow the pilot drill to center itself into the water main.

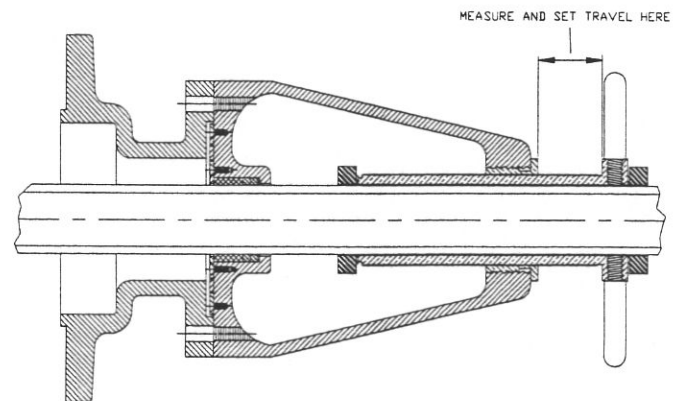


Figure 1

9. Attach the air motor or electric motor to the cutter shaft. The end of the cutter shaft (#16) has a square on the end with a keyway inside. The air motor shaft with key slides in place.

S-94 TAPPING MACHINE OPERATING INSTRUCTIONS



A 3/8" screw holds the shaft secure. **Warning:** Operate the motor only in a clockwise rotation. Failure to do so will damage the cutter and pilot drill. If an electric drive is used, the adapter slides over the square. No key is required.

10. Attached to the air motor is an aluminum handle. An aluminum extension bar bolts to the handle. The extension bar is adjustable so it will rest on the ground (see Figure 2) to prevent the motor from rotating. If the pit is damp, place a 1"x4"x12" long block of wood under the the extension bar and parallel to the centerline on the tapping machine. This will prevent the bar from digging into the soil and lets it slide along with the cutter shaft as the cut is being made.

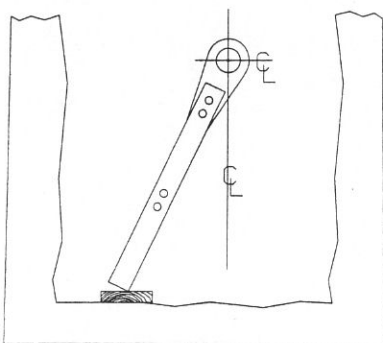


Figure 2

11. Turn the motor on and slowly turn the feed screw handles clockwise (CW). When the cut is in process, if the feed screw is advanced too quickly the motor will bog down and stop which can cause damage to the cutter. If the motor bogs down, rotate the feed screw counterclockwise a 1/4 turn. This action backs the cutter out and allows the motor to regain speed. A steady feed rate is most productive.

Warning: Never stand behind the tapping machine.

12. Continue the cutting operation until no cutting is heard or the feed screw (#10) stops at the feed screw bushing (#11). The tap is complete. Turn off the motor and remove it from the shaft.

13. To retract the cutter shaft, loosen the clamping collar (#13) at the back of the machine. To loosen the front clamping collar (#7) loosen one screw approximately 1/2 turn and loosen the other screw slowly, to allow the cutter shaft to retract slowly and smoothly. The shaft will retract by itself using

the water pressure in the line. **Warning:** Do not stand behind the cutter shaft at any time.

14. Retighten the screws on the front clamping collar (#7).

15. The tapping valve can now be closed and the tapping machine adapter assembly unbolted.

16. Extend the cutter shaft until the cutter projects beyond the adapter and the drill retaining pin is accessible. Remove the retaining pin, pilot drill and pipe coupon from the cutter. Care should be used to avoid damage to the cutter teeth while the coupon is being removed. Remove the cutter and adapter and pull the cutter shaft back.

17. The machine and accessories should be thoroughly cleaned. Drill and cutter should be oiled or greased for corrosion protection while not in use. The feed screw should be screwed in completely while not in use to protect the threads.

CAUTION: U.S. Pipe does not recommend the use of electric motors in wet trench conditions. If used, please consult the motor manufacturer's brochure for safety instructions. We assume no responsibility for the use of this option.

Shell cutters and pilot drills: When cutters and drills with brazed-in teeth become dull or the tips are damaged, they should be returned for reconditioning to United States Pipe and Foundry Co., 2501 Chestnut St., Chattanooga, TN 37408. Customers that have indexible shell cutters and the changeable tip pilot drill can purchase these replaceable tips and screws from U.S. Pipe. The pilot drill tips are available in carbide and tool steel. The indexible cutter is available in carbide only. Both can be changed by the customer.

U.S. PIPE VALVE AND HYDRANT PRODUCTS FOR THE WATER AND SEWAGE INDUSTRY

Fire Hydrants: Dry Barrel, both post and flush type; standard and high pressure. Warm climate type.

METROSEAL® Resilient Seated Gate Valves: 3" through 24", both non-rising stem (NRS) and outside screw and yoke (OS&Y).

Double Disc Gate Valves: 2" through 60", manually and power operated, in all popular configurations. Standard and high pressure.

Tapping Valves: Available in Resilient Seated or Double Disc styles.

Cutting-In Valves and Sleeves: 4" through 12", mechanical joint type, for installation in mains relieved of pressure.

Inserting Valves: 4" through 54", for installation under pressure without interrupting flow in Ductile Iron, gray iron, prestressed concrete steel cylinder, asbestos cement or steel pipe.

Tapping Sleeves and Tapping Saddles: For all popular sizes of Ductile Iron, gray iron, steel, concrete and asbestos cement pipe. Contact nearest sales office for details.

Tapping Machines and Custom Tapping Service: Available to 60" diameter on all types of pipe. Contact nearest sales office for details.

Underwriters Listed and Factory Mutual Approved: Fire hydrants and valves, for standard and high pressure.

Our specialized experience in this field since 1896 is available for the solution of unusual engineering problems. Please contact the closest valve and hydrant specialist indicated in the following list of sales offices.

Sales Offices Located in the Following Cities:

Eastern Region

Albany, NY (518)383-3225
Baltimore, MD (410)879-3556
+ Boston, MA (617)843-5200
+ Burlington, NJ (609)387-6000
New York, NY (914)332-0980
Philadelphia, PA (215)922-0747
Pittsburgh, PA (412)884-8945
Rochester, NY (716)436-3050

Western Region

+ Chicago, IL (708)920-0050
Cincinnati, OH (513)242-1200
Cleveland, OH (216)781-3535
Denver, CO (303)394-0004
Detroit, MI (313)459-2600
Madison, WI (608)271-0303
Minneapolis, MN (612)627-9661

Southern Region

+ Atlanta, GA (404)925-7473
Birmingham, AL (205)254-7236
Charlotte, NC (704)523-9484
+ Clearwater, FL (813)797-3345
Fort Lauderdale, FL (305)525-6733
Jackson, MS (601)957-9146
Memphis, TN (901)386-7550
+ Nashville, TN (615)377-9684
Orlando, FL (407)767-9199

Southwest Region

Austin, TX (512)442-1199
+ Dallas, TX (214)423-3881
Houston, TX (713)468-6850
Kansas City, MO (913)642-3802

Pacific Coast Region

Honolulu, HI (808)836-3577
Los Angeles, CA (714)671-7944
Phoenix, AZ (602)995-4478
Portland, OR (503)241-8347
San Francisco, CA (510)537-6690
Seattle, WA (206)852-9085
Sacramento, CA (209)547-9497

Valve & Hydrant Sales (Main Office)

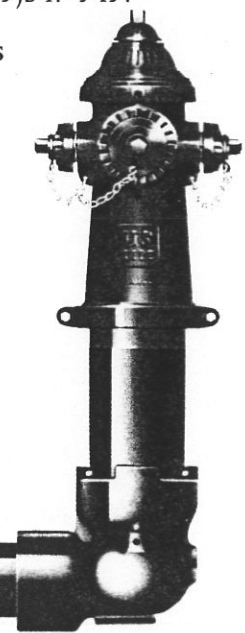
+ Chattanooga, TN
(615)752-3700

Export Office

Birmingham, AL
(205)254-7230

+ indicates valve and hydrant specialist located in this office

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are flowing at U.S. Pipe.



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