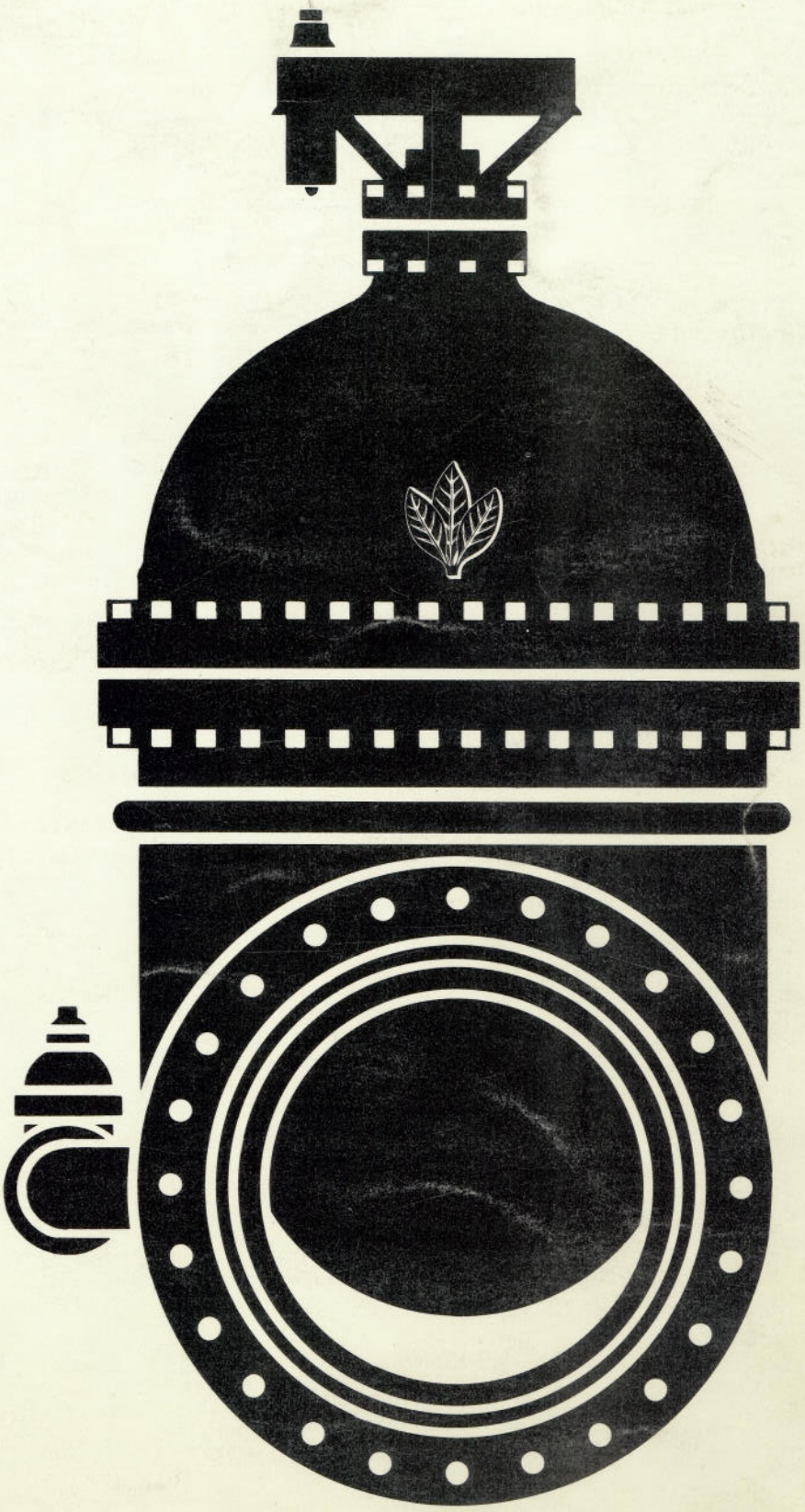
U.S. PIPE

SMITH Metropolitan Gate Valves

1974 Edition



U.S. PIPE

SMITH
Metropolitan Gate Valves
Contents

Introduction

In 1967 the business and assets of the A. P. Smith Mfg. Co. of East Orange, New Jersey were purchased by the United States Pipe and Foundry Company. The Smith Company founded in 1893, was a widely recognized specialist in the production of gate valves, fire hydrants, and related products servicing the Water and Gas Industry. In 1971 the Smith Valve and Hydrant Products plant was relocated with new facilities in the United States Pipe and Foundry Company's Chattanooga, Tennessee complex.

This catalog introduces many different gate valves for varied service. They all employ the same basic design: double disc, parallel seat type of construction using a compound side wedging mechanism. Each of the valve discs, on their rear face, have surfaces which taper transversely outward. The wedges which act between the discs have tapered sides to register with the transfer tapers on the rear face of the discs, while the heels are tapered to function with inclines cast on each side of the valve body. Briefly, the operation of the valve is as follows:

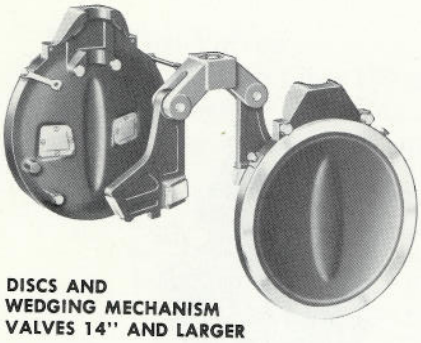
In the closing cycle, the stem is rotated and the discs travel until they cover the valve port-openings and their motion is arrested by stops in the bottom of the valve body. Further rotation of the stem brings the compound principle of the wedges into operation. They are forced downward and, by reason of the inclines on the valve body, also inwardly, so that they expand the discs laterally to their seats. Wedging force is exerted at six points. Conversely, on the opening cycle, the first rotation of the stem releases the wedges, leaving the discs free to travel without friction or grinding against the body ring faces. This design provides a simple and balanced wedging mechanism which assures tight shut-off, long life and easy operation. The streamline design of the discs and the absence of pockets and cavities precludes accumulation of tubercules and the inevitable build-up which renders the ordinary wedging mechanism inoperative.

No matter how excellent the design may be, the performance of the finished product is limited by the quality of materials and the excellence of workmanship used in translating the engineering design into reality. Quality is today an absolute essential and, to insure this, we have provided careful inspection during the various stages of manufacture, including sand control, metallurgical and physical testing laboratories.

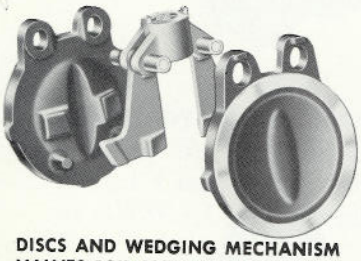
Smith Metropolitan type gate valves, measured by all accepted design criteria, are made to a specification distinctly and measurably in excess of the requirements of A.W.W.A. C500 "Gate Valves for Ordinary Water Service." Specifically, the Metropolitan Gate Valve body and bonnet thickness, manganese bronze stem, tensile and yield strength, the root diameter of the valve stems, the employment of bronze thrust collar bushing in all sizes, not only 16″ and larger, the use of all bronze wedges through 8″ size, and a reusable body/bonnet gasket material define in part the extent of this superiority. Of course, there are special applications requiring special materials and construction which may be agreed upon between the customer and manufacturer if unusual conditions are encountered.

The following pages cover the normal range of sizes and pressure ratings available; the standard valve-end connections available; the varying methods of operation including manual, electrical and hydraulic cylinder; as well as valves for highly specialized services and operating conditions not shown in this catalog. We welcome your inquiries and hope we can serve your valve requirements and assist you in solving your flow control problems.

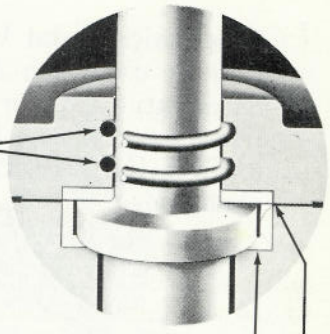
Features	Benefits
Construction and Material Smith "Metropolitan" side wedge design Gate Valves exceed requirements of American Water Works Association Specification C-500 and Federal Specification WW-V-58. All parts precision cast and accurately machined to gauges and templates to assure complete interchangeability.	Castings and operating parts of "Metropolitan" Gate Valves produced by one manufacturer are interchangeable with those produced by another. Standardization with interchangeability is achieved by the user and inventory of replacement and repair parts minimized accordingly.
Oversize Stems and Stem Collar Bushings High tensile strength bronze stems have oversize root diameter at base of thread. Stem collar is bronze bushed in all valve sizes. Accurately machined modified Acme threads assure easy operation.	Valve stem has ability to withstand the application of excessive force without failure and complete thrust-collar bushing reduces friction, allowing for easier operation and tighter seal.
Unique Wedging Action Compound side wedging mechanism assures positive shut-off under most difficult service conditions. Wedges are mechanically actuated and released by inclines in valve body and assure uniform distribution of wedge pressure and positive closing without disc distortion. Wedges through 8" valve size are bronze; in larger sizes cast-iron bronze mounted.	Six-point engagement of side-wedging mechanism produces tight closure with minimum torque.
Positive Shut-off Bronze disc and seat ring faces are accurately machine finished. Machined disc rings are securely rolled and pressed into double-dovetailed grooves machined in the cast-iron discs. Seat rings are threaded and screwed into machined seats in the valve body.	Disc-ring and seat ring design assure long service—free life and assurance of immediate and complete closure when required.
"O" Ring Seal Smith "Metropolitan" Valves for installation in a vertical position in horizontal piping are equipped with dual "O" ring seals above the valve stem thrust collar. Valves for installation in a horizontal position are equipped with standard stuffing box and gland construction.	One or both "O" rings in a valve with thrust collar bushing and where both rings are located above the thrust collar of the stem may be replaced if damaged without shutting down the main and disassembling the valve.
Extra Heavy Bodies and Bonnets Both wall thickness and metal strength exceed A.W.W.A. requirements. Generous fillets provide maximum strength castings.	Valve will tolerate greater abuse and more demanding operating conditions while offering substantially heavier section thickness to the normal corrosive action of the water and the ground fill material.



DISCS AND
WEDGING MECHANISM
VALVES 14" AND LARGER

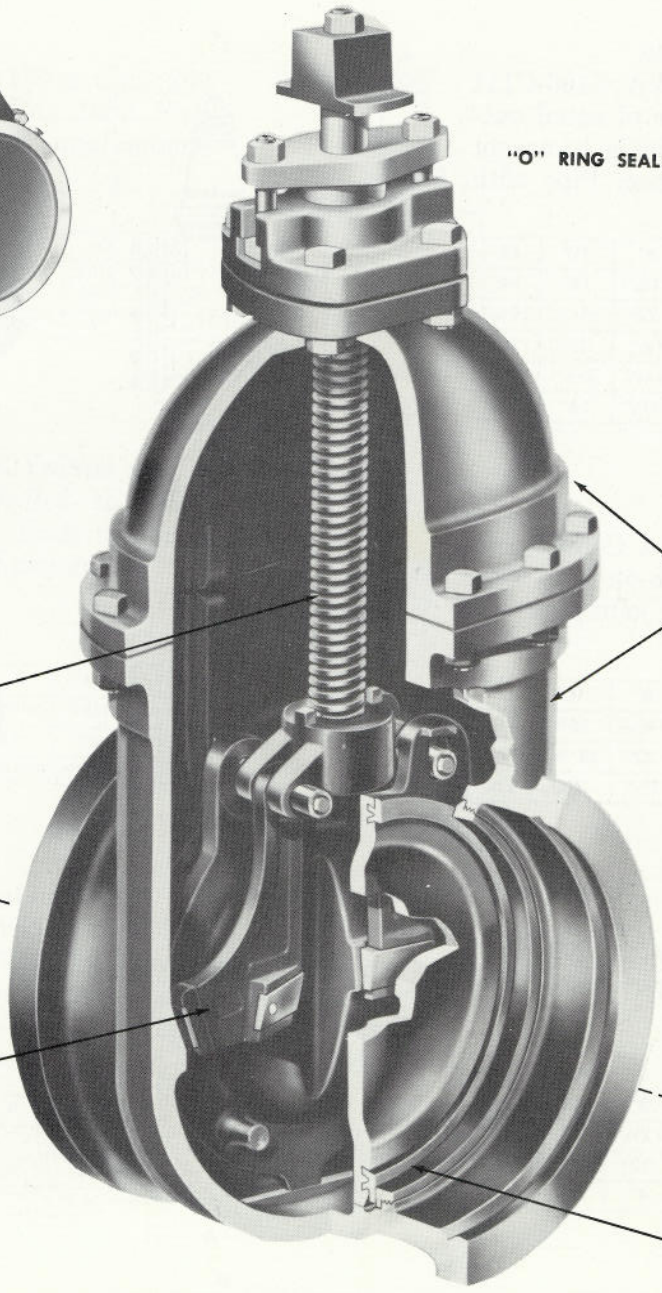


DISCS AND WEDGING MECHANISM
VALVES 12" AND SMALLER



"O" RING SEALS

STEM COLLAR BUSHINGS



EXTRA HEAVY BODIES
AND BONNETS

OVERSIZE STEMS

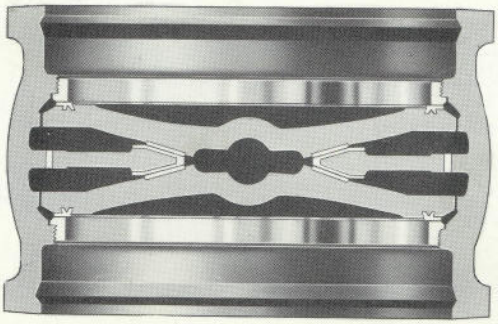
A

UNIQUE WEDGING ACTION

A

POSITIVE SHUT-OFF

CUTAWAY VIEW OF PARALLEL SEAT COMPOUND SIDE WEDGING VALVE



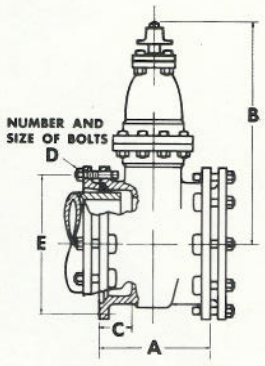
A A SECTIONAL VIEW

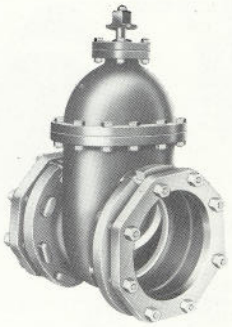
U.S. PIPE SMITH Metropolitan Gate Valves With "O" Ring Seals

Mechanical Joint Valves

May be used with AWWA C106-C111 Specification pipe or pipe of equal outside diameter. Also available to accept AWWA C-102 Specification Pipe with plain ends.

SIZE	4"	6"	8"	10"	12"
A	9⅛"	10½"	11½"	13"	14"
B	15⅛"	18 3/16"	22"	25 13/16"	29⅛"
C	2½"	2½"	2½"	2½"	2½"
D	4-¾"	6-¾"	6-¾"	8-¾"	8-¾"
E	7½"	9½"	11¾"	14"	16¼"



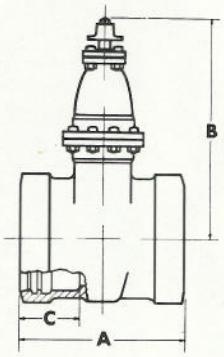


NO. 3460

TYTON* Valves

May be used with AWWA C-106 Specification pipe of the Push-on joint type and with LOK-TYTON® joint pipe with correct gaskets.

SIZE	4"	6"	8"	10"	12"
A	11"	12¾"	14¼"	15⅞"	16 5/16"
B	15⅛"	18 3/16"	22"	25 13/16"	29⅛"
C	3 5/16"	3 5/16"	3⅞"	3⅞"	3⅞"

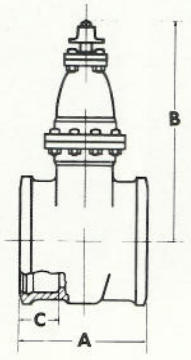


NO. 3008

Hub Valves

May be used with AWWA C-102 Specification pipe or other pipe of equal outside diameter.

SIZE	4"	6"	8"	10"	12"
A	11⅞"	12¾"	12¾"	13⅞"	14⅛"
B	15⅛"	18 3/16"	22"	25 13/16"	29⅛"
C	4"	4"	4"	4"	4"

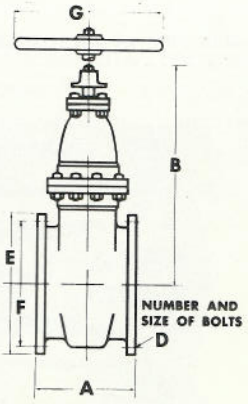


NO. 3000

Flange Valves

May be used with Pipe and Fittings flanges Faced and Drilled to ASA B 16.1 Class 125.

SIZE	4"	6"	8"	10"	12"
A	9"	10½"	11½"	13"	14"
B	15⅛"	18 3/16"	22"	25 13/16"	29⅛"
D	8-⅝"	8-¾"	8-¾"	12-⅞"	12-⅞"
E	9"	11"	13½"	16"	19"
F	7½"	9½"	11¾"	14¼"	17"
G	9"	11"	13"	15"	19"



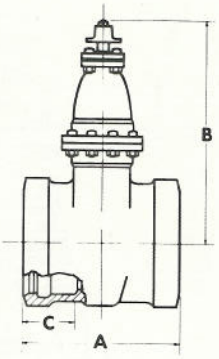
NO. 3100
(NO. 3150 WITH HANDWHEEL)

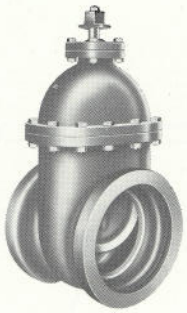
*Trademark

Ring-Tite Valves

May be used with Class 150 or Class 200 Cement Asbestos Ring-Tite Joint Pipe or other pipe with ends of equal outside diameter.

SIZE	4"	6"	8"	10"	12"
A	11"	12¾"	14¼"	15⅞"	16⅝"
B	15⅛"	18 3/16"	22"	25 13/16"	29 1/16"
C	3 9/16"	4"	4½"	5"	5 1/16"





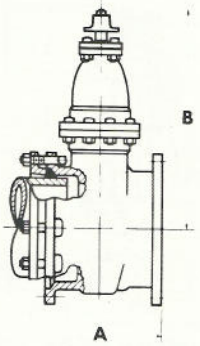
NO. 3002

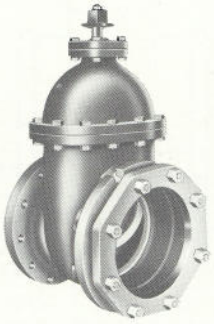
Flange by Mech. Joint Valves

Flanges Faced and Drilled to ASA B 16.1 Class 125—M.J. Ends conform to AWWA C-111 Specification.

SIZE*	4"	6"	8"	10"	12"
A	11¼"	13⅞"	15⅞"	16⅜"	16⅝"
B	15⅛"	18 3/16"	22"	25 13/16"	29⅛"

*FOR OTHER DIMENSIONS SEE MECHANICAL JOINT VALVES—NO. 3460 AND FLANGE VALVES—NO. 3100.





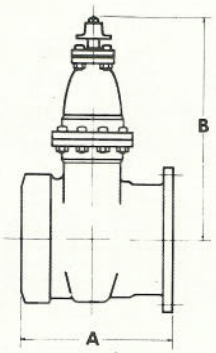
NO. 3260

Flange by TYTON* Valves

Flanges Faced and Drilled to ASA B 16.1 Class 125—TYTON® Ends will accept AWWA C-106 Specification Push-on joint pipe and LOK-TYTON® joint pipe with correct gaskets.

SIZE*	4"	6"	8"	10"	12"
A	11¼"	13⅞"	15⅞"	16⅜"	16⅝"
B	15⅛"	18 3/16"	22"	25 13/16"	29⅛"

*FOR OTHER DIMENSIONS SEE TYTON JOINT VALVES—NO. 3008 AND FLANGE VALVES—NO. 3100.



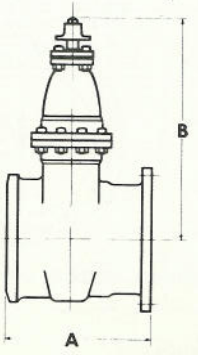
NO. 3206

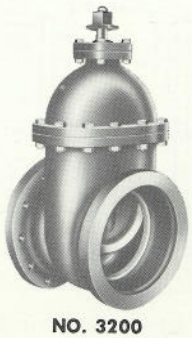
Flange by Hub Valves

Flanges Faced and Drilled to ASA B 16.1 Class 125—Hub Ends conform to AWWA C-102 Specification.

SIZE*	4"	6"	8"	10"	12"
A	11¼"	13⅞"	15⅞"	16⅜"	16⅝"
B	15⅛"	18 3/16"	22"	25 13/16"	29 1/16"

*FOR OTHER DIMENSIONS SEE HUB VALVES—NO. 3000 AND FLANGE VALVES NO. 3100





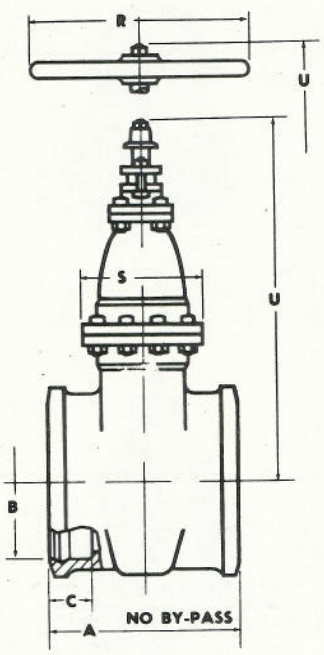
NO. 3200

NOTE: O S & Y and other types and sizes available on request. For parts list for small valves, see page V-28.
"B" Dimension applies to gate valves with "O" ring seals.

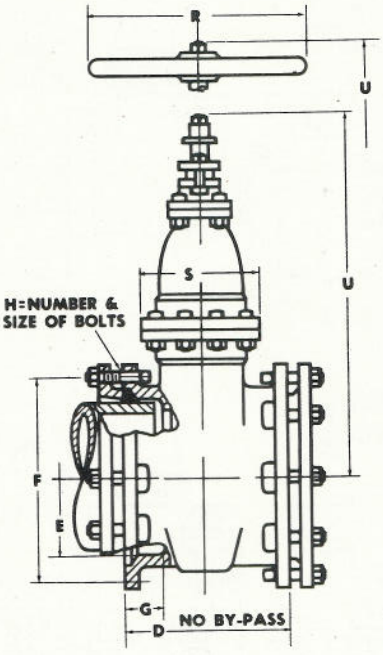
*Trademark

SMITH Metropolitan Gate Valves

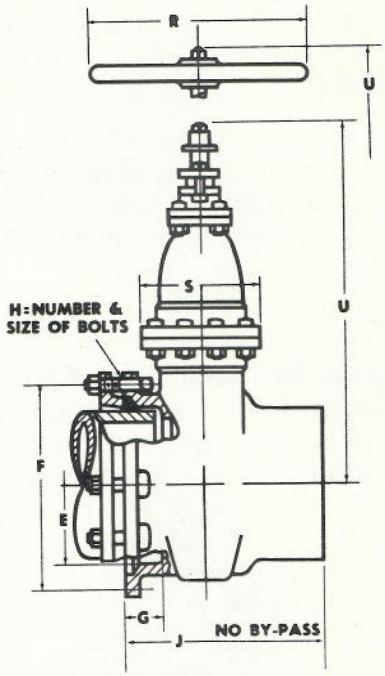
Series 3000—Vertical—NRS
Sizes 3"—12"—200 psi WWP—400 psi Test
Sizes 14"—30"—150 psi WWP—300 psi Test



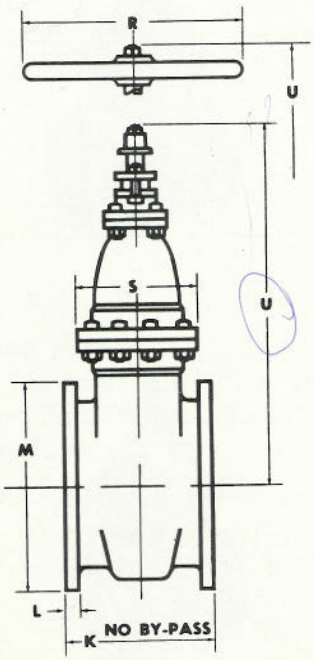
HUB ENDS
FIG. 3000 - NUT OPERATED
FIG. 3050 - WHEEL OPERATED

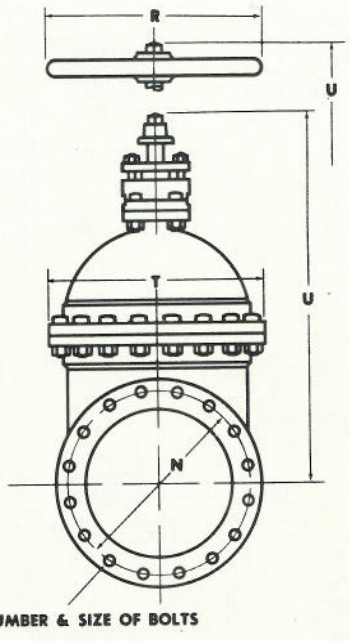


MECHANICAL JOINT ENDS
FIG. 3460 - NUT OPERATED
FIG. 3460-W - WHEEL OPERATED

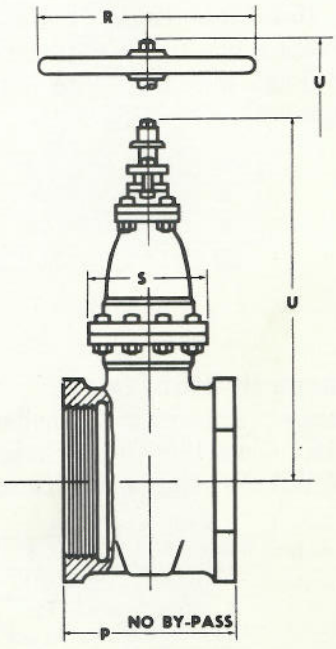


MECHANICAL JOINT & PLAIN END
FIG. 3473 - NUT OPERATED
FIG. 3473-W - WHEEL OPERATED





FLANGED ENDS
FIG. 3100 - NUT OPERATED
FIG. 3150 - WHEEL OPERATED



SCREWED ENDS
FIG. 3300 - NUT OPERATED
FIG. 3350 - WHEEL OPERATED

For parts list, refer to Page V-28.

Dimension "U"—Dimension applicable standard stuffing box construction. For O-ring seal plate construction see dimensions on page V-4 and V-5.

Non-rising stem (N.R.S.) valves without gearing are available with either conventional stuffing boxes or "O" Ring Seals. Valves for underground service are normally furnished with 2" square operating nut.

Valve sizes 16" and larger are available with gearing and by-pass valve. Hub-end valves 3" through 24" are suitable for use with ANSI A21.6 and will accommodate AWWA 1908 pit cast pipe through Class D.

NOTE: 2" Metropolitan Gate Valves in several end configurations available.
Inquire for details.

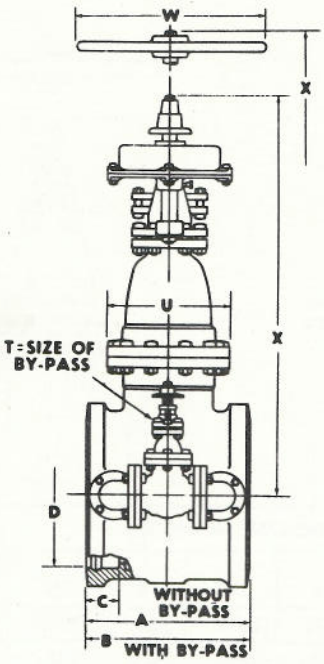
TABLE NUMBER 1 — **DIMENSIONS IN INCHES**

SIZE OF VALVE	3"	4"	5"	6"	8"	10"	12"	14"	16"	18"	20"	24"	30"
A	9⅞	11⅞	12⅝	12¾	12¾	13⅞	14⅛	15⅛	15⅝	16¾	22¾	25¼	28¼
B	4⅝	5¾	6¾	7⅞	10	12⅛	14¼	16 7/16	18½	20¾	22⅞	27⅛	33¼
C	3½	4	4	4	4	4	4	4	4	4	4	4	4½
D	8	9⅛	—	10½	11½	13	14	16¾	19⅛	19⅛	20¼	24¼	28¾
E	4.06	4.90	—	7.00	9.15	11.20	13.30	15.44	17.54	19.64	21.74	25.94	32.17
F	6 3/16	7½	—	9½	11¾	14	16¼	18¾	21	23¼	25½	30	36⅞
G	2½	2½	—	2½	2½	2½	2½	3½	3½	3½	3½	3½	4
H	4-⅝	4-¾	—	6-¾	6-¾	8-¾	8-¾	10-¾	12-¾	12-¾	14-¾	16-¾	20-1
J	12	15 5/16	—	17⅛	18⅛	19⅛	20 13/16	21 5/16	23 1/16	23 13/16	24⅝	27 5/16	34⅜
K	8	9	10	10½	11½	13	14	15	17	18½	20¼	24¼	28¾
L	¾	15/16	15/16	1	1⅛	1 3/16	1¼	1⅜	1 7/16	1 9/16	1 11/16	1⅞	2⅛
M	7½	9	10	11	13½	16	19	21	23½	25	27½	32	38¾
N	6	7½	8½	9½	11¾	14¼	17	18¾	21¼	22¾	25	29½	36
O	4-⅝	8-⅝	8-¾	8-¾	8-¾	12-⅞	12-⅞	12-1	16-1	16-1⅛	20-1⅛	20-1¼	28-1¼
P	6¼	7⅝	—	9	10⅛	—	—	—	—	—	—	—	—
R	6½	9	11	11	13	15	19	23	23	23	31½	45¼	45¼
S	5½	7⅛	7¾	8¼	9⅝	10½	11¼	12¾	14½	16¼	16¾	19⅜	22¾
T	7⅜	9¼	10⅝	11⅞	14⅝	17⅛	19⅜	22¼	25⅝	29	30¾	36⅜	44¼
U*	14	17 3/16	18⅛	20½	24½	28 5/16	31⅝	38 13/16	42½	46	49⅞	59¼	69½
NUMBER OF THREADS PER INCH ON STEM	4	3	3	3	3	3	3	3	3	3	3	2	2
ROOT DIAM. OF STEM THREAD	.859	.875	.875	1.125	1.250	1.375	1.50	1.50	1.75	1.75	2.00	2.25	2.75
NUMBER OF TURNS TO OPEN	13¼	13½	16⅞	19½	25¾	32	38	44½	50¼	56½	62½	50¼	62¼

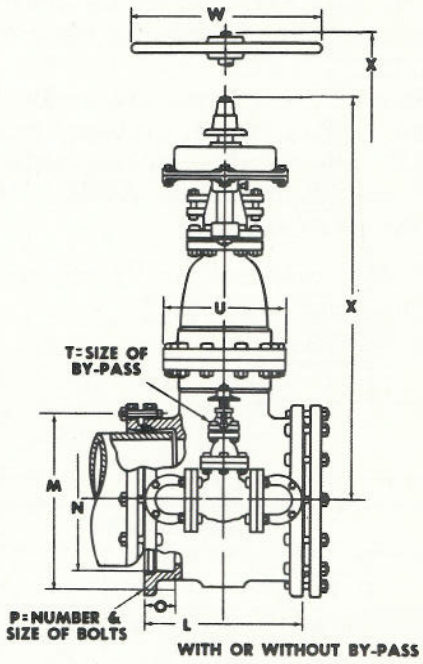
NOTES: 1. Hub (Bell) Ends—are A.W.W.A. Class D dimensions in sizes 3" thru 24", specify class of pipe for 30".
2. Flanged Ends—125 Lb. Standard ANSI A21.10.
3. Mechanical Joint Ends—ANSI A21.11 (AWWA C111).

*"U" Dimension refers to gate valves with standard stuffing box construction. Refer to page V-4 and V-5 for gate valves with "O" ring seals.

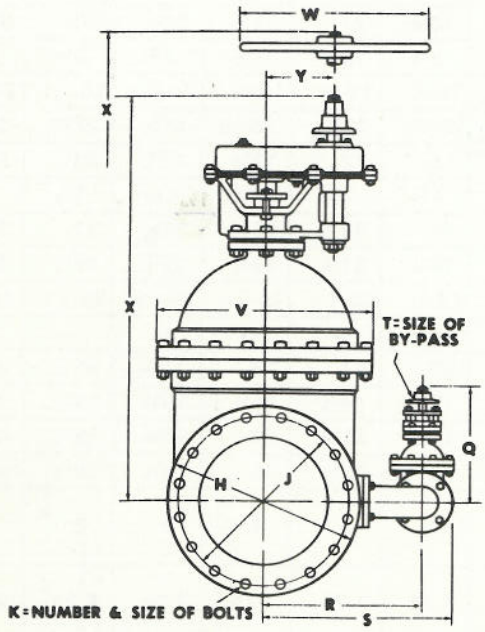
SMITH Metropolitan Gate Valves
Series 3000—Vertical—NRS
Spur Geared—With By-Pass
150 psi WWP—300 psi Test—Sizes 14"—48"

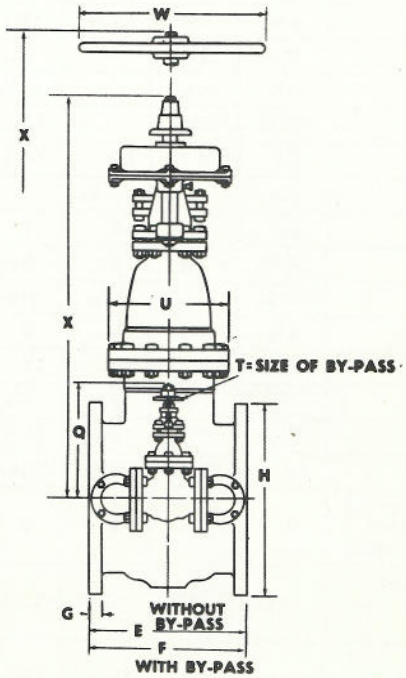


HUB ENDS
FIG. 3505 - NUT OPERATED
FIG. 3505-W - WHEEL OPERATED



MECHANICAL JOINT ENDS
FIG. 3506 - NUT OPERATED
FIG. 3506-W - WHEEL OPERATED





FLANGED ENDS
FIG. 3525 - NUT OPERATED
FIG. 3525-W - WHEEL OPERATED

NOTES: 1. Valves with other type of ends available on request.
2. For parts list for smaller valves, see page V-29.
3. For parts list for spur gearing, see page V-29.

Non-rising stem (N.R.S.) spur-geared valves are available with either conventional stuffing boxes or "O" Ring Seals.

Valves for underground service are normally furnished with 2" square operating nut on main valve and by-pass valve; handwheels furnished if specified. The spur gears are made of alloy steel, the teeth are precision machine cut and operate in lubricant. The gear case is fitted with fill and drain plugs.

The valve stem and pinion stem rotate within lubricated bronze bearings. When spur-geared valves are buried in the ground, it is sometimes desirable to cover and enclose the exposed portion of the valve stem and stuffing box. Cast-iron removable stem and stuffing box protectors are available and are furnished to order.

Gear ratios and by-pass valve sizes comply with the requirements of AWWA specification C500.

The gear case is filled with lubricant before shipment. The lubricant is of the permanent type suitable for temperatures of −30° to +200° F.

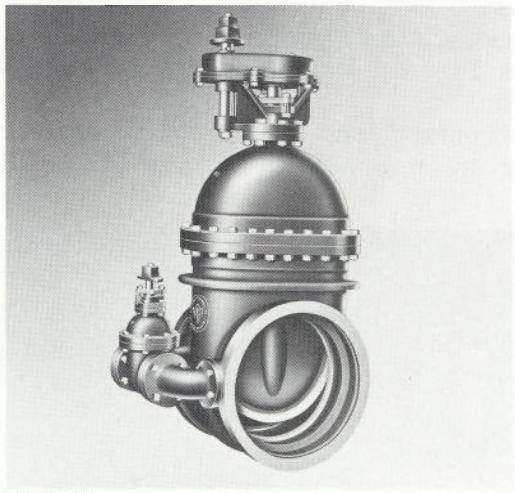


FIG. 3505

TABLE NUMBER 2 — **DIMENSIONS IN INCHES**

SIZE OF VALVE	14"	16"	18"	20"	24"	30"	36"	42"	48"	54"*	60"*
A	15⅛	15⅝	16¾	22¾	25¼	28¼	32½	36⅜	40	42	44½
B	18⅛	19⅝	20	22¾	25¼	28¼	32½	36⅜	40	42	44½
C	4	4	4	4	4	4½	4½	5	5	5½	5½
D	16⁷⁄₁₆	18½	20¾	22⅞	27⅛	33¼	39½	45⅞	52⅛	58⅛	64⅜
E	15	17	18½	20¼	24¼	28¾	33½	38½	42¼	42	44½
F	16¾	19⅛	19⅛	20¼	24¼	28¾	33½	38½	42¼	42	44½
G	1⅜	1⁷⁄₁₆	1⁹⁄₁₆	1¹¹⁄₁₆	1⅞	2⅛	2⅜	2⅝	2¾	3⅛	3⅛
H	21	23½	25	27½	32	38¾	46	53	59½	66¼	73
J	18¾	21¼	22¾	25	29½	36	42¾	49½	56	62¾	69¼
K	12-1	16-1	16-1⅛	20-1⅛	20-1¼	28-1¼	32-1½	36-1½	44-1½	44-1¾	52-1¾
L	16¾	19⅛	19⅛	20¼	24¼	28¾	—	—	—	—	—
M	18¾	21	23¼	25½	30	36⅞	—	—	—	—	—
N	15.44	17.54	19.64	21.74	25.94	32.17	—	—	—	—	—
O	3½	3½	3½	3½	3½	4	—	—	—	—	—
P	10-¾	12-¾	12-¾	14-¾	16-¾	20-1	—	—	—	—	—
Q	9⁹⁄₁₆	14	14	14	17⁹⁄₁₆	17⁹⁄₁₆	20½	20½	24½	24½	28⁹⁄₁₆
R	17⅝	18¾	19½	20¾	24⅞	28⅜	31⅛	35¹¹⁄₁₆	46	52¾	54⅝
S	21⅜	22½	23¼	24½	29⅜	32⅞	37⁹⁄₁₆	41⅝	53⁵⁄₁₆	60¹⁄₁₆	63⁵⁄₁₆
T	2	3	3	3	4	4	6	6	8	8	10
U	12¾	14½	16¼	16¾	19⅜	22¾	25⁹⁄₁₆	34¾	39½	41¼	44¼
V	22¼	25⅝	29	30¾	36⅜	44¼	51½	61⅞	70½	75⅜	83¼
W	23	23	23	31½	31½	45¼	45¼	45¼	45¼	45¼	45¼
X	45¹⁵⁄₁₆	49¾	53¼	56⅜	64⅛	75⁵⁄₁₆	86⁷⁄₁₆	103¹⁄₁₆	113⁷⁄₁₆	124⁹⁄₁₆	139¼
Y	8	8	8	8	8	10	10	13	13	14	16.33
GEAR RATIO	2:1	2:1	2:1	2:1	2:1	3:1	3:1	4:1	4:1	5:1	6:1
NUMBER OF THREADS PER INCH ON STEM	3	3	3	3	2	2	2	2	2	1½	1⅔
ROOT DIAM. OF STEM THREAD	1.50	1.75	1.75	2.00	2.25	2.75	3.25	3.48	4.25	4.355	4.75
NUMBER OF TURNS TO OPEN	89	100½	113	125	100¼	186¾	223½	348	395	413½	614

NOTES: 1. Hub (Bell) Ends—are A.W.W.A. Class D dimensions in sizes 14" thru 24", specify class of pipe for 30" thru 60".

2. Flanged Ends—125 Lb. Standard ANSI A21.10.

3. Mechanical Joint Ends—ANSI A21.11 (AWWA C111).

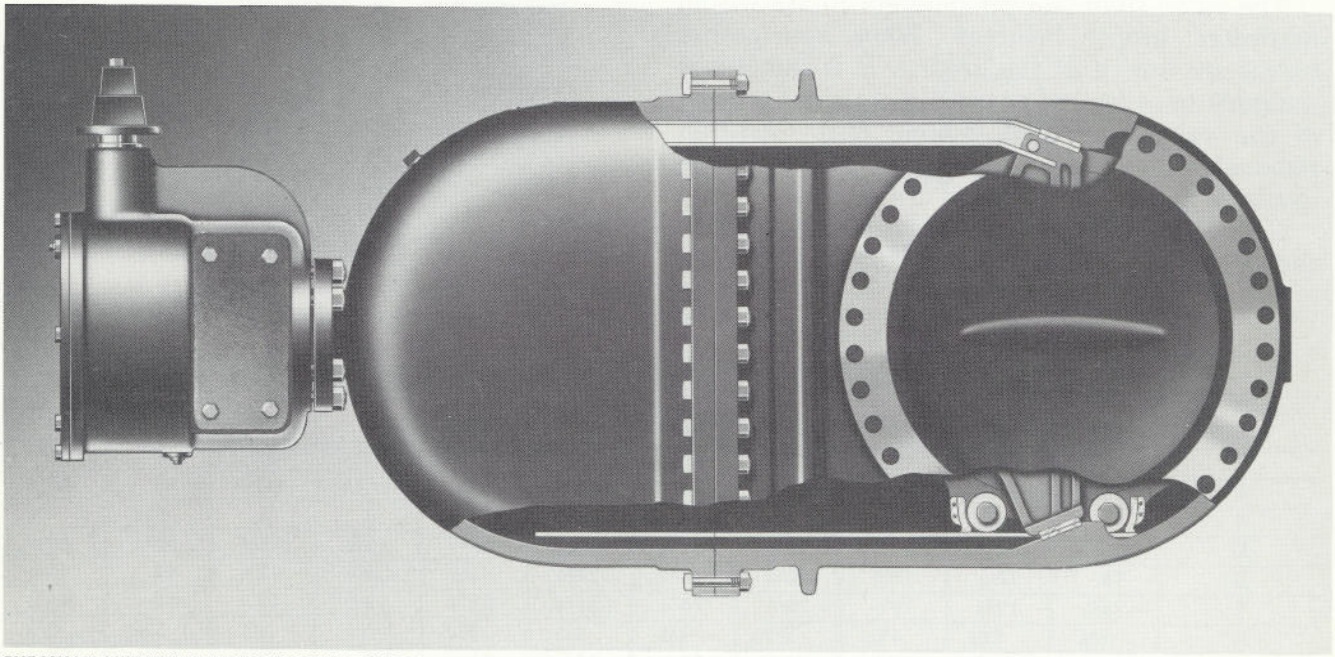
*For informational purposes only—no longer available.

Gearing and by-pass valves are used to reduce the torque required to operate large valves. By-pass valves are used to fill the line thus balancing the pressure before the main valve is operated.

Enclosed bevel gearing is normally applied to valves 14" and larger installed in a horizontal position.

Horizontal valves installed on edge in horizontal piping are equipped with bronze tracks, rollers and scrapers. The bronze tracks and rollers carry the weight of the discs throughout the operating cycle.

The bronze upper wedge guide rail in the top of the valve carries the wedge free of contact with the discs after the wedging has been released and while the discs are traveling from the closed to the open position and vice versa.



CUTAWAY VIEW SHOWING TRACKS, ROLLERS AND SCRAPERS IN BOTTOM, AND WEDGE GUIDE RAIL IN TOP OF HORIZONTAL VALVES

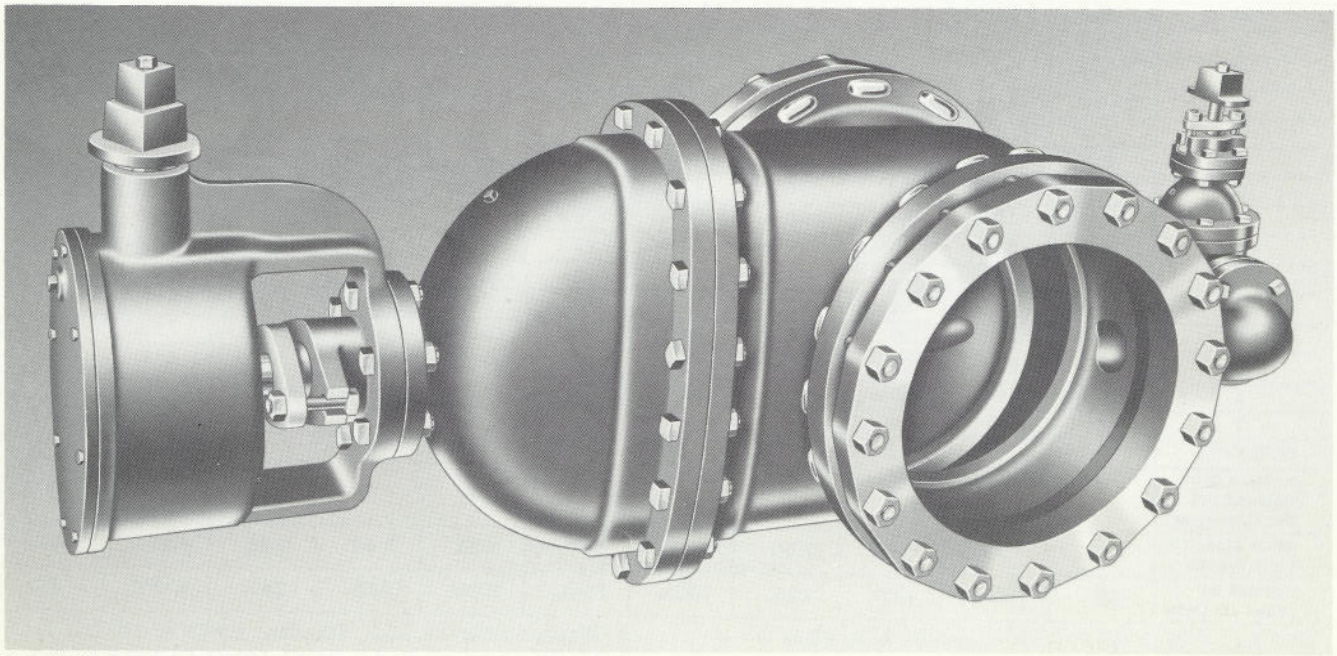
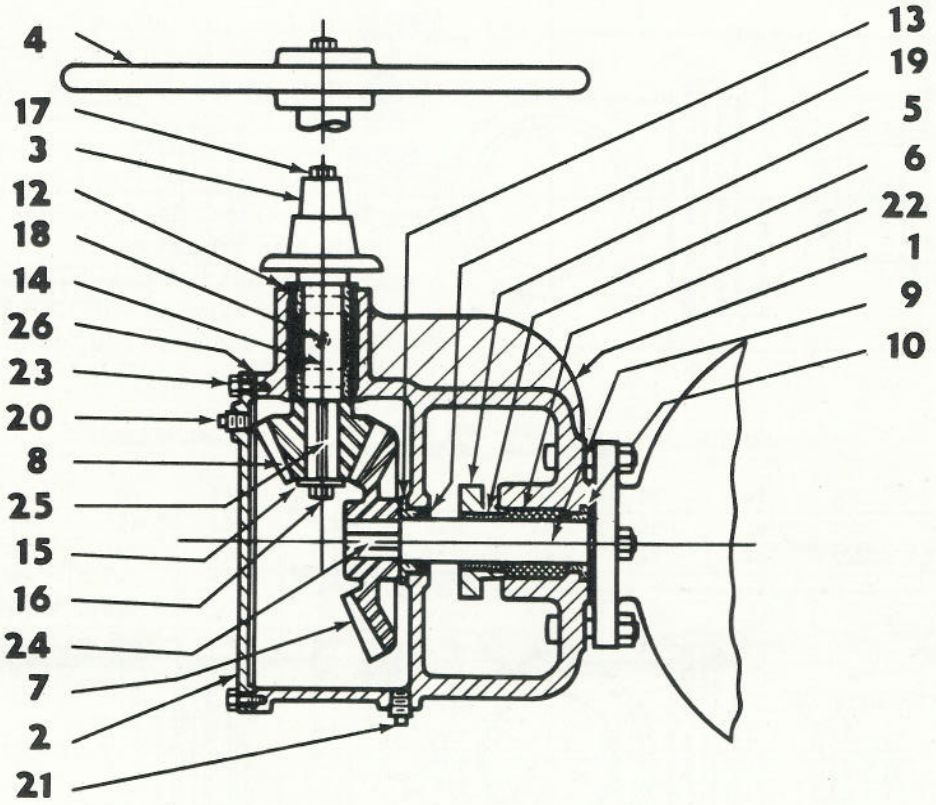


FIG. 3556

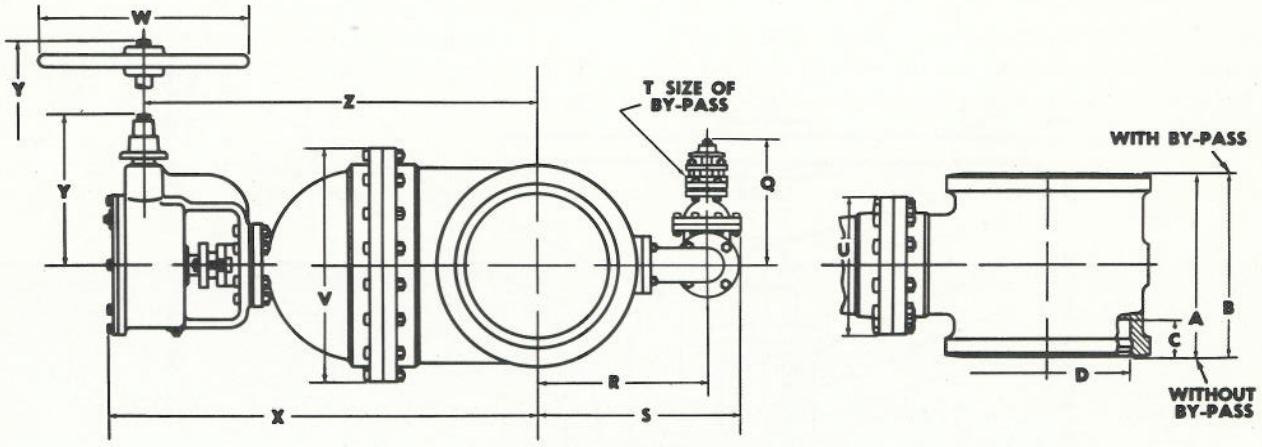


ENCLOSED BEVEL GEARING
EXTENDED TYPE GEAR CASE

NO.	NAME OF PART	NO. REQ'D.	MATERIAL
1	ENCLOSED BEVEL GEAR BRACKET	1	CAST IRON
2	ENC. BEVEL GEAR BRACKET COVER	1	CAST IRON
3	OPERATING NUT	1	CAST IRON
4	HANDWHEEL	1	CAST IRON
5 6	GLAND GLAND BUSHING	1	CAST IRON BRONZE BUSHED
7	BEVEL GEAR	1	STEEL—CUT TEETH
8	BEVEL PINION	1	STEEL—CUT TEETH
9	MAIN STEM	1	MANG. BRONZE
10	STUFFING BOX BUSHING	1	BRONZE
11	GLAND BOLT & NUT	2 SETS	MANG. BRONZE
12	BEVEL PINION STEM BUSHING	1	BRONZE
13	MAIN STEM BRACKET BUSHING	1	BRONZE

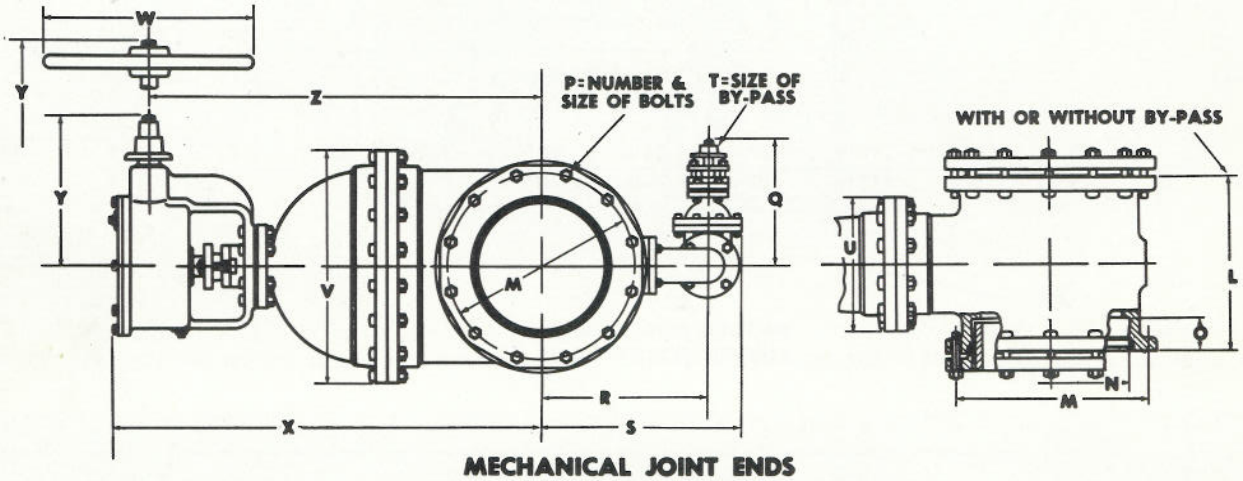
NO.	NAME OF PART	NO. REQ'D.	MATERIAL
14	BEVEL PINION STEM	1	BRONZE
15	BEVEL PINION STEM WASHER	1	BRONZE
16	BEVEL PINION STEM CAP SCREW	1	STEEL
17	OPERATING NUT CAP SCREW	1	STEEL
18	GREASE FITTING	1	BRASS
19	OIL SEAL	1	MFR'S. STD.
20	BRACKET COVER FILLER PLUG	1	BRONZE
21	BRACKET DRAIN PLUG	1	BRONZE
22	MAIN STEM STUFFING BOX PACKING	1 SET	LUBRICATED FLAX
23	BRACKET COVER CAP SCREW		STEEL
24	BEVEL GEAR KEY	1	STEEL
25	BEVEL PINION KEY	1	STEEL
26	BRACKET & COVER GASKET	1	COMPOSITION

SMITH Metropolitan Gate Valves
Series 3000—Horizontal—NRS
Beveled Geared—With By-Pass
150 psi WWP—300 psi Test—Sizes 14"—48"



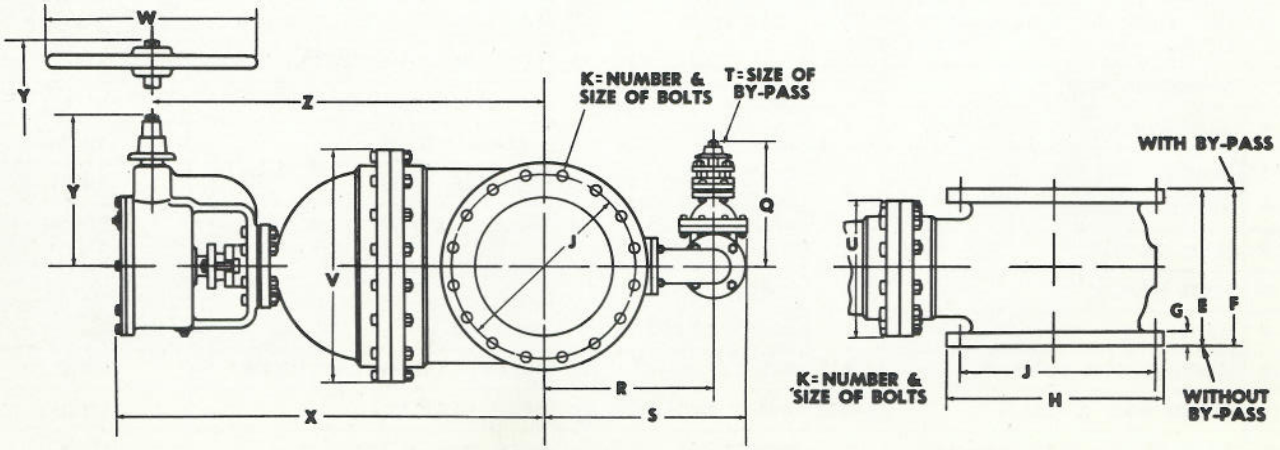
HUB ENDS

FIG. 3555 - NUT OPERATED
FIG. 3555-W - WHEEL OPERATED



MECHANICAL JOINT ENDS

FIG. 3556 - NUT OPERATED
FIG. 3556-W - WHEEL OPERATED



FLANGED ENDS

FIG. 3575 - NUT OPERATED
FIG. 3575-W - WHEEL OPERATED

NOTE: For parts list for bevel gearing, see page V-11.

Valves for underground service are normally furnished with 2″ square operating nut on main valve and by-pass valve; handwheels furnished if specified.

The bevel gears are made of alloy steel, the teeth are precision machine cut and operate in lubricant. The gear case is fitted with fill and drain plugs. The valve stem and pinion stem rotate within lubricated bronze bearings.

When bevel gear operated valves are buried in the ground, it is sometimes desirable to cover and enclose the exposed portion of the valve stem and stuffing box. Cast-iron removable stem and stuffing box protectors are available and furnished to order. See illustration on page V-10.

Gear ratios and by-pass valve sizes comply with the requirements of AWWA specification C500.

TABLE NUMBER 3 — **DIMENSIONS IN INCHES**

SIZE OF VALVE	14″	16″	18″	20″	24″	30″	36″	42″	48″	54″*	60″*
A	15⅛	15⅝	16¾	22¾	25¼	28¼	32½	36⅜	40	42	44½
B	18⅛	19⅝	20	22¾	25¼	28¼	32½	36⅜	40	42	44½
C	4	4	4	4	4	4½	4½	5	5	5½	5½
D	16⁷⁄₁₆	18½	20¾	22⅞	27⅛	33¼	39½	45⅞	52⅛	58⅛	—
E	15	17	18½	20¼	24¼	28¾	33½	38½	42¼	42	44½
F	16¾	19⅛	19⅛	20¼	24¼	28¾	33½	38½	42¼	42	44½
G	1⅜	1⁷⁄₁₆	1⁹⁄₁₆	1¹¹⁄₁₆	1⅞	2⅛	2⅜	2⅝	2¾	3⅛	3⅛
H	21	23½	25	27½	32	38¾	46	53	59½	66¼	73
J	18¾	21¼	22¾	25	29½	36	42¾	49½	56	62¾	69¼
K	12-1	16-1	16-1⅛	20-1⅛	20-1¼	28-1¼	32-1½	36-1½	44-1½	44-1¾	52-1¾
L	16¾	19⅛	19⅛	20¼	24¼	28¾	—	—	—	—	—
M	18¾	21	23¼	25½	30	36⅞	—	—	—	—	—
N	15.44	17.54	19.64	21.74	25.94	32.17	—	—	—	—	—
O	3½	3½	3½	3½	3½	4	—	—	—	—	—
P	10-¾	12-¾	12-¾	14-¾	16-¾	20-1	—	—	—	—	—
Q	9⁹⁄₁₆	14	14	14	17³⁄₁₆	17³⁄₁₆	20½	20½	24½	24½	28⁵⁄₁₆
R	17⅝	18¾	19½	20¾	24⅞	28⅜	31⅛	35¹¹⁄₁₆	46	48¾	54⅝
S	21⅜	22½	23¼	24½	29⅜	32⅞	37⁹⁄₁₆	41⅝	53⁵⁄₁₆	56⅛	63³⁄₁₆
T	3	3	3	3	4	4	6	6	8	8	10
U	12¾	14½	16¼	16¾	19⅜	22¾	25⁹⁄₁₆	34¾	39½	41¼	44¼
V	22¼	25⅝	29	30¾	36⅜	44¼	51½	61⅞	70½	75⅜	83¼
W	23	23	23	31½	31½	45¼	45¼	45¼	45¼	45¼	45¼
X	44¹⁄₁₆	44⅛	51¼	54½	62⅛	73⅞	85⅛	102½	112⅞	123	133½
Y	16¼	16¼	16¼	16¼	16¼	17⅜	17⅜	25⁷⁄₁₆	25⁷⁄₁₆	25⁷⁄₁₆	30¹¹⁄₁₆
Z	40⅛	40³⁄₁₆	47⁵⁄₁₆	50⁹⁄₁₆	58⅝	69¾	81	98½	108⅞	119	126¼
GEAR RATIO	2:1	2:1	2:1	2:1	2:1	3:1	3:1	4:1	4:1	5:1	6:1
NUMBER OF THREADS PER INCH ON STEM	3	3	3	3	2	2	2	2	2	1½	1⅔
ROOT DIAM. OF STEM THREAD	1.50	1.75	1.75	2.00	2.25	2.75	3.25	3.48	4.25	4.355	4.75
NUMBER OF TURNS TO OPEN	89	100½	113	125	100¼	186¾	223½	348	395	413½	614

NOTES: 1. Hub (Bell) Ends—are A.W.W.A. Class D dimensions in sizes 14″ thru 24″, specify class of pipe for 30″ thru 60″.
2. Flanged Ends—125 Lb. Standard ANSI A21.10.
3. Mechanical Joint Ends—ANSI A21.11 (AWWA C111).

*For informational purposes only—no longer available.

SMITH Metropolitan Gate Valves
Series 3000—O.S.&Y.
200 psi WWP—400 psi Test—Sizes 3"—12"
150 psi WWP—300 psi Test—Sizes 14"—30"

Rising-stem (O.S.&Y.) gate valves are generally employed in above-ground piping and at accessible locations. The rising stem serves as a position indicator; stem threads are free of contact with the fluid or gas in the valve.

Manually operated rising-stem valves can be either handwheel, chain-wheel or floor-stand operated. Power-operated rising-stem valves are also available. Rising-stem valves sizes 14" and larger are available for installation in vertical or horizontal position with bevel gearing and by-pass valve. Rising-stem valves installed on edge are equipped with bronze tracks, rollers and scrapers. Smooth and positive valve operation is assured by perfect alignment of the bored stem opening in the bonnet and the outside stem nut. This is achieved by an accurately machined raised lip on the valve bonnet which registers with a counterbore in the bottom of the yoke. Rising-stem valves are available with all standard types of end connections.

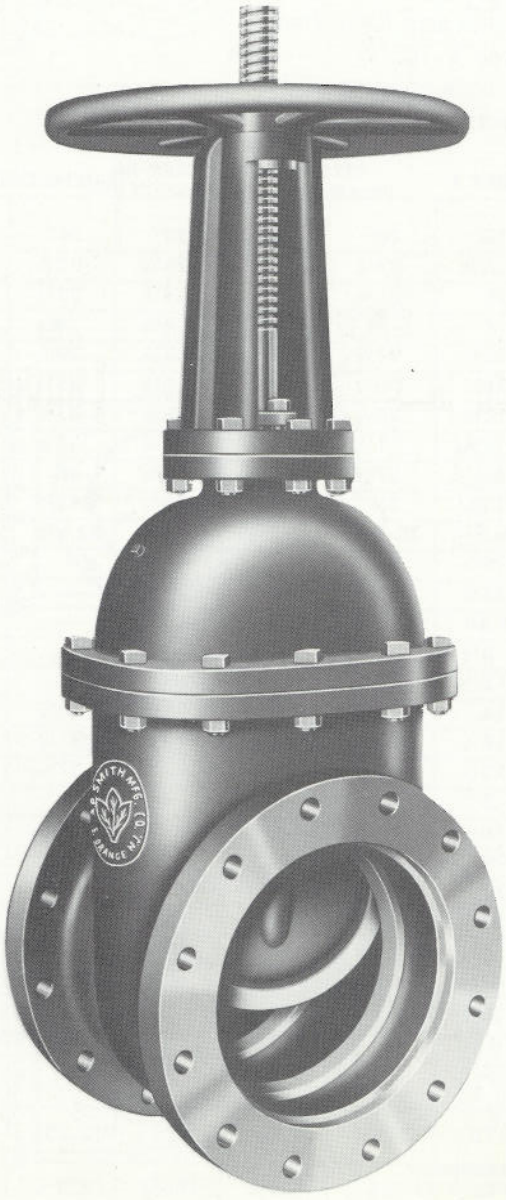


FIG. 3620

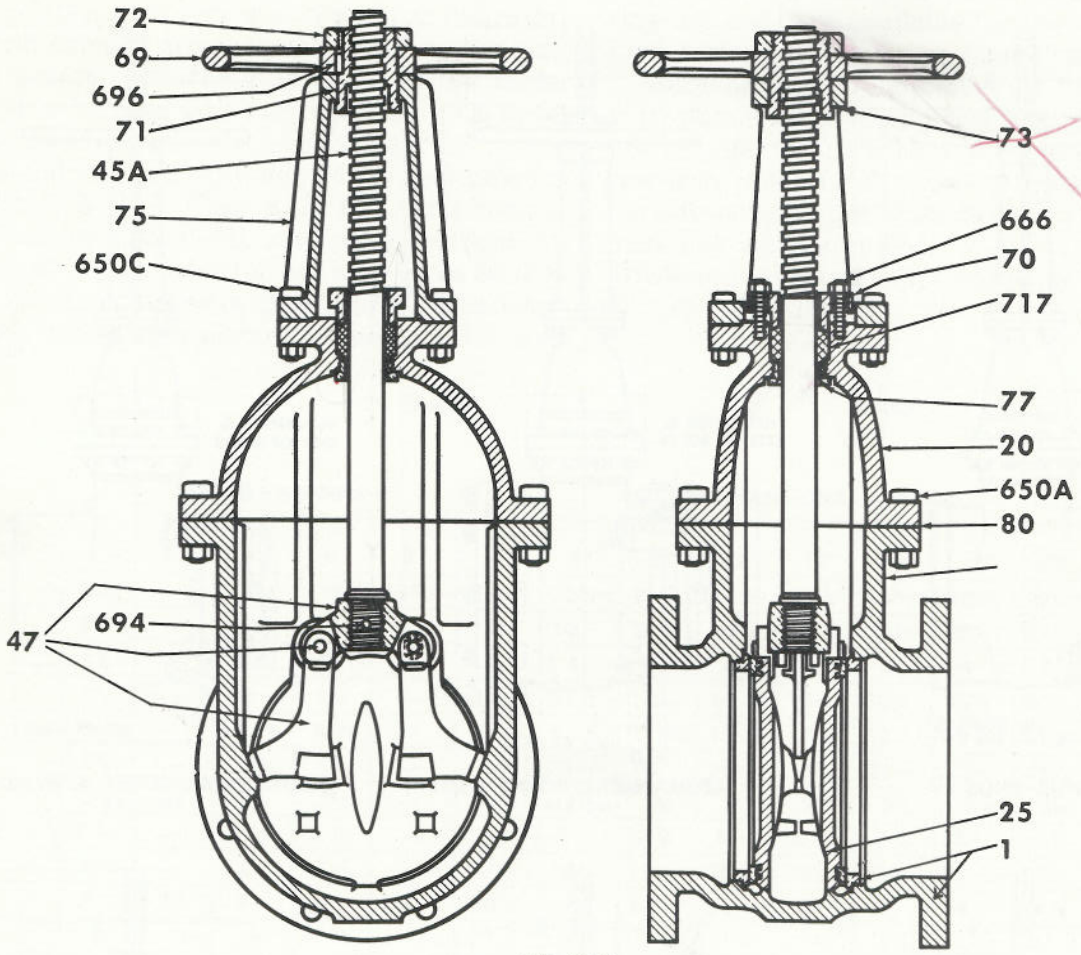


FIG. 3620

NO.	NAME OF PART OR SUB-ASSEMBLY	MATERIAL
1	BODY**	CAST IRON
	SEAT RING	BRONZE
20	BONNET	CAST IRON
25	DISC ASSEMBLY	4" ALL BRONZE 6"-12" C.I. DISC, BRONZE RINGS
45A	STEM	MANG. BRONZE
47	YOKE STEM NUT WEDGE & PIN ASSEMBLY	4"-8" BRONZE 10"-12" C.I. WEDGES BRONZE FACED
69	HANDWHEEL	CAST IRON
70	GLAND	BRONZE
71	OUTSIDE STEM NUT	BRONZE
72	HANDWHEEL LOCK NUT	BRONZE
73	FRICTION WASHER	BRONZE

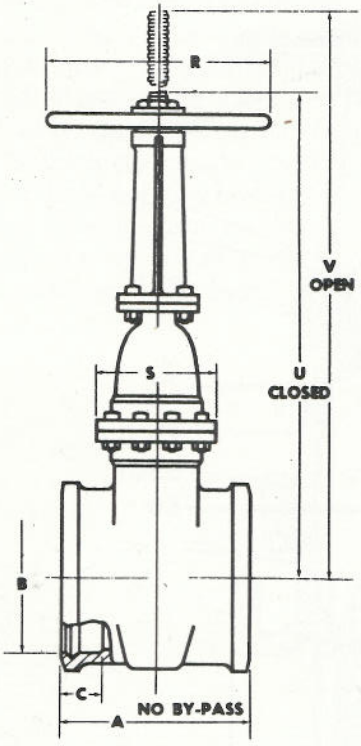
NO.	NAME OF PART OR SUB-ASSEMBLY	MATERIAL
75	BRACKET	CAST IRON
77	STUFFING BOX BUSHING	BRONZE
80	BODY & BONNET GASKET	RUBBER (CBS)
650A	BODY & BONNET BOLTS & NUTS	STEEL*
650C	BONNET & BRACKET BOLTS & NUTS	STEEL*
666	GLAND STUD & NUT	BRASS
694	STEM PIN	BRASS
696	HANDWHEEL KEY	STEEL
717	STUFFING BOX PACKING	LUBRICATED FLAX

*Rust Proofed **Specify end construction required

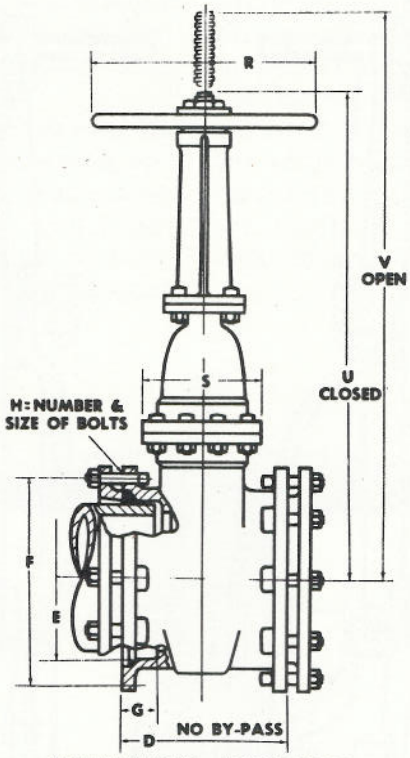
NOTE: Part #200
Set of M.J. accessories for M.J. Valves—Glands, Gaskets, Bolts & Nuts.

U.S. PIPE

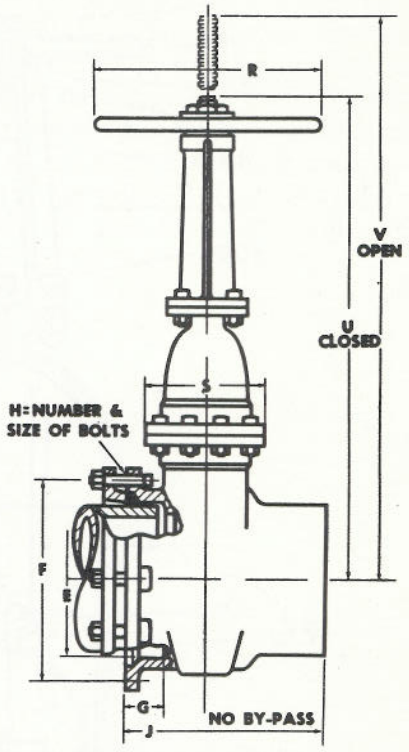
SMITH Metropolitan Gate Valves
Series 3000—O.S.&Y.
300 psi WWP—400 psi Test—Sizes 3"—12"
150 psi WWP—300 psi Test—Sizes 14"—30"



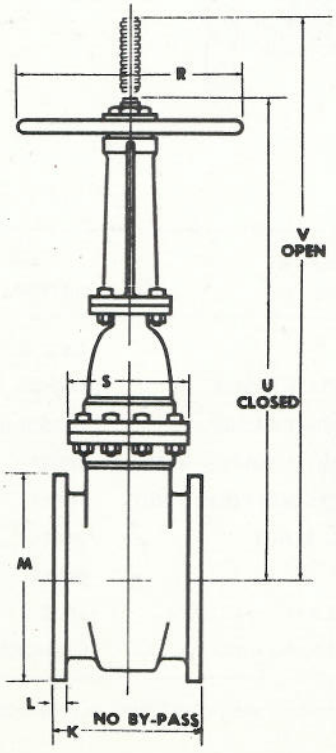
HUB ENDS
FIG. 3600



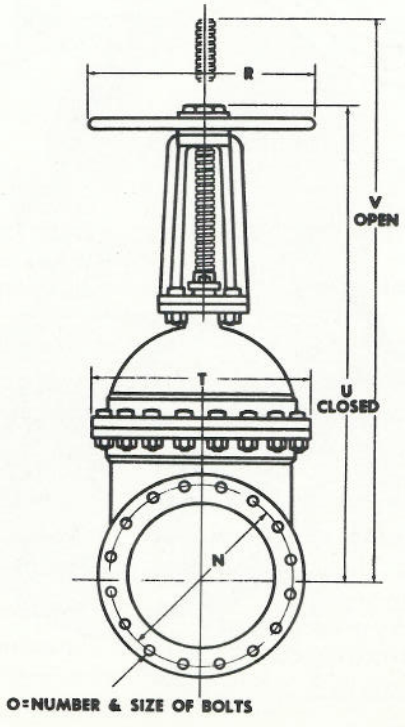
MECHANICAL JOINT ENDS
FIG. 3611

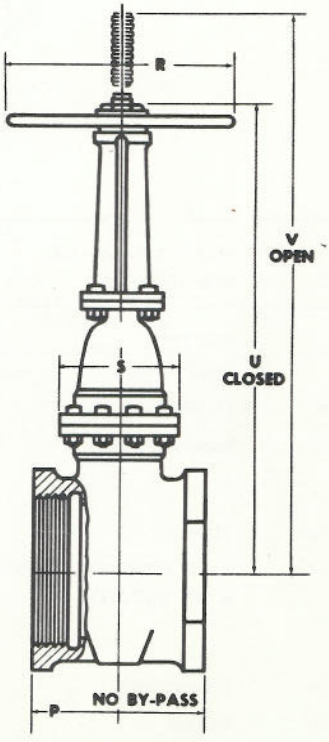


MECHANICAL JOINT & PLAIN END
FIG. 3612



FLANGED ENDS
FIG. 3620





SCREWED ENDS
FIG. 3640

Rising-stem (O.S.&Y.) valves are handwheel operated, the stem serves as a position indicator, the stem threads are above the stuffing box and out of contact with the fluid or gas in the valve. Valve sizes 14″ and larger are available with bevel gearing and by-pass valve—see page V-18.

Hub-end valves 2″ through 24″ are suitable for use with A.W.W.A. Class A, B, C, D and Federal Specifications WW-P-421 cast-iron pipe. Sizes 3″ through 8″ are suitable for use with Class 50, 100 and 150 cement-asbestos pipe. Valves with oversize hub ends are available for use with 10″ and larger diameter cement-asbestos pipe. Valves with ring-tite ends are available for use with ring-tite joint cement-asbestos pipe sizes 3″ and larger.

Mechanical-joint-end valves are suitable for use with standardized mechanical-joint cast-iron pipe and to order for use with A.W.W.A. Class B, C, D cast-iron pipe. Lead-tipped, armour-tipped and duck-tipped rubber gaskets are available and furnished when specified.

For illustrations see opposite page.

TABLE NUMBER 4 — **DIMENSIONS IN INCHES**

SIZE OF VALVE	2″	2½″	3″	4″	5″	6″	8″	10″	12″	14″	16″	18″	20″	24″	30″
A	8 3/8	—	9 7/8	11 7/8	12 5/8	12 3/4	12 3/4	13 7/8	14 1/8	15 1/8	15 5/8	16 3/4	22 3/4	25 1/4	28 1/4
B	3 1/2	—	4 5/8	5 3/4	6 3/4	7 7/8	10	12 1/8	14 1/4	16 7/16	18 1/2	20 3/4	22 7/8	27 1/8	33 1/4
C	2 3/4	—	3 1/2	4	4	4	4	4	4	4	4	4	4	4	4 1/2
D	7 7/8	—	8	9 1/8	—	10 1/2	11 1/2	13	14	16 3/4	19 1/8	19 1/8	20 1/4	24 1/4	28 3/4
E	2.80	—	4.06	4.90	—	7.00	9.15	11.20	13.30	15.44	17.54	19.64	21.74	25.94	32.17
F	4 3/4	—	6 3/16	7 1/2	—	9 1/2	11 3/4	14	16 1/4	18 3/4	21	23 1/4	25 1/2	30	36 7/8
G	2 1/2	—	2 1/2	2 1/2	—	2 1/2	2 1/2	2 1/2	2 1/2	3 1/2	3 1/2	3 1/2	3 1/2	3 1/2	4
H	2-5/8	—	4-5/8	4-3/4	—	6-3/4	6-3/4	8-3/4	8-3/4	10-3/4	12-3/4	12-3/4	14-3/4	16-3/4	20-1
J	11 11/16	—	12	15 9/16	—	17 1/8	18 1/8	19 1/8	20	21 5/16	23 1/16	23 13/16	24 5/8	27 5/16	34 3/8
K	7	7 1/2	8	9	10	10 1/2	11 1/2	13	14	15	17	18 1/2	20 1/4	24 1/4	28 3/4
L	5/8	11/16	3/4	15/16	15/16	1	1 1/8	1 3/16	1 1/4	1 3/8	1 7/16	1 9/16	1 11/16	1 7/8	2 1/8
M	6	7	7 1/2	9	10	11	13 1/2	16	19	21	23 1/2	25	27 1/2	32	38 3/4
N	4 3/4	5 1/2	6	7 1/2	8 1/2	9 1/2	11 3/4	14 1/4	17	18 3/4	21 1/4	22 3/4	25	29 1/2	36
O	4-5/8	4-5/8	4-5/8	8-5/8	8-3/4	8-3/4	8-3/4	12-7/8	12-7/8	12-1	16-1	16-1 1/8	20-1 1/8	20-1 1/4	28-1 1/4
P	5 1/8	5 11/16	6 1/4	7 5/8	—	9	10 1/8	—	—	—	—	—	—	—	—
R	6 1/2	6 1/2	6 1/2	9	11	11	13	15	19	23	23	23	31 1/2	45 1/4	45 1/4
S	5 1/8	5 3/8	5 1/2	7 1/8	7 3/4	8 1/4	9 5/8	10 1/2	11 1/4	13	14 1/2	16 1/4	16 3/4	19 3/8	22 3/4
T	6 1/16	6 13/16	7 3/8	9 1/4	10 5/8	11 7/8	14 5/8	17 1/8	19 3/8	22 1/2	25 5/8	29	30 3/4	36 3/8	44 1/4
U	10 7/16	12 5/16	13 15/16	17 5/8	20 9/16	23 5/16	28 13/16	35	41 5/16	46	53 1/2	59 13/16	65 11/16	76 1/4	93 3/4
V	12 7/8	15 1/4	17 3/8	22 3/8	26 1/8	29 11/16	37 1/2	45 11/16	53 15/16	60 3/4	70 5/16	78 5/8	86 7/16	101 3/8	124 7/8
NUMBER OF THREADS PER INCH ON STEM	4	4	4	3	3	3	3	3	3	3	3	3	3	2	2
ROOT DIAM. OF STEM THREAD	.667	.667	.859	.875	.875	1.125	1.250	1.375	1.50	1.50	1.75	1.75	2.00	2.25	2.75
NUMBER OF TURNS TO OPEN	9 1/2	11 3/4	13 1/4	13 1/2	16 7/8	19 1/2	25 3/4	32	38	44 1/2	50 1/4	56 1/2	62 1/2	50 1/4	62 1/4

NOTES: 1. Hub (Bell) Ends—are A.W.W.A. Class D dimensions in sizes 14″ thru 24″, specify class of pipe for 30″ thru 60″.
2. Flanged Ends—125 Lb. Standard ANSI A21.10.
3. Mechanical Joint Ends—ANSI A21.11 (AWWA C111).

Rising-stem (O.S.&Y.) bevel-geared valves may be hand-wheel, chain-wheel or nut operated. The valve stem serves as a position indicator. The stem threads are above the stuffing box and are out of contact with the fluid or gas in the valve.

Gearing and by-pass valves are used to reduce the torque required to operate large valves. By-pass valves are used to fill the line thus balancing the pressure before the main valve is operated. By-pass valves may be rising-stem or non-rising stem (N.R.S.) type.

Enclosed bevel gearing is normally applied to valves 14" and larger.

The gear case pinion stem opening is fitted with an "O" Ring Seal. The gear case is fitted with fill and drain plugs and is filled with lubricant before shipment. The lubricant is of the permanent type suitable for temperatures of —30° to +200° F.

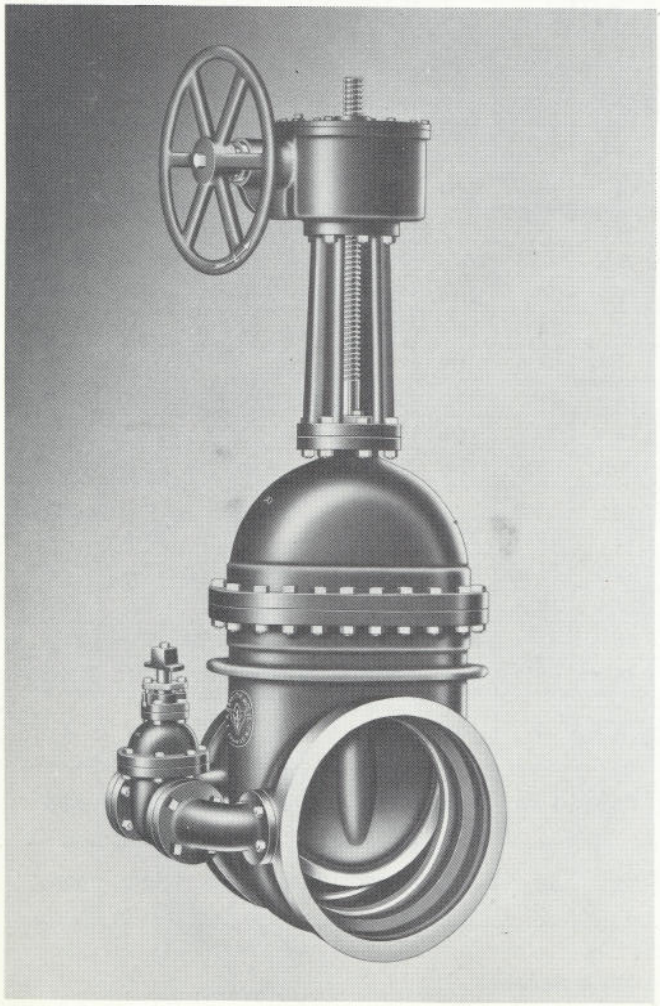
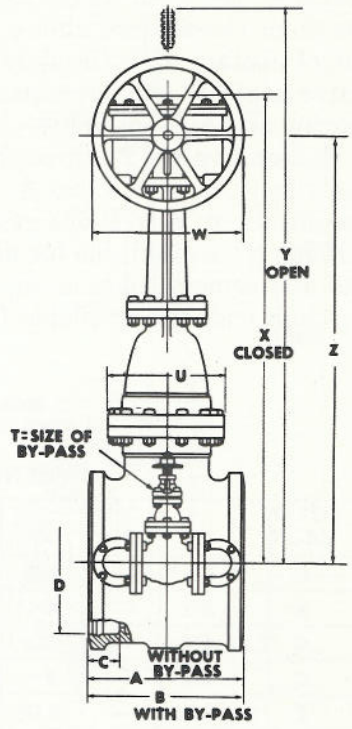
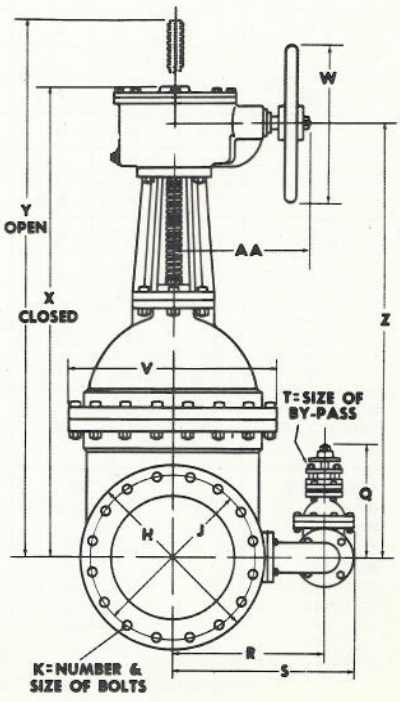


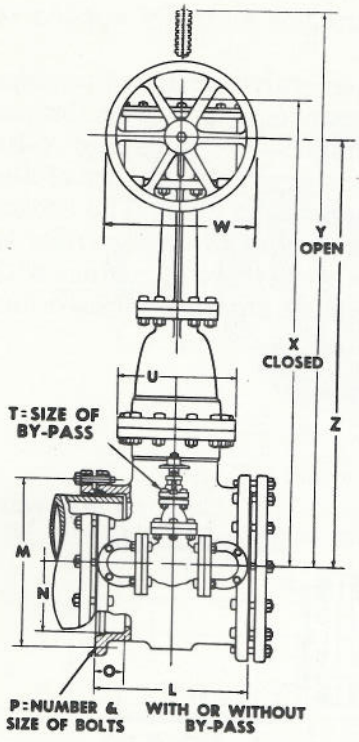
FIG. 3665



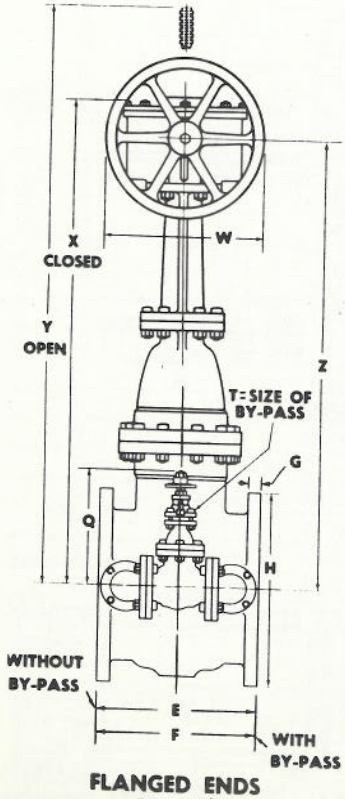
HUB ENDS
FIG. 3663



FLANGED ENDS
FIG. 3675



MECHANICAL JOINT ENDS
FIG. 3666



FLANGED ENDS
FIG. 3675

TABLE NUMBER 5 — **DIMENSIONS IN INCHES**

SIZE OF VALVE	14"	16"	18"	20"	24"	30"	36"	42"	48"	54"*	60"*
A	15⅛	15⅝	16¾	22¾	25¼	28¼	32½	36⅜	40	42	44½
B	18⅛	19⅝	20	22¾	25¼	28¼	32½	36⅜	40	42	44½
C	4	4	4	4	4	4½	4½	5	5	5½	5½
D	16⁷⁄₁₆	18½	20¾	22⅞	27⅛	33¼	39½	45⅞	52⅛	58⅛	64⅜
E	15	17	18½	20¼	24¼	28¾	33½	38½	42¼	42	44½
F	16¾	19⅛	19⅛	20¼	24¼	28¾	33½	38½	42¼	42	44½
G	1⅜	1⁷⁄₁₆	1⁹⁄₁₆	1¹¹⁄₁₆	1⅞	2⅛	2⅜	2⅝	2¾	3⅛	3⅛
H	21	23½	25	27½	32	38¾	46	53	59½	66¼	73
J	18¾	21¼	22¾	25	29½	36	42¾	49½	56	62¾	69¼
K	12-1	16-1	16-1⅛	20-1⅛	20-1¼	28-1¼	32-1½	36-1½	44-1½	44-1¾	52-1¾
L	16¾	19⅛	19⅛	20¼	24¼	28¾	—	—	—	—	—
M	18¾	21	23¼	25½	30	36⅞	—	—	—	—	—
N	15.44	17.54	19.64	21.74	25.94	32.17	—	—	—	—	—
O	3½	3½	3½	3½	3½	4	—	—	—	—	—
P	10-¾	12-¾	12-¾	14-¾	16-¾	20-1	—	—	—	—	—
Q	9⁹⁄₁₆	14	14	14	17³⁄₁₆	17³⁄₁₆	20½	20½	24½	24½	28⁵⁄₁₆
R	17⅝	18¾	19½	20¾	24⅞	28⅜	31⅛	35¹¹⁄₁₆	46	52¾	54⅝
S	21⅜	22½	23¼	24½	29⅜	32⅞	37⁷⁄₁₆	41⅝	53⁵⁄₁₆	59½	63³⁄₁₆
T	2	3	3	3	4	4	6	6	8	8	10
U	12¾	14½	16¼	16¾	19⅜	22¾	25⁹⁄₁₆	34¾	39½	41¼	44¼
V	22¼	25⅝	29	30¾	36⅜	44¼	51½	61⅞	70½	75⅜	83¼
W	23	23	23	31½	31½	45¼	45¼	45¼	45¼	45¼	45¼
X	50¾	58⅜	64⁹⁄₁₆	72¾	85¹¹⁄₁₆	101⁷⁄₁₆	119	139¹³⁄₁₆	155¹⁵⁄₁₆	171¹³⁄₁₆	189¹⁄₁₆
Y	64⅞	70⅜	78¹¹⁄₁₆	89	104⅛	127	150¹¹⁄₁₆	176⅞	200	222	246½
Z	46½	54⅛	60⁵⁄₁₆	68½	80³⁄₁₆	96³⁄₁₆	113¾	135⅛	151¼	167⅛	184⅜
AA	14⅞	14⅞	14⅞	14⅞	14⅞	16	16	23½	23½	23½	28¹¹⁄₁₆
GEAR RATIO	2:1	2:1	2:1	2:1	2:1	3:1	3:1	4:1	4:1	5:1	6:1
NUMBER OF THREADS PER INCH ON STEM	3	3	3	3	2	2	2	2	2	1½	1⅔
ROOT DIAM. OF STEM THREAD	1.50	1.75	1.75	2.00	2.25	2.75	3.25	3.48	4.25	4.355	4.75
NUMBER OF TURNS TO OPEN	89	100½	113	125	100¼	186¾	223½	348	395	413½	614

NOTES: 1. Hub (Bell) Ends—are A.W.W.A. Class D dimensions in sizes 14" thru 24", specify class of pipe for 30" thru 60".
2. Flanged Ends—125 Lb. Standard ANSI A21.10.
3. Mechanical Joint Ends—ANSI A21.11 (AWWA C111).

*For informational purposes only—no longer available.

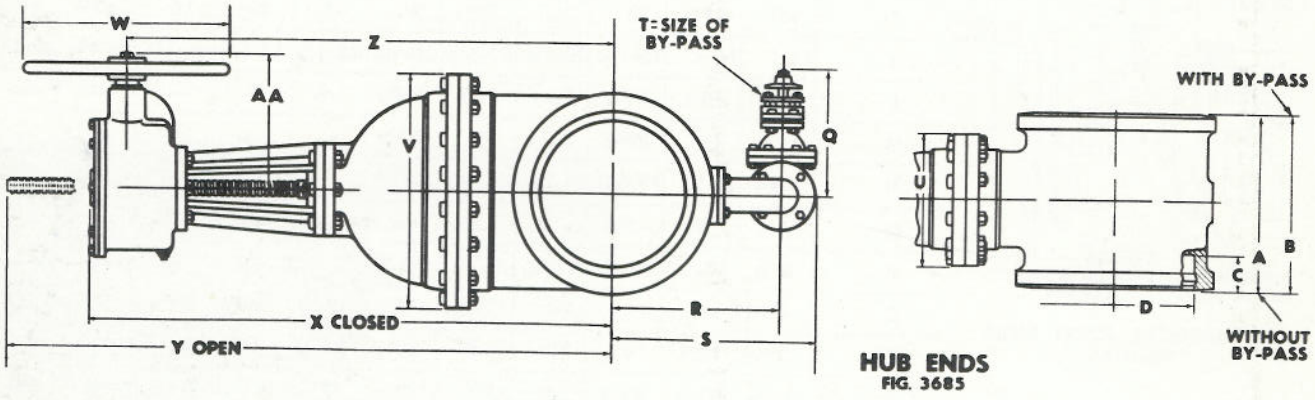
Rising-stem (O.S.&Y.) bevel-geared valves may be hand-wheel, chain-wheel or nut operated. The valve stem serves as a position indicator. The stem threads are beyond the stuffing box and are out of contact with the fluid or gas in the valve.

Gearing and by-pass valves are used to reduce the torque required to operate large valves. By-pass valves are used to fill the line thus balancing the pressure before the main valve is operated.

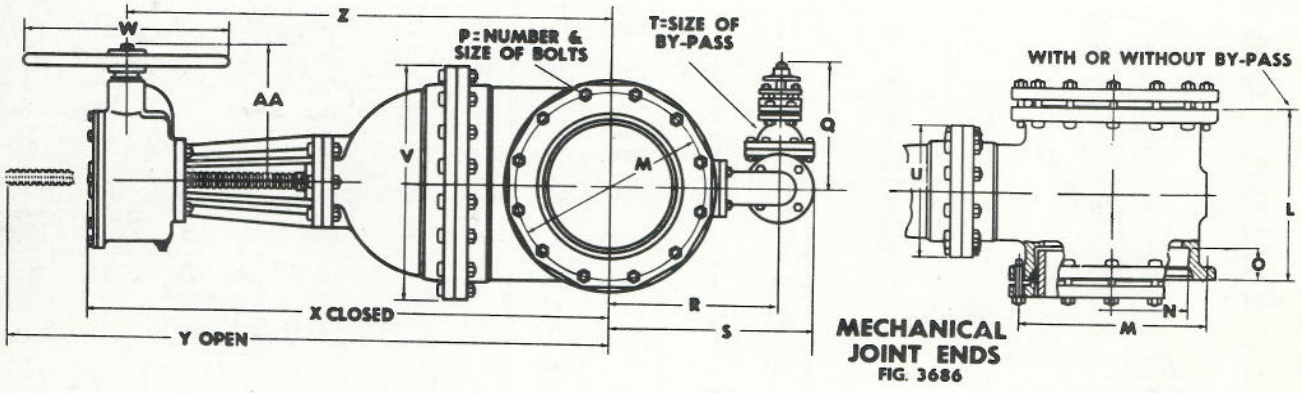
The gear case pinion stem opening is fitted with an "O" Ring Seal. The gear case is fitted with fill and drain plugs and is filled with lubricant before shipment. The lubricant is of the permanent type suitable for temperatures of —30° to +200° F.

Enclosed bevel gearing is normally applied to valves 14" and larger.

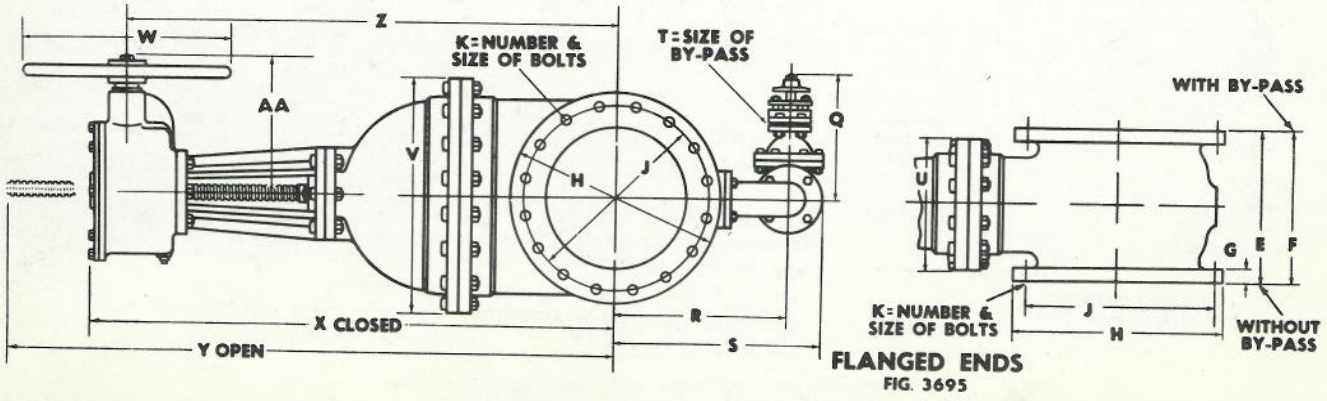
Horizontal rising-stem valves installed on edge in horizontal piping are equipped with bronze tracks, rollers and scrapers—refer to page V-10. The tracks and rollers carry the weight of the discs throughout the operating cycle. The bronze wedge guide rail in the top of the valve (refer to page V-10) carries the wedge free of contact with the discs after the wedging has been released and while the discs are traveling.



HUB ENDS
FIG. 3685



MECHANICAL JOINT ENDS
FIG. 3686



FLANGED ENDS
FIG. 3695

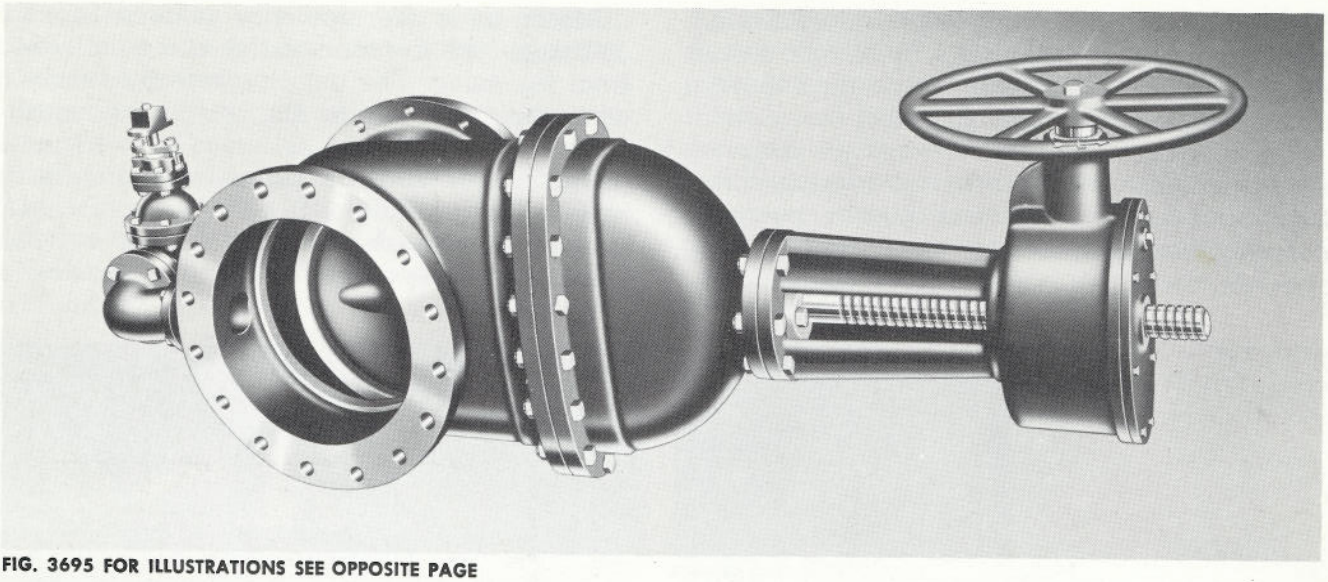


FIG. 3695 FOR ILLUSTRATIONS SEE OPPOSITE PAGE

TABLE NUMBER 6

DIMENSIONS IN INCHES

SIZE OF VALVE	14"	16"	18"	20"	24"	30"	36"	42"	48"	54"*	60"*
A	15 1/8	15 5/8	16 3/4	22 3/4	25 1/4	28 1/4	32 1/2	36 3/8	40	42	44 1/2
B	18 1/8	19 5/8	20	22 3/4	25 1/4	28 1/4	32 1/2	36 3/8	40	42	44 1/2
C	4	4	4	4	4	4 1/2	4 1/2	5	5	5 1/2	5 1/2
D	16 7/16	18 1/2	20 3/4	22 7/8	27 1/8	33 1/4	39 1/2	45 7/8	52 1/8	58 1/8	64 3/8
E	15	17	18 1/2	20 1/4	24 1/4	28 3/4	33 1/2	38 1/2	42 1/4	42	44 1/2
F	16 3/4	19 1/8	19 1/8	20 1/4	24 1/4	28 3/4	33 1/2	38 1/2	42 1/4	42	44 1/2
G	1 3/8	1 7/16	1 9/16	1 11/16	1 7/8	2 1/8	2 3/8	2 5/8	2 3/4	3 1/8	3 1/8
H	21	23 1/2	25	27 1/2	32	38 3/4	46	53	59 1/2	66 1/4	73
J	18 3/4	21 1/4	22 3/4	25	29 1/2	36	42 3/4	49 1/2	56	62 3/4	69 1/4
K	12-1	16-1	16-1 1/8	20-1 1/8	20-1 1/4	28-1 1/4	32-1 1/2	36-1 1/2	44-1 1/2	44-1 3/4	52-1 3/4
L	16 3/4	19 1/8	19 1/8	20 1/4	24 1/4	28 3/4	—	—	—	—	—
M	18 3/4	21	23 1/4	25 1/2	30	36 7/8	—	—	—	—	—
N	15.44	17.54	19.64	21.74	25.94	32.17	—	—	—	—	—
O	3 1/2	3 1/2	3 1/2	3 1/2	3 1/2	4	—	—	—	—	—
P	10-3/4	12-3/4	12-3/4	14-3/4	16-3/4	20-1	—	—	—	—	—
Q	9 9/16	14	14	14	17 3/16	17 3/16	20 1/2	20 1/2	24 1/2	24 1/2	28 5/16
R	17 5/8	18 3/4	19 1/2	20 3/4	24 7/8	28 3/8	31 1/8	35 11/16	46	52 3/4	54 5/8
S	21 3/8	22 1/2	23 1/4	24 1/2	29 3/8	32 7/8	37 1/16	41 5/8	53 5/16	59 1/2	63 3/16
T	2	3	3	3	4	4	6	6	8	8	10
U	12 3/4	14 1/2	16 1/4	16 3/4	19 3/8	22 3/4	25 9/16	34 3/4	39 1/2	41 1/4	44 1/4
V	22 1/4	25 5/8	29	30 3/4	36 3/8	44 1/4	51 1/2	61 7/8	70 1/2	75 3/8	83 1/4
W	23	23	23	31 1/2	31 1/2	45 1/4	45 1/4	45 1/4	45 1/4	45 1/4	45 1/4
X	50 3/4	58 3/8	64 9/16	72 3/4	85 1/16	101 7/16	119	139 13/16	155 15/16	171 13/16	189 1/16
Y	64 7/8	70 3/8	78 11/16	89	104 1/8	127	150 11/16	176 7/8	200	222	246 1/2
Z	46 1/2	54 1/8	60 5/16	68 1/2	80 3/16	96 3/16	113 3/4	135 1/8	151 1/4	167 1/8	184 3/8
AA	14 7/8	14 7/8	14 7/8	14 7/8	14 7/8	16	16	23 1/2	23 1/2	23 1/2	28 1/16
GEAR RATIO	2:1	2:1	2:1	2:1	2:1	3:1	3:1	4:1	4:1	5:1	6:1
NUMBER OF THREADS PER INCH ON STEM	3	3	3	3	2	2	2	2	2	1 1/2	1 2/3
ROOT DIAM. OF STEM THREAD	1.50	1.75	1.75	2.00	2.25	2.75	3.25	3.48	4.25	4.355	4.75
NUMBER OF TURNS TO OPEN	89	100 1/2	113	125	100 1/4	186 3/4	223 1/2	348	395	413 1/2	614

NOTES: 1. Hub (Bell) Ends—are A.W.W.A. Class D dimensions in sizes 14" thru 24", specify class of pipe for 30" thru 60".

2. Flanged Ends—125 Lb. Standard ANSI A21.10.

3. Mechanical Joint Ends—ANSI A21.11 (AWWA C111).

*For informational purposes only—no longer available.

Non-rising (N.R.S.) and rising stem (O.S.&Y.) gate valves can be equipped with electric motor operating units to provide automatic, speedy, positive and remote valve operation.

Motor-operated valves have a wide range of application. They are used in water supply lines, water and sewage treatment plants, pumping stations, industrial cooling water systems, gas lines, etc.

Motor units are especially adapted to valve operation from a control station at a point remote from the valve. The units provide the means of controlling and limiting the opening and closing of the valves.

Provision is made for manual operation in the event of power failure. A wide range of control equipment is available including float switches, pressure switches and other electrical devices.

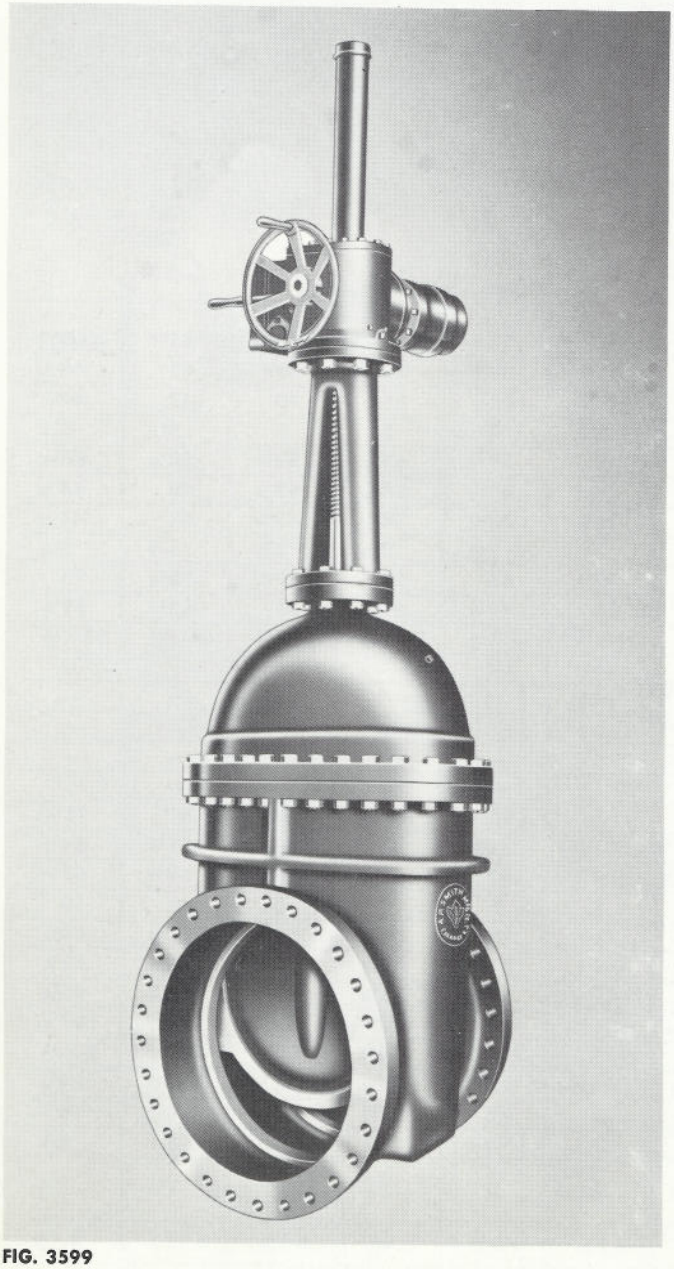


FIG. 3599

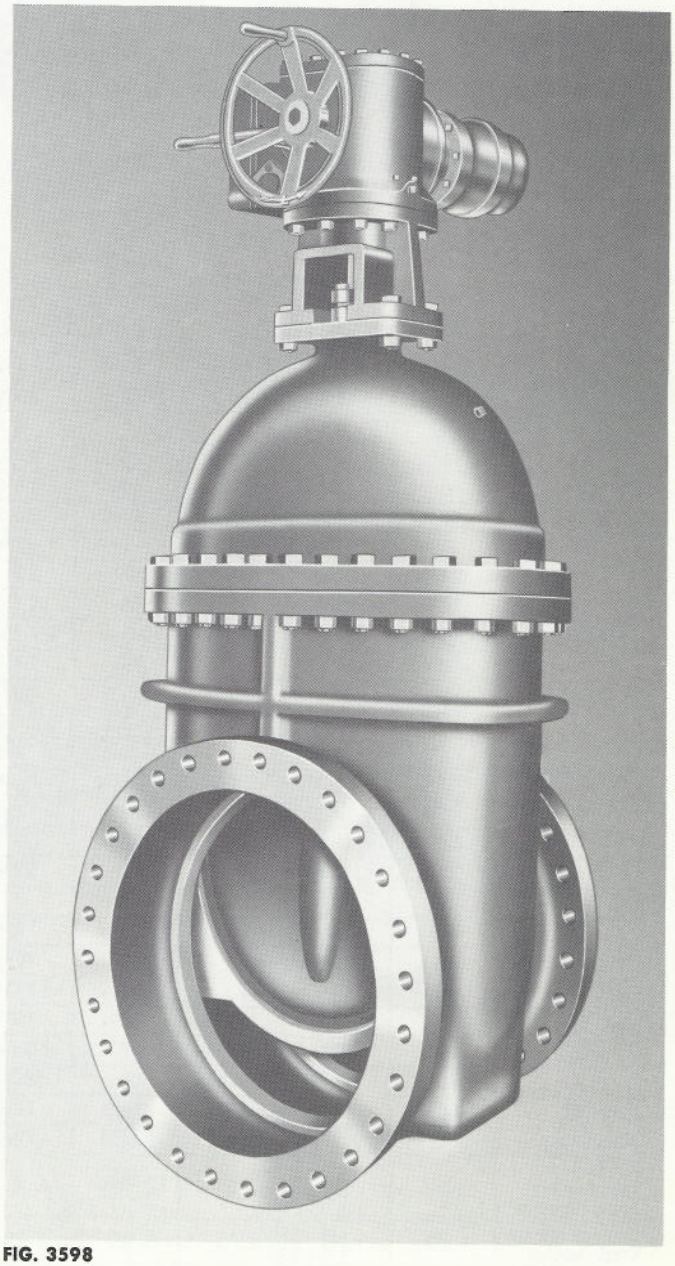


FIG. 3598

The electric valve operating unit is an efficient, automatic, power-actuated device for operating all types of valves.

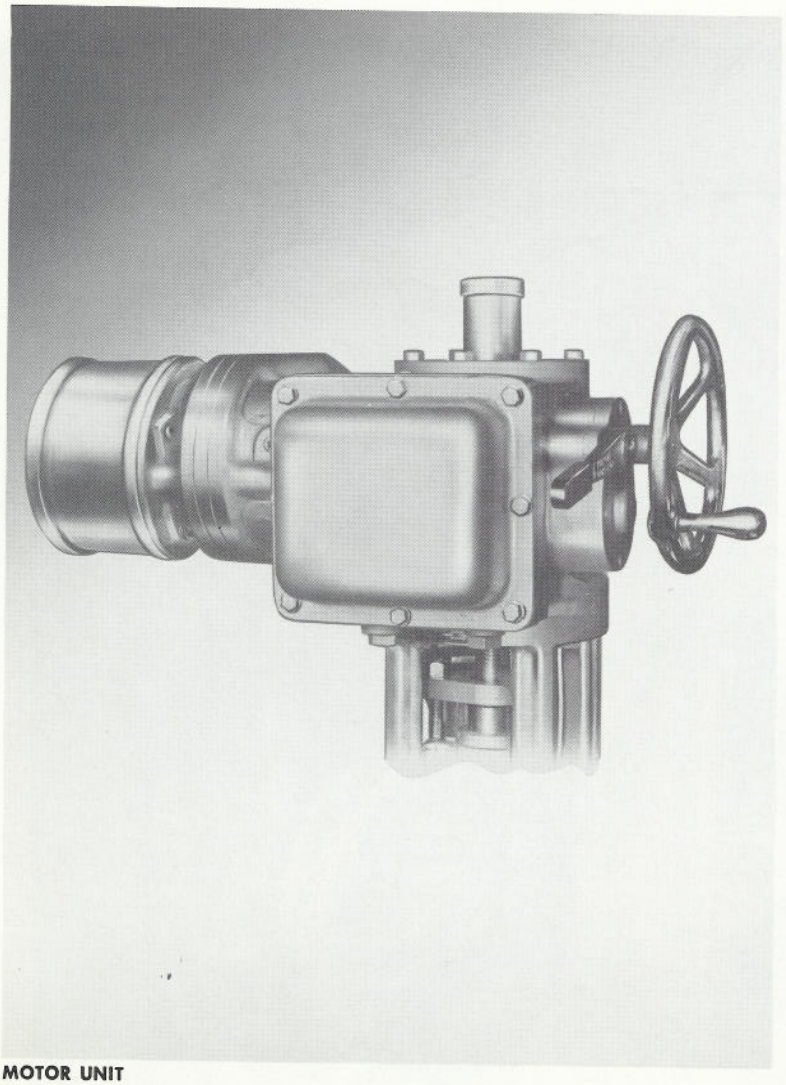
Proper valve seating is of prime importance in automatic valve operation. Valves can be damaged through improper seating or by valve disc contact with foreign material. The torque limit switch built into the unit protects valve operating parts from damage in both the opening and closing cycle and at the same time sufficient thrust is provided to assure tight valve closure.

A geared limit switch is also incorporated in the valve operating unit. Control of valve disc travel is accomplished by proper setting of the geared limit switch.

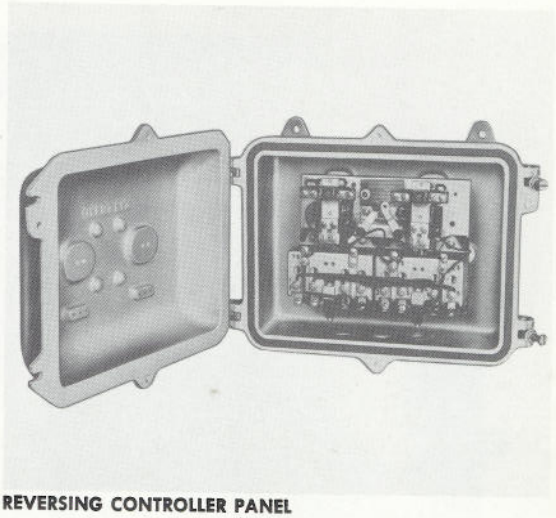
A reversing contactor is required with each electric operating unit. The contactor includes interlocks which provide for both directions of rotation and prevent reversal of direction without first stopping the motor unit.

Push-button stations can be furnished with various combinations of lights and buttons and are generally used as the motor unit actuating device. Other equipment such as float switches or pressure switches can also be used.

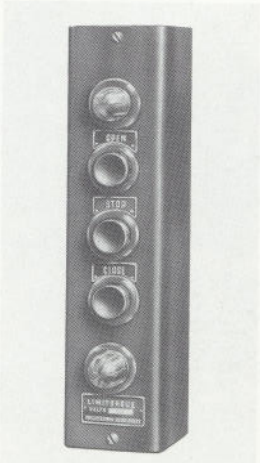
When specified, the equipment can be furnished in water-tight or explosion-proof enclosures. Mechanical and remote-type position indicators are available.



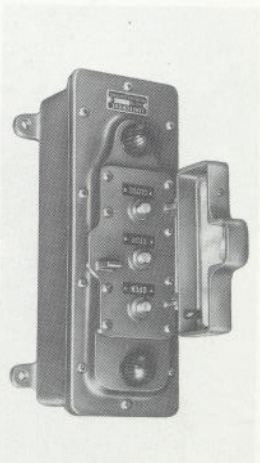
MOTOR UNIT



REVERSING CONTROLLER PANEL



SURFACE MOUNTED
PUSH BUTTON STATION



FLUSH MOUNTED
PUSH BUTTON STATION

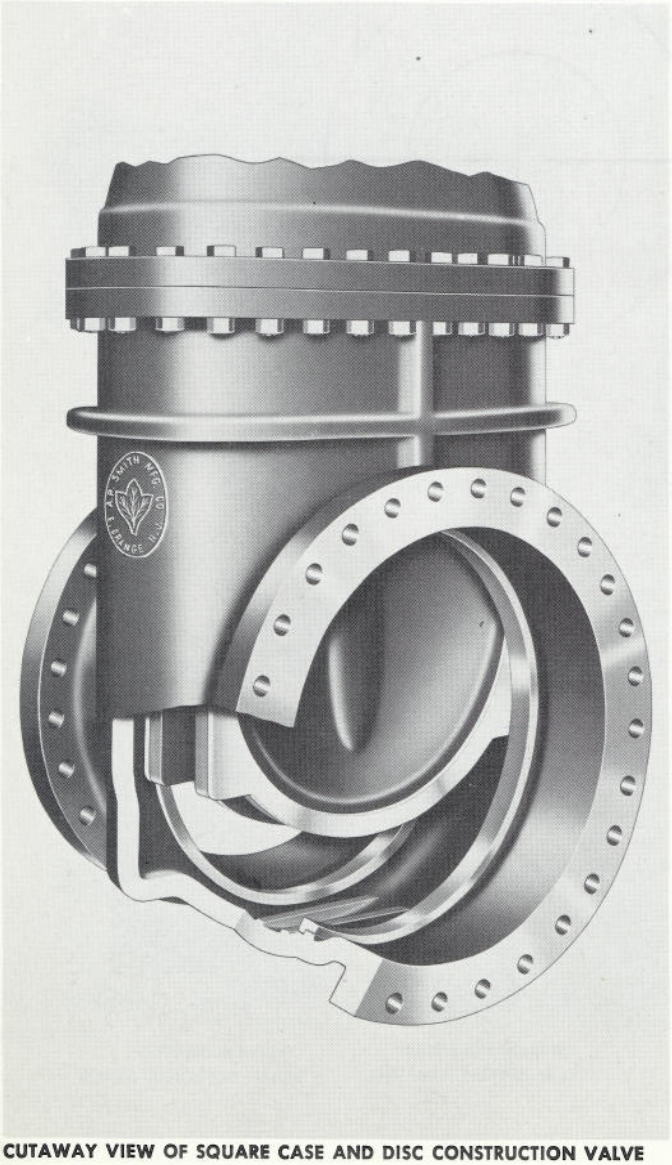
Manual, hydraulic-cylinder and electric-motor operated valves which will be subject to frequent operation and which, in service, will be either in a fully open or fully closed position, should be of the square bottom case and disc type.

The square bottom case and disc construction prevents the downstream disc from tilting into the downstream port opening.

The disc and disc rings at the bottom are essentially square with the result that a substantial area of the disc ring is in contact with the body seat ring during the operating cycle. Disc and seat ring wear is thereby reduced.

Valves 14" and larger to be installed in a flat position in vertical piping should be of the square bottom case and disc construction and in addition should have bronze tracks secured in the valve body and bonnet providing supporting surfaces for the discs during the operating cycle.

Valves installed on edge in horizontal piping are equipped with bronze tracks, rollers and scrapers—refer to page V-10. The bronze wedge guide rail in the top of the valve (refer to page V-10) carries the wedge free of contact with the discs after the wedging has been released and while the discs are traveling to an open or shut position. Valves which will be used frequently or which will be used for throttling service should be square bottom throttle construction.



CUTAWAY VIEW OF SQUARE CASE AND DISC CONSTRUCTION VALVE

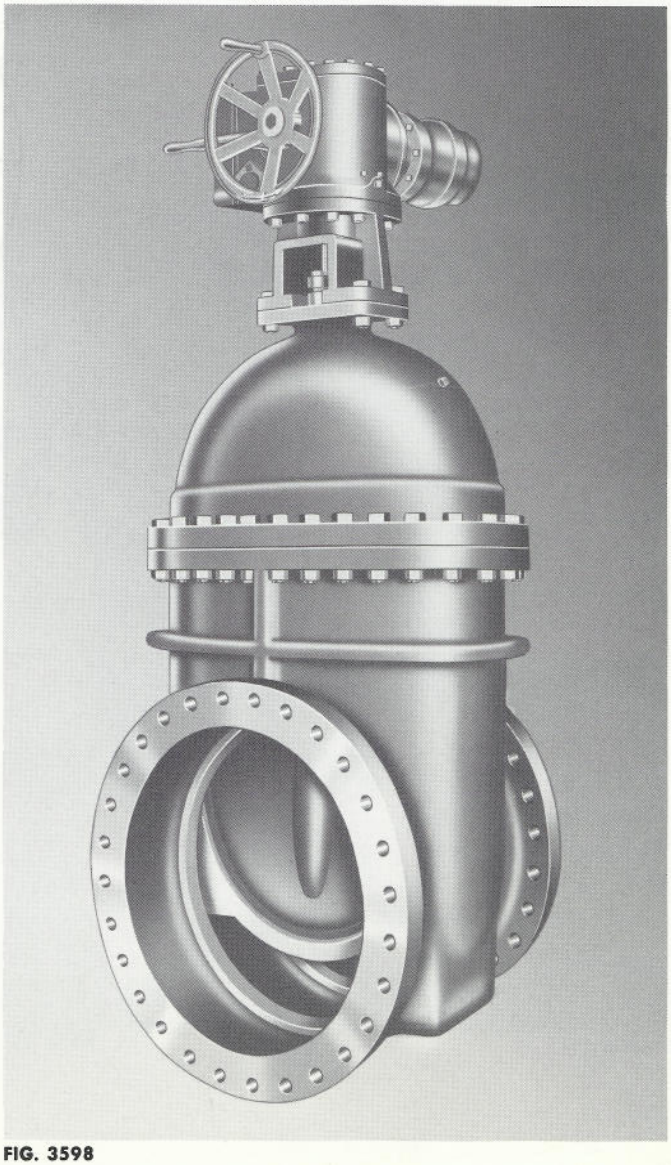


FIG. 3598

Manual, hydraulic-cylinder and electric-motor operated valves which will be subject to frequent operation, substantial unbalanced pressure, high velocity and will be used to control flow should be square bottom throttle construction.

Single throttle construction may be employed in valves when the flow ***is not*** subject to reversal. Double throttle construction is employed when the flow ***is*** subject to reversal.

The throttle construction mechanically lifts the disc ring face out of contact with the seat ring face. The disc and seat ring faces are not in contact while the valve is in a partially open position or while the discs are moving. Throttle construction therefore prevents disc tilting, uneven disc and seat ring wear and chatter.

Throttle construction valves are suitable for installation in vertical, horizontal-on-edge or in flat position in vertical pipe lines.

Throttle construction valves installed on edge in horizontal piping are equipped with bronze tracks, rollers and scrapers—refer to page V-10. The bronze wedge guide rail in the top of the valve (refer to page V-10) carries the wedge free of contact with the discs after the wedging has been released and while the discs are traveling. Valve sizes 14″ and larger are available with gearing and by-pass valve. Throttle construction valve operation is illustrated and described on page V-26.

Throttle construction valve discs are provided with three non-ferrous metal shoes precision

(continued)

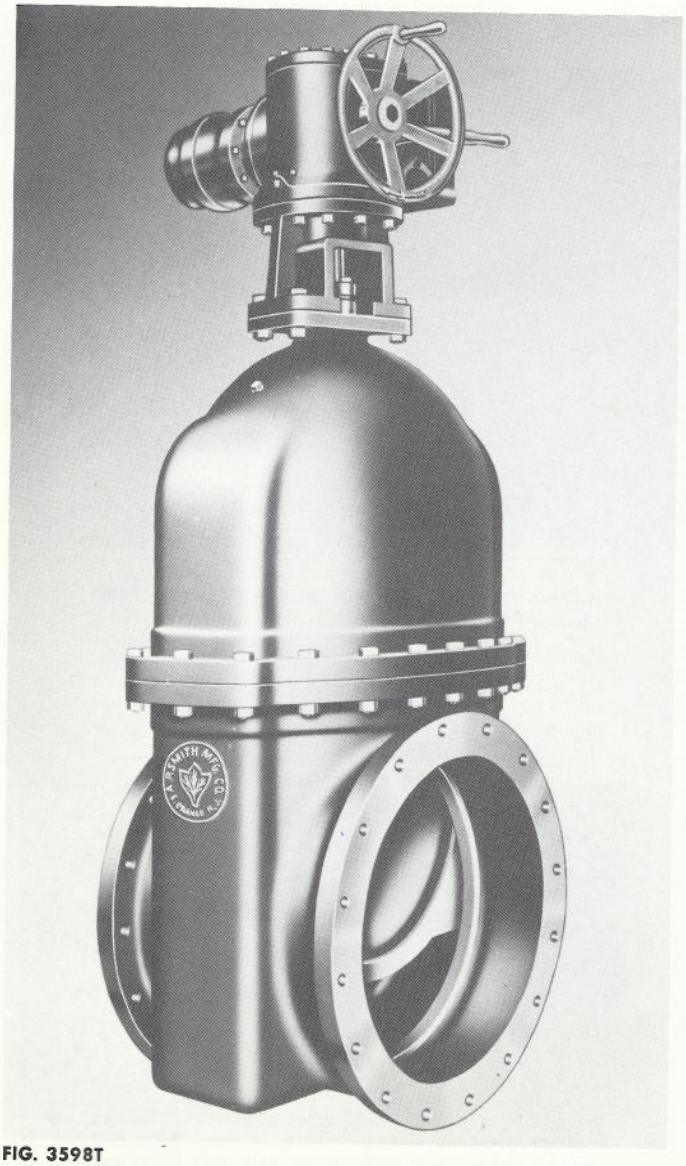


FIG. 3598T

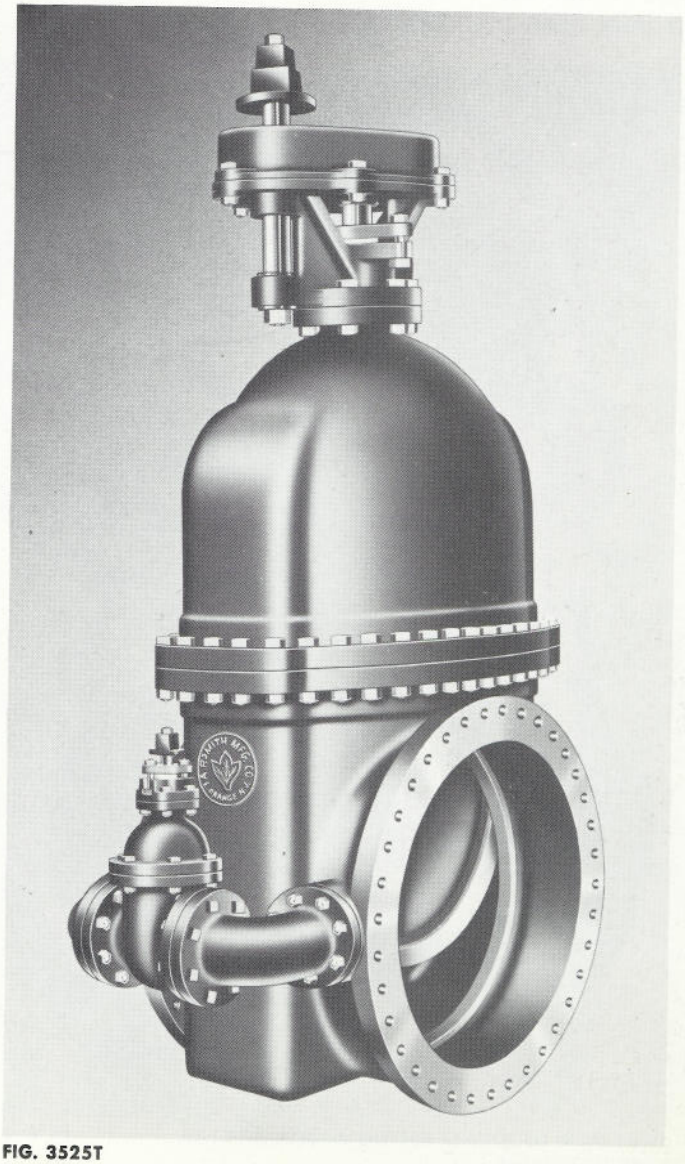


FIG. 3525T

(continued)

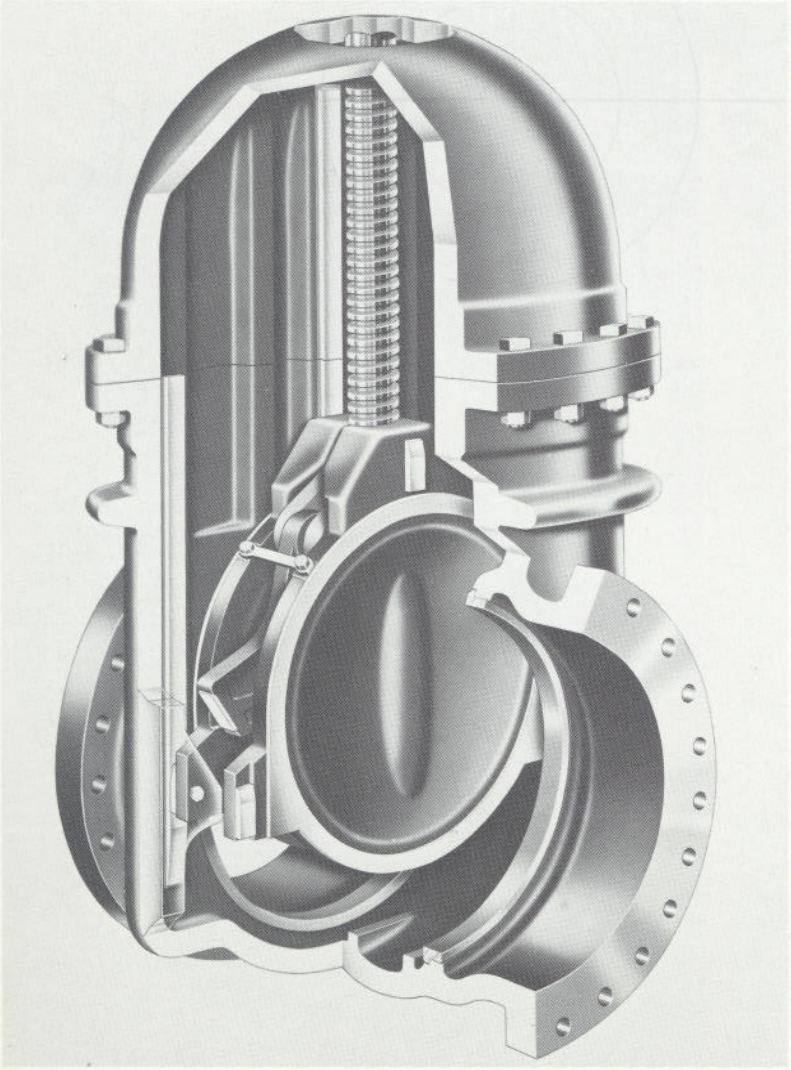
machined. One shoe is attached to the disc at the top centerline, the other shoes are attached to lugs which are integral with the disc, one on either side of each disc at the bottom. All three shoes are jig located on each disc.

Throttle construction valve bodies are provided with three non-ferrous machined tracks. One track is located adjacent to each side of the body seat ring, the third track is located at the top centerline above the seat ring and extends into the valve bonnet. The tracks are accurately positioned by means of jigs and securely attached to the body and bonnet.

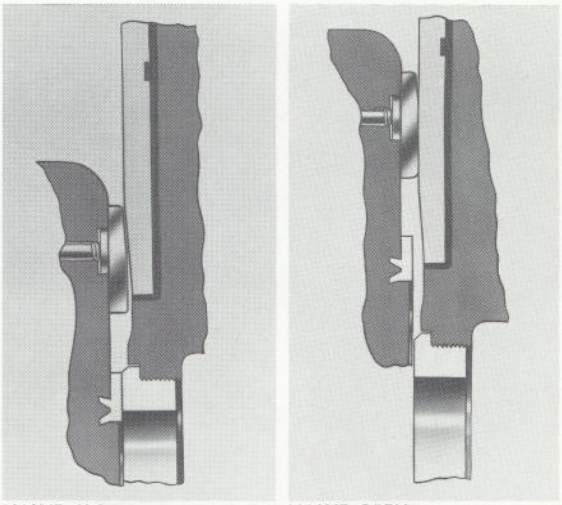
The three disc shoes register with the three body tracks and each shoe is in contact with a track while the valve is unseated and in any partially open position.

As throttle construction valves open, the disc shoes slide up inclines at the bottom of each track thus lifting and holding the disc face out of contact with the body seat ring face. In closing, the disc shoes slide on the tracks and down the inclines at the bottom of each track until the disc ring face is in contact with the body seat ring face thus permitting the wedging of the discs in the closed position.

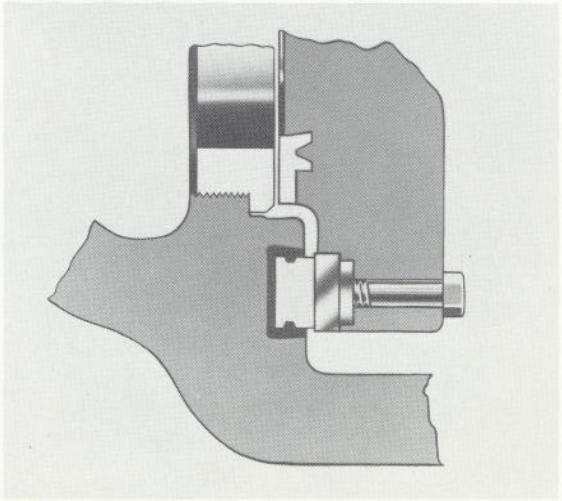
The non-ferrous disc shoes and body tracks are designed with ample bearing capacity and special alloys are employed to reduce friction and prevent galling under severe service. Throttle construction therefore prevents disc tilting, uneven disc and seat ring wear and chatter. This assures long service life under severe operating conditions.



CUTAWAY VIEW OF SQUARE BOTTOM DOUBLE THROTTLE CONSTRUCTION VALVE



VALVE CLOSED VALVE OPEN
DETAIL VIEW—CENTER DISC SHOE AND CENTER BODY BONNET RAIL



VALVE OPEN
DETAIL VIEW—SIDE DISC SHOES AND SIDE BODY RAILS

Hydraulic-cylinder operation is recommended in connection with valves which are operated frequently and are in a remote or inaccessible location.

Cylinder operation is economical because the source of power is usually provided by existing installations.

Cylinders are usually operated by manual or solenoid four-way control valves at a point removed from the valve location.

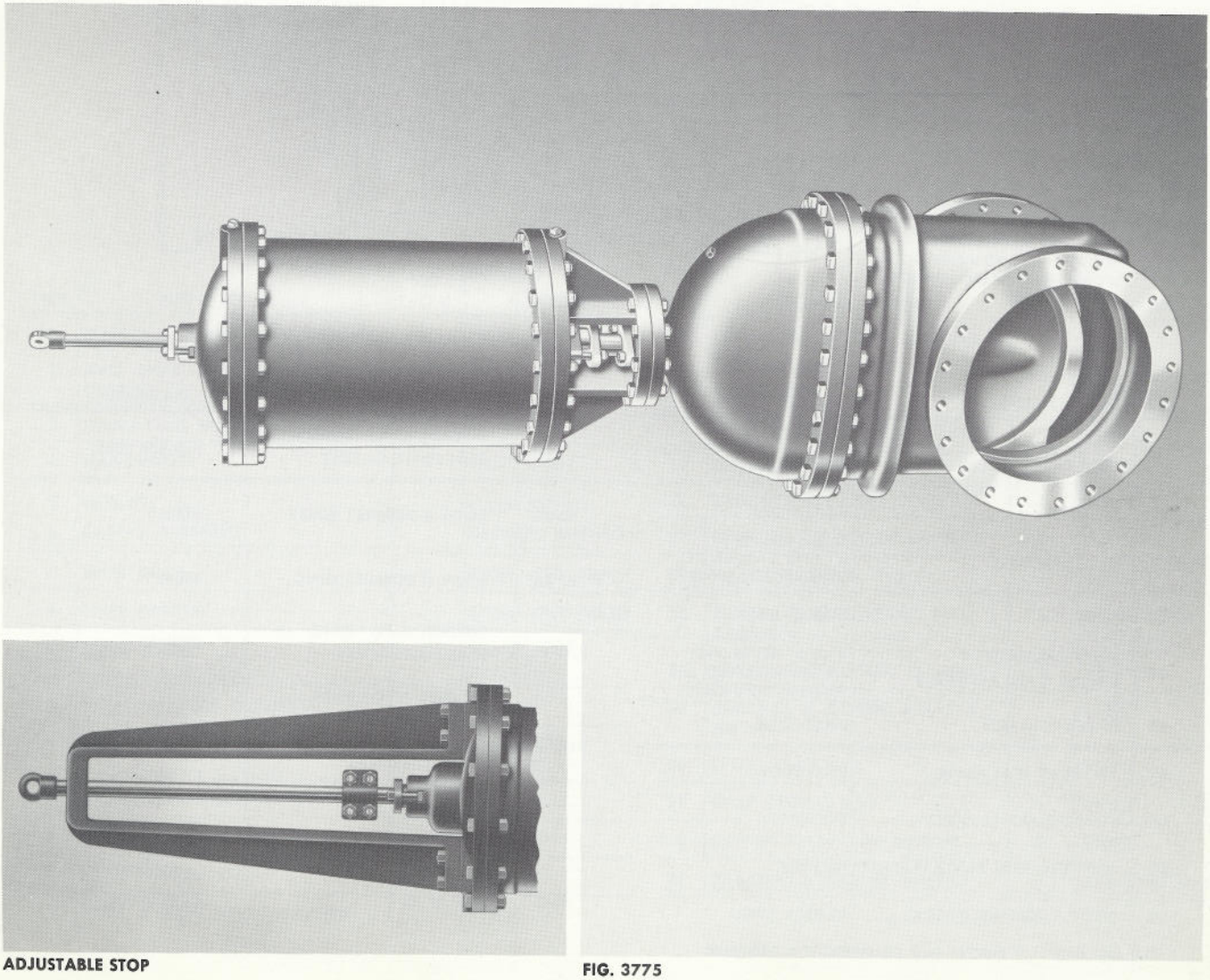
In opening, pressure admitted to the bottom of the cylinder moves the piston and opens the valve. The fluid above the piston is exhausted through the top cylinder outlet.

In closing, pressure admitted to the top of the cylinder moves the piston and closes the valve. The fluid below the piston is exhausted through the bottom cylinder outlet.

Cylinder tail rods are equipped with an eyebolt which can be used as an auxiliary means of opening the valve in the event of power failure. The tail rod also serves as a position indicator and can be used to actuate a remote indicator.

Adjustable stops are furnished when specified and are used to control the extent of the disc travel. They are generally employed with throttle service valves.

Cylinders are manufactured for specified disc and cylinder operating pressures.

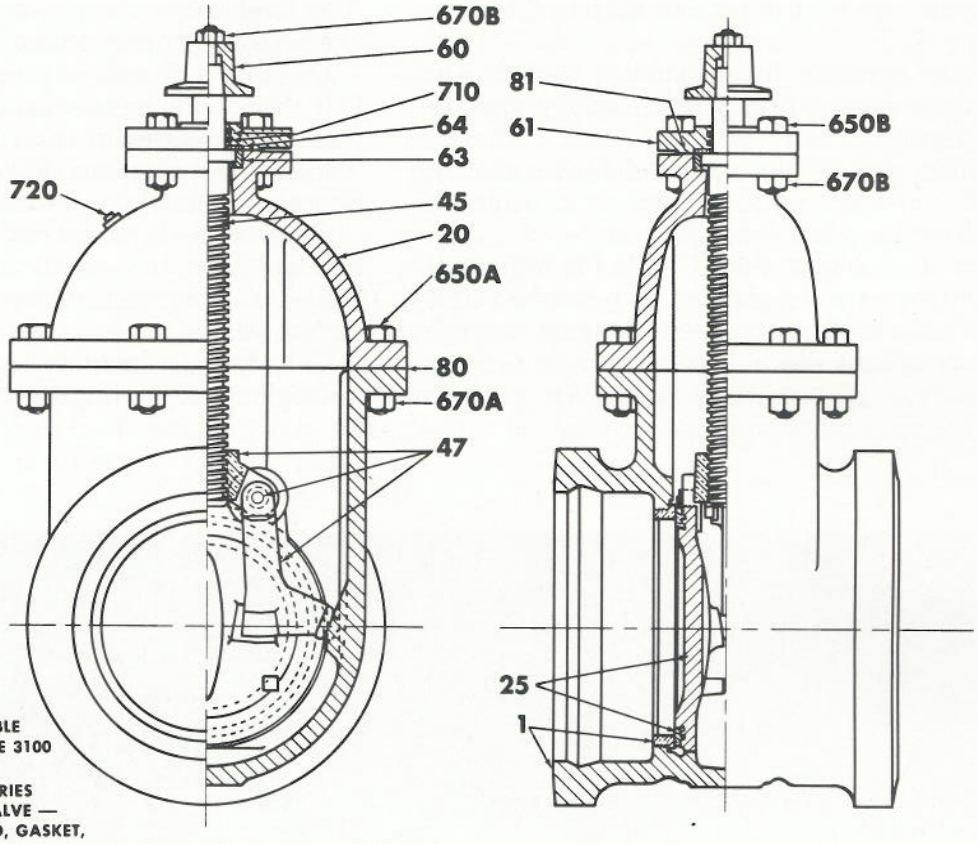


ADJUSTABLE STOP

FIG. 3775

U.S. PIPE

SMITH Metropolitan Gate Valves
200 psi WWP—400 psi Test Vertical
Sizes 4"—30"



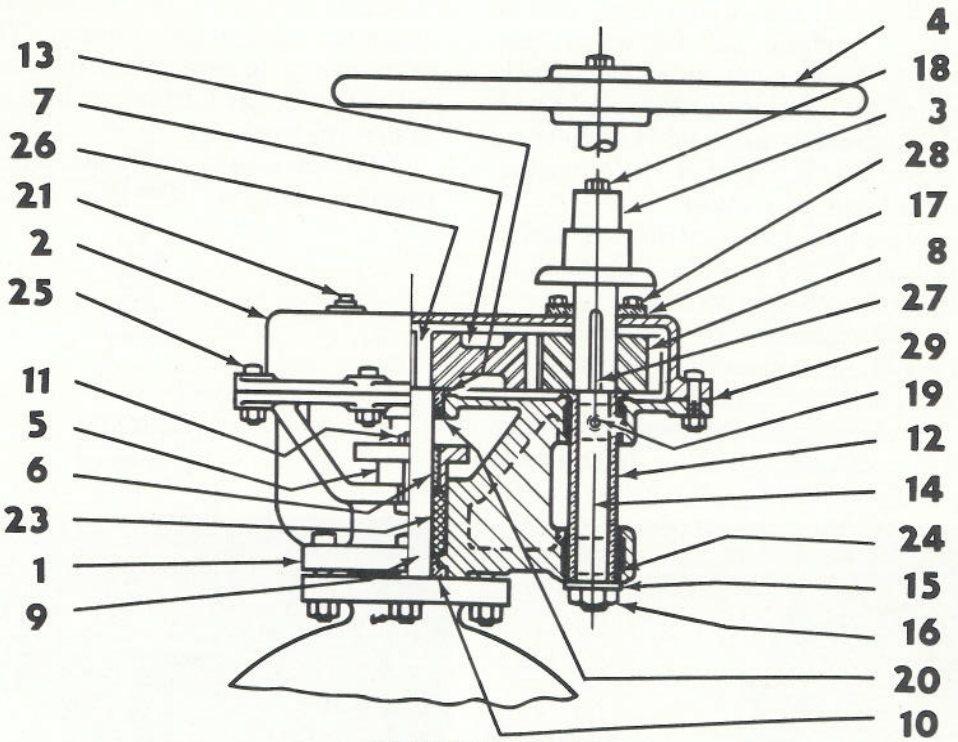
NOTE 1: PART NO. 69 HANDWHEEL AVAILABLE AS SHOWN ON VALVE 3100

NOTE 2: PART NO. 200 SET OF M.J. ACCESSORIES FOR 3460 OR 3260 VALVE — (CONSISTS OF GLAND, GASKET, BOLTS & NUTS)

NO.	NAME OF PART OR SUB-ASSEMBLY	MATERIAL
1	BODY **	CAST IRON
	SEAT RINGS	BRONZE
20	BONNET	CAST IRON
25	DISC ASSEMBLY	4" ALL BRONZE 6" AND LARGER C.I. DISC BRONZE RINGS
45	STEM	MANG. BRONZE
47	YOKE STEM NUT WEDGE & PIN ASSEMBLY	4" — 8" ALL BRONZE 10" AND LARGER C.I. BRONZE MOUNTED
60	OPERATING NUT	CAST IRON
61	"O" RING SEAL PLATE	CAST IRON
63	STEM COLLAR BUSHING	BRONZE
64	"O" RING SEAL PLATE WASHER	BRONZE
80	BODY & BONNET GASKET	RUBBER (CBS)

NO.	NAME OF PART OR SUB-ASSEMBLY	MATERIAL
81	BONNET & "O" RING SEAL PLATE GASKET	RUBBER (CBS)
650A	BODY & BONNET BOLTS	STEEL*
670A	BODY & BONNET NUTS	STEEL*
650B	BONNET & "O" RING SEAL PLATE BOLTS	STEEL*
670B	BONNET & "O" RING SEAL PLATE NUTS	STEEL*
	OPERATING NUT HOLD DOWN NUT	STEEL*
710	"O" RINGS	COMPOUND
720	TEST PLUG	CAST IRON

* RUST PROOFED **SPECIFY END CONSTRUCTION REQUIRED



ENCLOSED SPUR GEARING
EXTENDED TYPE GEAR CASE

NO.	NAME OF PART	NO. REQ'D.	MATERIAL
1	ENCLOSED SPUR GEAR BRACKET	1	CAST IRON
2	ENC. SPUR GEAR BRACKET COVER	1	CAST IRON
3	OPERATING NUT	1	CAST IRON
4	HANDWHEEL	1	CAST IRON
5	GLAND	1	CAST IRON
6	GLAND BUSHING		BRONZE BUSHED
7	SPUR GEAR	1	STEEL—CUT TEETH
8	SPUR PINION	1	STEEL—CUT TEETH
9	MAIN STEM	1	MANGANESE BRONZE
10	STUFFING BOX BUSHING	1	BRONZE
11	GLAND BOLT & NUT	2	MANGANESE BRONZE
12	SPUR PINION STEM BUSHING	1	BRONZE
13	MAIN STEM BRACKET BUSHING	1	BRONZE
14	SPUR PINION STEM	1	BRONZE
15	SPUR PINION STEM WASHER	1	STEEL

NO.	NAME OF PART	NO. REQ'D.	MATERIAL
16	SPUR PINION STEM WASHER NUT	1	STEEL
17	COVER PLATE	1	BRONZE
18	OPERATING NUT CAP SCREW	1	STEEL
19	GREASE FITTING FOR BRACKET	1	BRASS
20	BRACKET OIL SEAL RING	1	MFR'S. STD.
21	BRACKET COVER FILLER PLUG	1	BRONZE
22	BRACKET DRAIN PLUG	1	BRONZE
23	MAIN STEM STUFFING BOX PACKING	1 SET	LUBRICATED FLAX
24	SPUR PINION STEM "O" RING	1	RUBBER
25	BRACKET & COVER BOLTS & NUTS		STEEL*
26	SPUR GEAR KEY	1	STEEL
27	SPUR PINION KEY	1	STEEL
28	COVER PLATE CAP SCREW	2	STEEL
29	BRACKET & COVER GASKET	1	COMPOSITION

*RUST PROOFED

U.S. PIPE

SMITH Metropolitan Gate Valves
250 psi WWP—500 psi Test—Sizes 2"—12"
Information on larger sizes available on request.

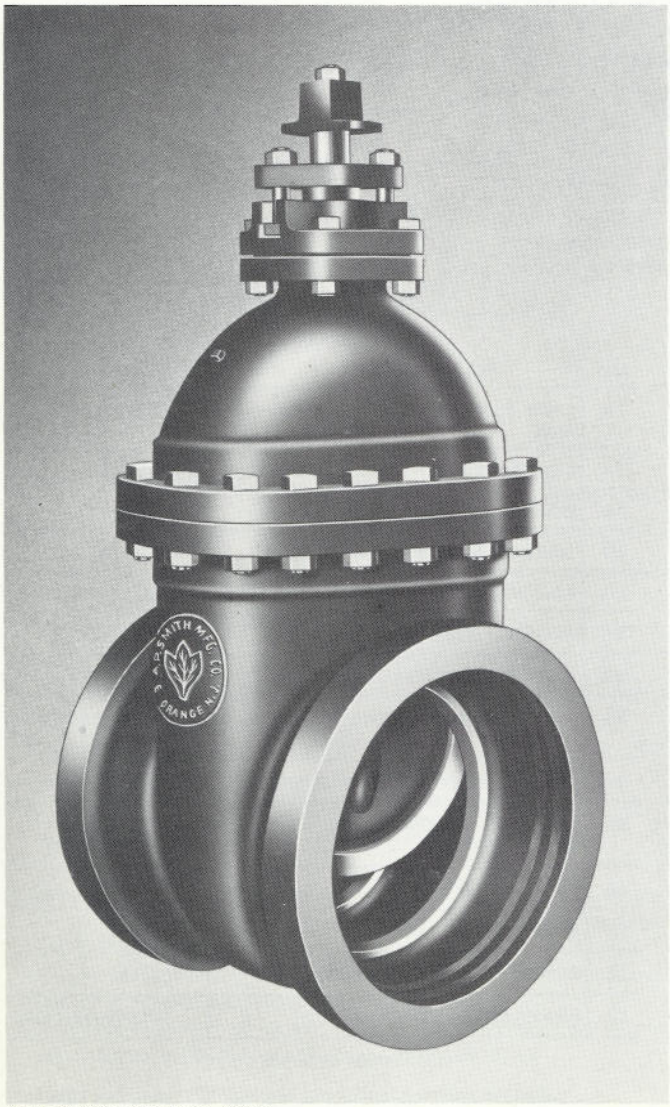
The Smith High Pressure Gate Valve is of the double-disc, parallel-seat, side-wedge type and is produced in size 2" through 12" for water, gas and other services. The recommended non-shock water working pressure rating is 250 psi. Fluid service valves are hydrostatically tested at 500 psi; gas service valves are air tested. Information on larger sizes available on request.

Square bottom case and disc construction (Refer to page V-24 through V-26) may be employed in connection with high pressure valves.

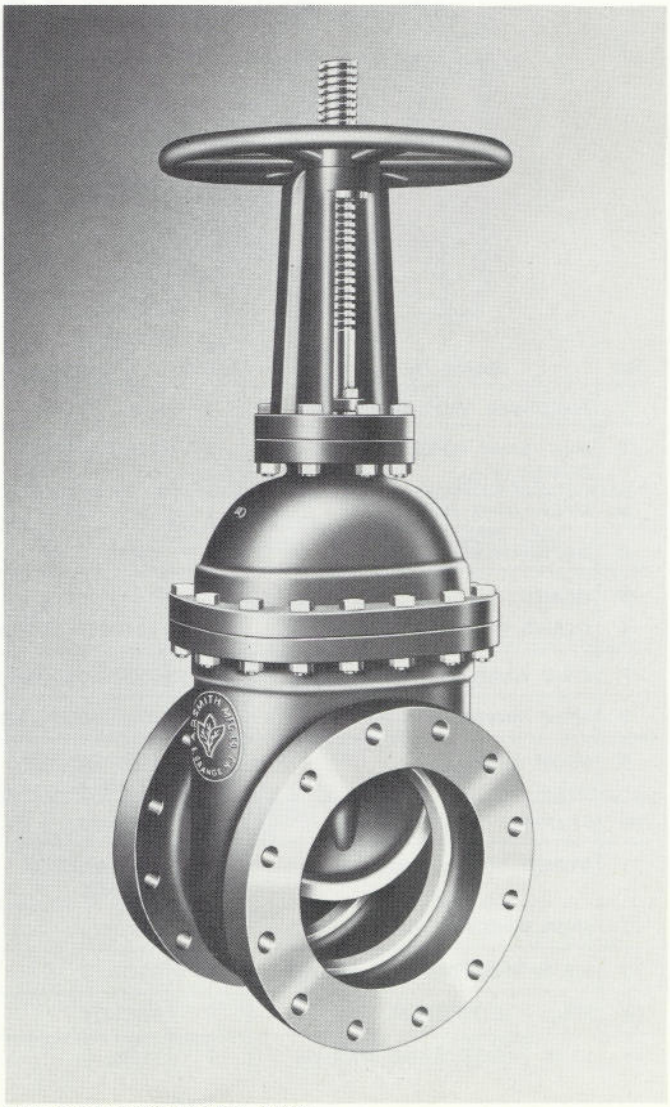
Smith High Pressure Valves are available with all standard types of end connections and may be non-rising stem (N.R.S.) or rising stem (O.S.&Y.) type. Valves for underground service are normally furnished with 2" square operating nut; handwheels furnished if specified.

The valve bodies and bonnets are of high-strength cast iron, the valve stems are of high-strength manganese bronze. The valves have extra-heavy bronze mountings and are equipped with stem collar bushings which permit repacking under pressure.

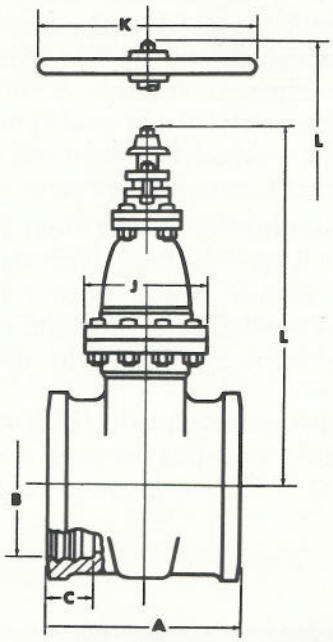
The valves are equipped with either conventional packing or "O" Ring Seals.



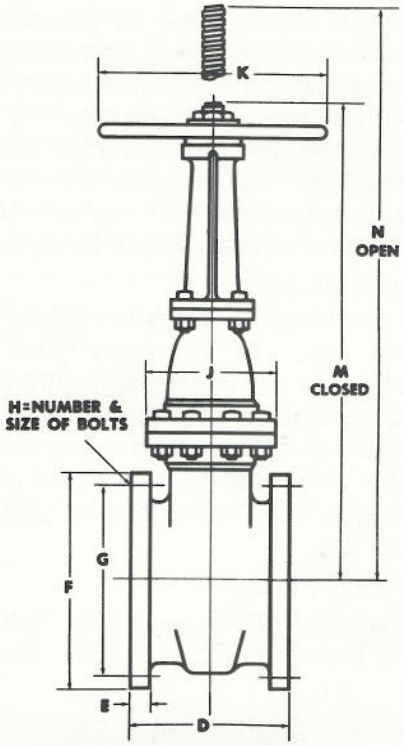
NON RISING STEM FIG. 4000



RISING STEM (O.S.&Y.) FIG. 4620



HUB ENDS
FIG. 4000 - NUT OPERATED
FIG. 4000-W - WHEEL OPERATED
NON RISING STEM



FLANGED ENDS
FIG. 4620
RISING STEM (OS&Y)

TABLE NUMBER 11 — **DIMENSIONS IN INCHES**

SIZE OF VALVE	2"	3"	4"	6"	8"	10"	12"
A	—	—	—	12¾	13¼	14⅞	15¼
B	—	—	—	8	10¼	12 7/16	14⅝
C	—	—	—	4	4	4½	4½
D	7½	9½	10⅛	11⅜	13	14⅜	15½
E	⅞	1⅛	1¼	1 7/16	1⅝	1⅞	2
F	6½	8¼	10	12½	15	17½	20½
G	5	6⅝	7⅞	10⅝	13	15¼	17¾
H	8-⅝	8-¾	8-¾	12-¾	12-⅞	16-1	16-1⅛
J	5⅛	5½	7⅛	8¼	9⅝	10½	11¼
K	6½	6½	9	11	13	15	19
L	9 9/16	14	17 3/16	20½	24½	28 5/16	31⅝
M	10 7/16	13 15/16	17⅝	23 5/16	28 13/16	35	41 5/16
N	12⅞	17⅜	22⅜	29 11/16	37½	45 11/16	53 15/16
NUMBER OF THREADS PER INCH ON STEM	4	4	3	3	3	3	3
ROOT DIAM. OF STEM THREAD	.667	.667	.875	1.125	1.250	1.375	1.50
NUMBER OF TURNS TO OPEN	9½	13¼	13½	19½	25¾	32	38

NOTES: 1. Hub (Bell) Ends—are A.W.W.A. Class D dimensions in sizes 2" thru 12".
2. Flanged Ends—250 Lb. Standard Spec. B16.B.
3. Available with Mechanical Joint Ends.

Needle and Slot-type Indicator

Position indicators are available in two types. Needle and slot type is used on non-rising stem valves which are not equipped with gearing. The barrel type is used on non-rising stem valves equipped with spur or bevel gearing.

Needle and slot type indicators are all bronze. The plate has raised figures and is attached to the valve stuffing box; the needle moves within the slot indicating the position of the valve discs.

Barrel-type Indicator

Barrel-type indicator housings are made of high-strength cast iron. All operating parts are of bronze. The gears are worm type. The bronze pointer moves along the plate indicating the position of the valve discs.

A specially constructed needle and slot type indicator is available to order for rising stem (O.S.&Y.) valves.

"O" Ring Seal Plate

"O" Ring Seal Plates for non-rising stem valves are made of high-strength cast iron. Seal plates for Metropolitan-type valves are equipped with a bronze bushing above the valve stem collar.

The seal plate incorporates two specially compounded "O" Rings. The top ring is the dirt seal and the lower ring is the pressure seal.

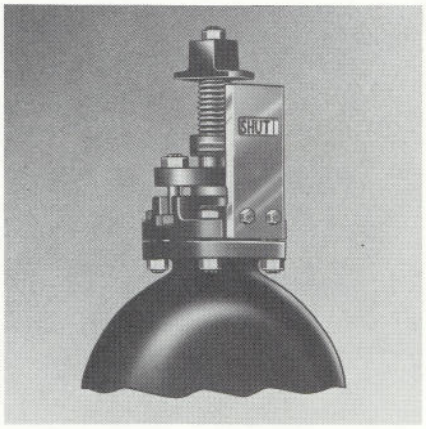
The valve stem, the seal plate opening and the grooves which accept the "O" Rings are machined to very close tolerances, assuring a long-life trouble-free, bottle-tight seal. The bolts and nuts which secure the seal plate to the valve bonnet are high-strength, rust-proofed steel.

Cross Section "O" Ring Seal Plate

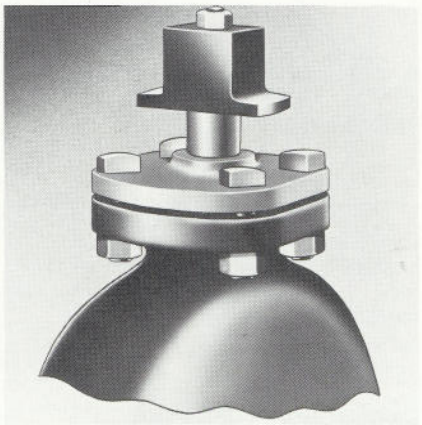
The "O" Ring Seal Plate eliminates conventional packing, glands, followers and gland bolts and nuts. The possibility of stem binding is eliminated and the torque required to operate valves is reduced.

Specially compounded "O" Rings are available for all fluid and gas services and may be used regardless of the valve operating pressure.

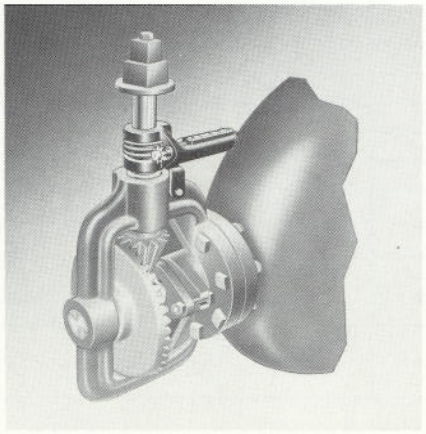
NEEDLE AND SLOT-TYPE INDICATOR



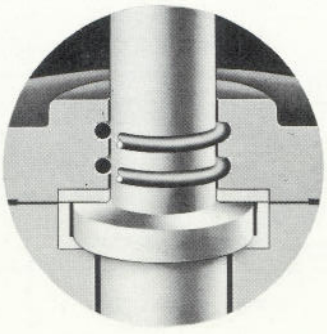
"O" RING SEAL PLATE



BARREL TYPE INDICATOR



CROSS SECTION "O" RING SEAL PLATE



Auxiliary Chain Wheel for Handwheel Operated O.S. &Y. Valve

Chain wheels are generally used to operate non-rising stem and rising-stem valves located in overhead positions. They are available in two types. The auxiliary type attaches to the valve handwheel and the direct-mounted type replaces the valve handwheel.

Auxiliary Chain Wheel for Handwheel Operated Non-Rising Stem Valve

Handwheel operated valves in service can be converted to chain wheel operation by attaching the auxiliary type chain wheel to the handwheel. Chains are made of rust-proofed high-strength steel. Guides provide positive engagement of chain with chain wheel. Chain wheels provide a safe, positive means of operating inaccessible valves.

Drain Type Clean-out for 12″ and Smaller Valves

Clean-outs permit the removal of sludge, scale, sediment or other foreign matter from the valve body without dismantling the valve.

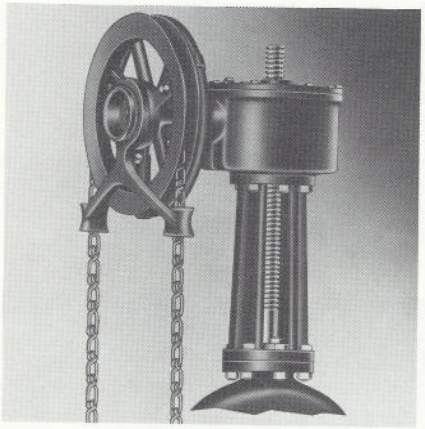
The clean-out may also be used to drain the fluid in the valve and the adjacent piping.

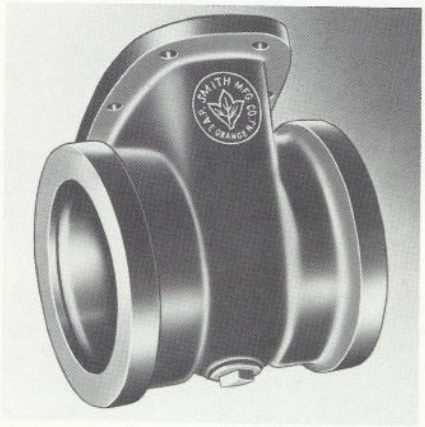
The threaded plug-type clean-out is generally used in connection with valve sizes 12″ and smaller. A boss is provided on the valve body which accepts the threaded plug.

Flanged Clean-out for 14″ and Larger Valves

Valve sizes 14″ and larger may be fitted with one or two hand-hole type clean-outs which consist of a cover plate bolted on to a built-up portion near the bottom of the valve body. A gasket is installed between the body and the cover plate.

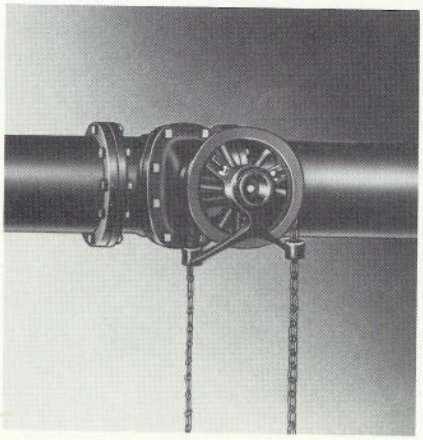
AUXILIARY CHAIN-WHEEL FOR HAND-WHEEL OPERATED O.S.&Y. VALVE

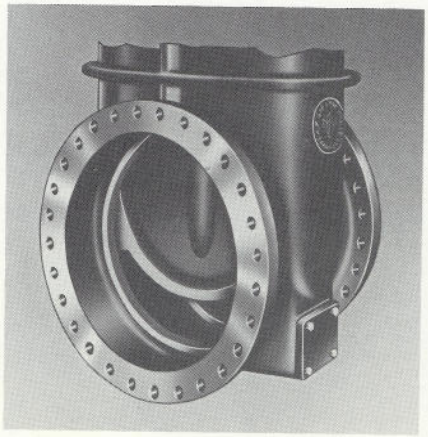




DRAIN TYPE CLEAN-OUT FOR 12" AND SMALLER VALVES

AUXILIARY CHAIN-WHEEL FOR HAND-WHEEL OPERATED NON-RISING STEM VALVE





FLANGED CLEAN-OUT FOR 14" AND LARGER VALVES

Floor stands are used with extension stems to operate non-rising stem, rising-stem or outside screw and yoke type valves. Floor stands are of high-strength cast iron, bronze mounted and are normally handwheel operated.

Non-rising stem floor stands are available with or without position indicator. Rising-stem floor stands are normally furnished without position indicator as the valve stem serves to indicate position of the valve discs.

If large diameter valves are floor stand operated and the valves are not equipped with gearing, gearing can be provided on the floor stand.

Cranks can be substituted for handwheels on bevel or worm geared floor stands. Two-speed gearing can be furnished to order. Ball or roller bearings can be provided in rising-stem floor stands when specified.

Motor operated floor stands are available and are used to facilitate the operation of large valves, particularly when the valve is at an inaccessible location.

FIG. 100 N.R.S. FLOOR STAND WITH INDICATOR

FIG. 100-1 N.R.S. FLOOR STAND WITH NO INDICATOR

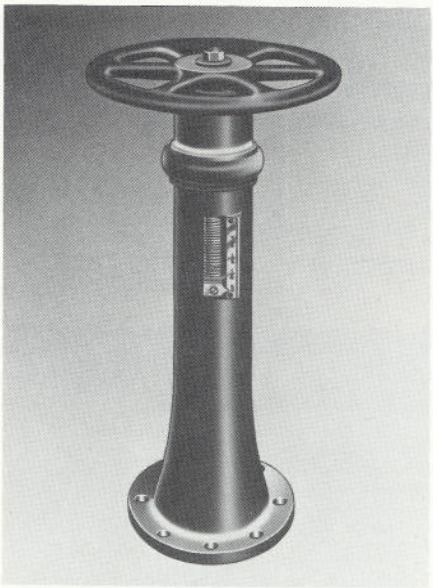


FIG. 105 RISING STEM (O.S.&Y.) ENCLOSED BEVEL GEARING FLOOR STAND

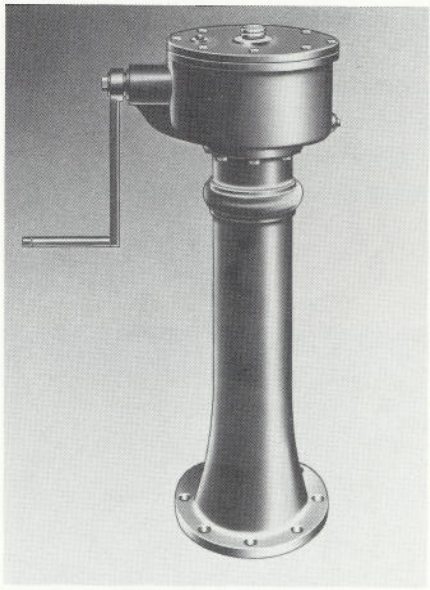
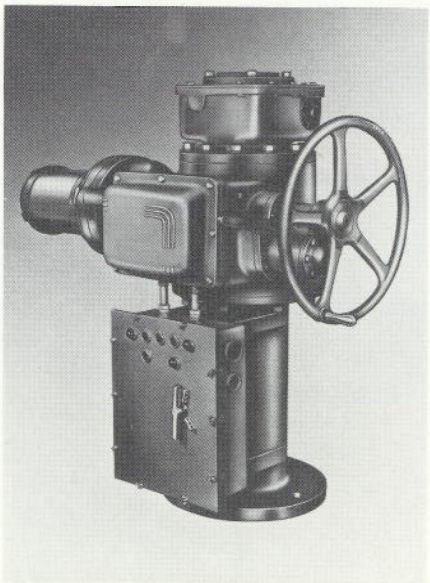
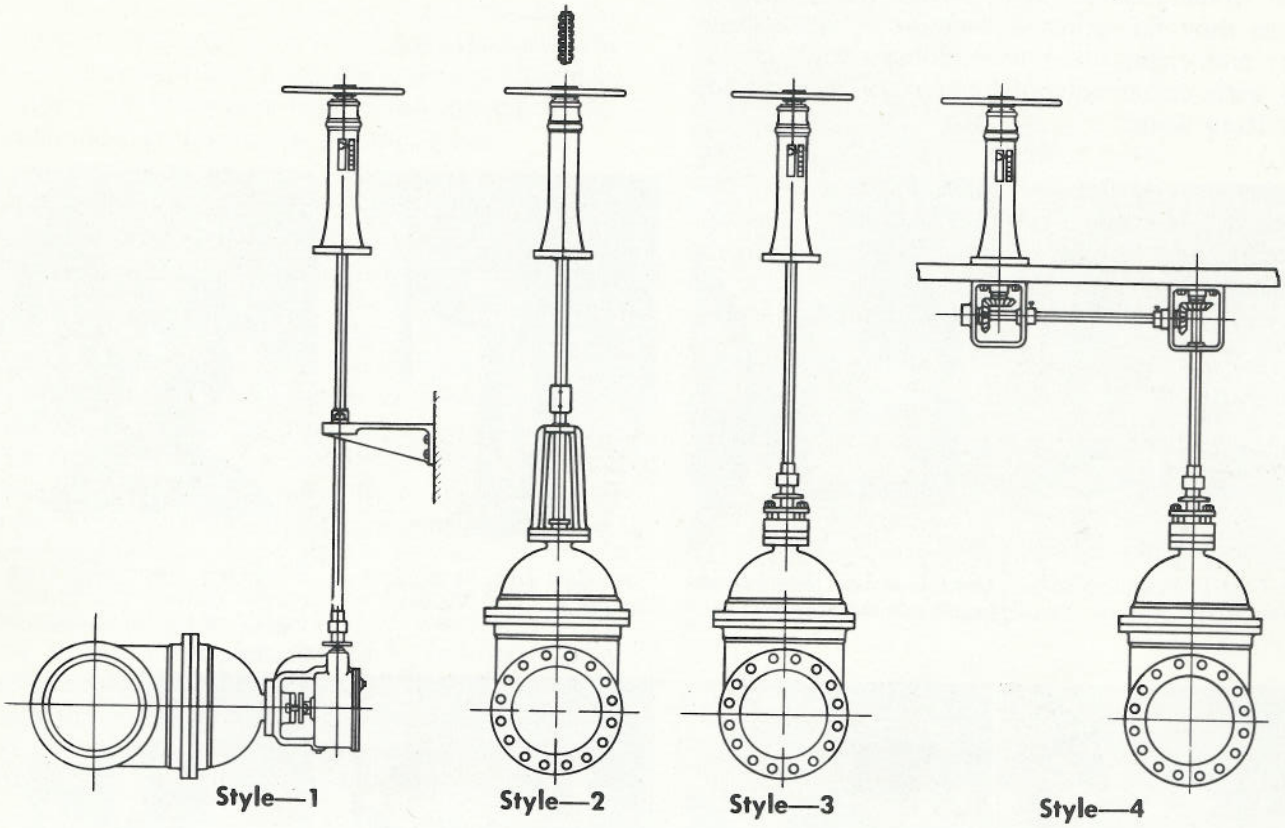


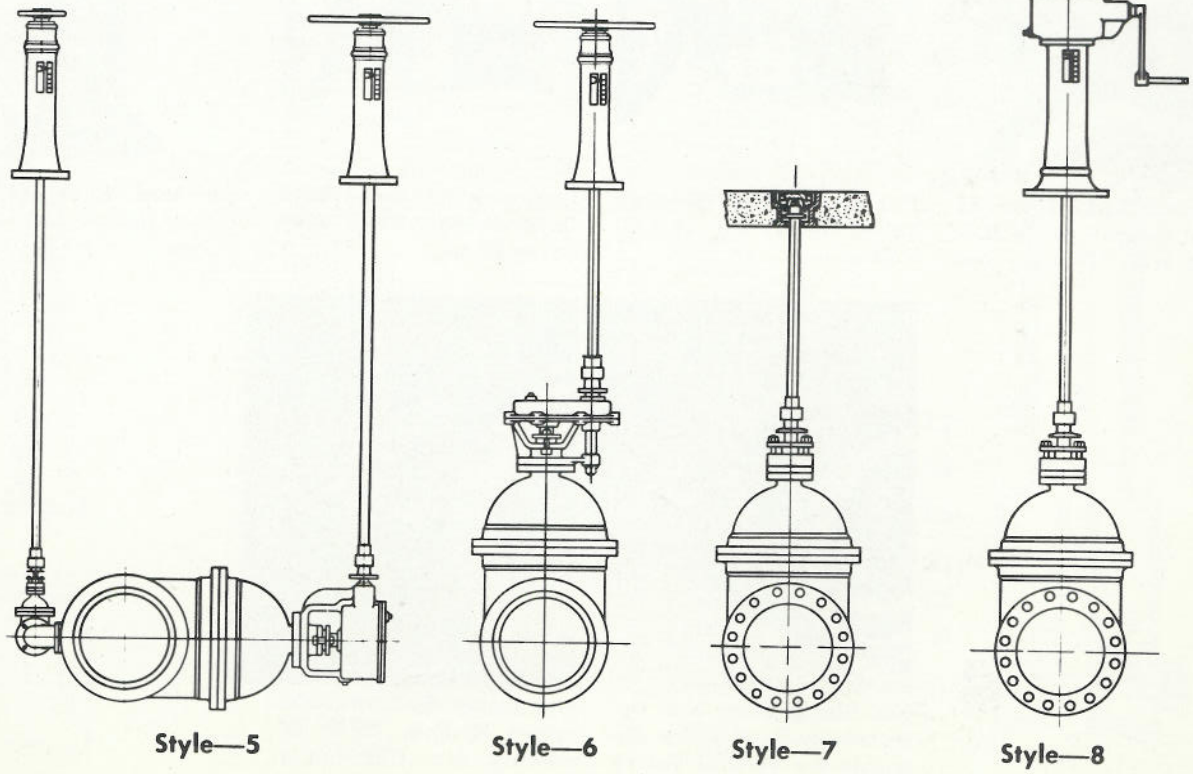
FIG. 101 RISING STEM (O.S.&Y.) FLOOR STAND

FIG. 104 MOTOR OPERATED N.R.S. OR RISING STEM (O.S.&Y.) FLOOR STAND



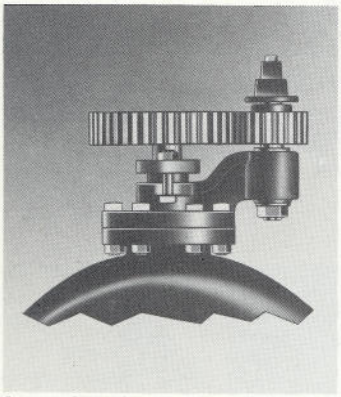


Style—1 Style—2 Style—3 Style—4

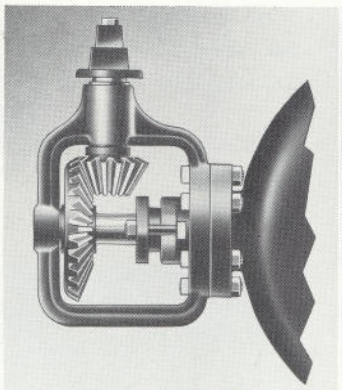


Style—5 Style—6 Style—7 Style—8

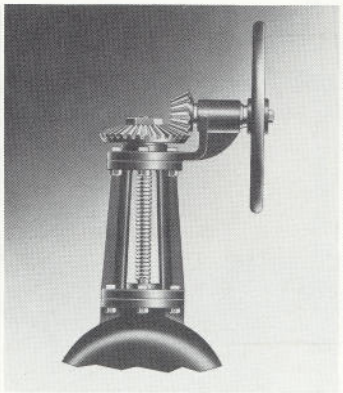
All by-pass valves have flange ends. By-pass valves may be either non-rising or rising-stem type. Non-rising stem by-pass valves are available with either conventional stuffing boxes or "O" Ring Seals.



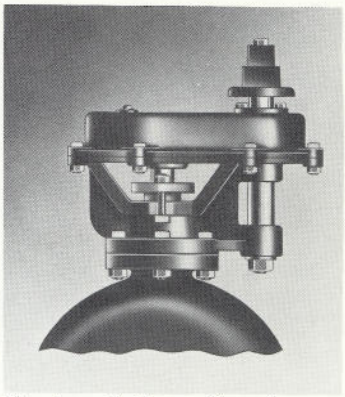
Open Cast-Iron Spur Gearing for N.R.S. Valves



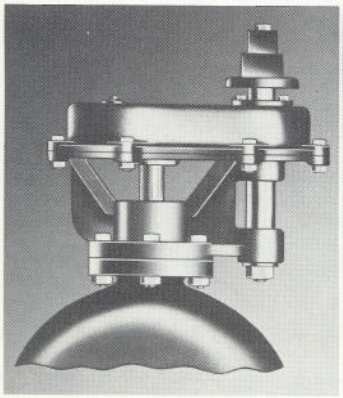
Open Cast-Iron Bevel Gearing for N.R.S. Valves



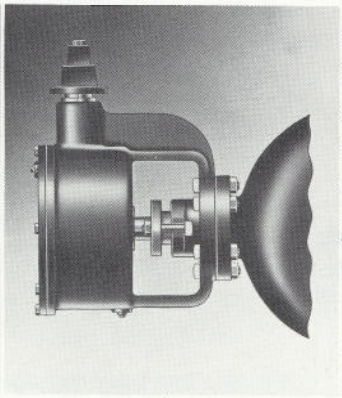
Open Cast-Iron Bevel Gearing for O.S.&Y. Valves



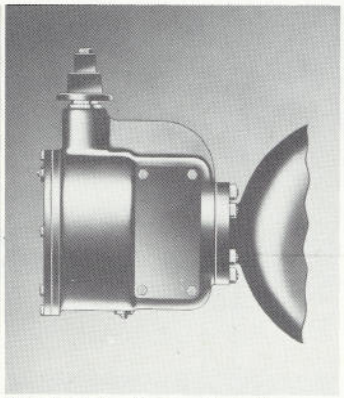
Enclosed Spur Gearing (Steel Gears) for N.R.S. Valves With Conventional Stuffing Box



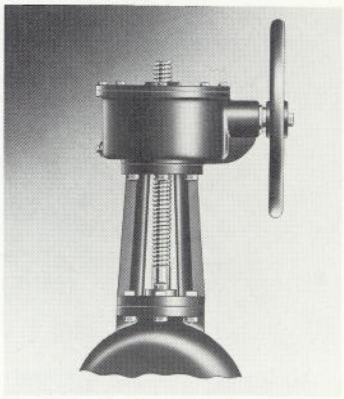
Enclosed Spur Gearing (Steel Gears) for N.R.S. Valves With "O" Ring Seal



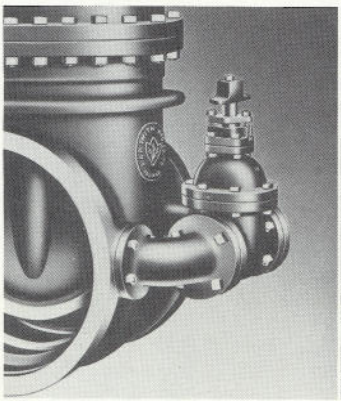
Enclosed Bevel Gearing (Steel Gears) for N.R.S. Valves



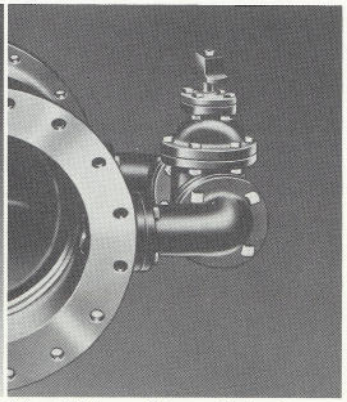
Enclosed Extended-Type Bevel Gearing With Stem Cover Plates



Enclosed Bevel Gearing (Steel Gears) for O.S.&Y. Valves



Non-Rising Stem Nut Operated By-Pass Valve Assembly for Vertical Valves

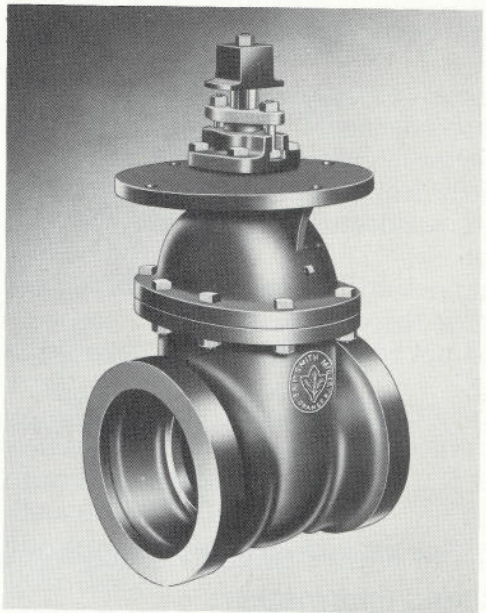


Non-Rising Stem Nut Operated By-Pass Valve Assembly for Horizontal Valves. By-Pass Valve With "O" Ring Seals

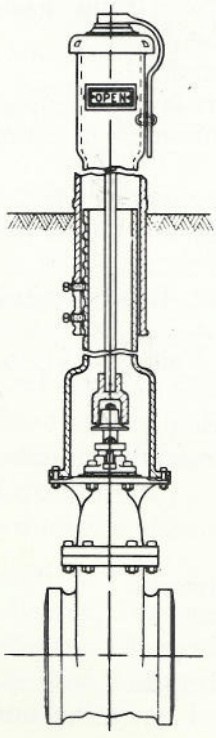
Smith Underwriter's Approved Indicator Posts are used to operate valves in underground fire protection systems. Two types are available. The one-piece type is used when the trench is extremely shallow; the two-piece type is adjustable to accommodate variations in ground levels.

The posts are rugged in construction, built of high-strength cast iron. Two large window openings are located near the top of the post which are fitted with heavy plate glass. Two bronze plates having the words "open" and "shut" cast in large legible letters are located immediately behind the glass plates. The word "open" or "shut" is visible when the valve is open or closed. Indicator posts are equipped with an angle-type operating wrench which can be locked to the post thus preventing unauthorized valve operation. All operating parts are completely enclosed to protect them against the elements.

Indicator posts open counterclockwise (left) and are equipped with 1¼" square operating nuts unless otherwise specified. Indicator post valves have a flange integral with the valve bonnet providing a means of readily attaching the post to the valve. Indicator posts are available for use with 3" through 14" non-rising stem valves.

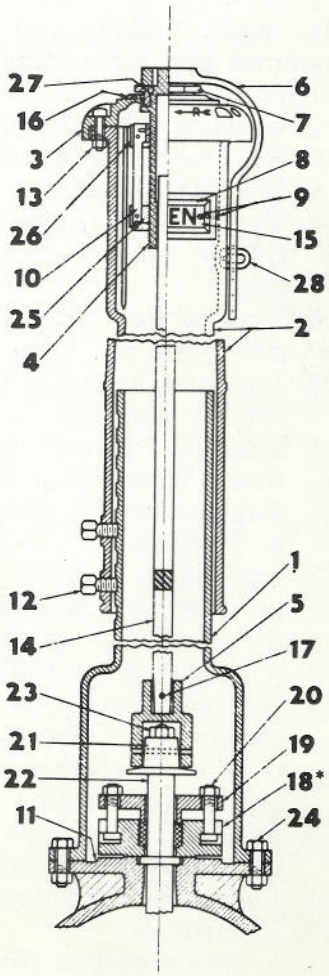


HUB END N.R.S. POST INDICATOR TYPE GATE VALVE
AVAILABLE VARIOUS END CONNECTIONS



NO.	NAME OF PART	REQ'D. NO.	MATERIAL
1	UNDERGROUND SECTION	1	CAST IRON
2	ABOVE GROUND SECTION	1	CAST IRON
3	TOP CAP	1	CAST IRON
4	OPERATING NUT	1	MANG. BRONZE
5	COUPLING NUT	1	CAST IRON
6	LOCK GUARD & WRENCH	1	MALL. IRON
7	OPERATING STEM NUT	1	BRONZE
8	TARGET WINDOW GRID	2	BRONZE
9	TARGET GRID & TARGET NUT—SCREWS	12	BRASS
10	TARGET NUT	1	BRONZE
11	VALVE BONNET**	1	CAST IRON
12	ADJUSTING SCREWS	2	STEEL*
13	TOP BOLTS & NUTS	3	STEEL*
14	EXTENSION ROD	1	STEEL
15	TARGET WINDOW	2	GLASS
16	OIL CUP	1	BRASS
17	COUPLING NUT PINS	1	BRASS
* 18	STUFFING BOX**	1	CAST IRON
19	STUFFING BOX GLAND**	1	CAST IRON
20	STUFFING BOX GLAND BOLTS**	2	STEEL*
21	VALVE NUT**	1	CAST IRON
22	VALVE STEM**	1	MANG. BRONZE
23	VALVE STEM NUT**	1	STEEL*
24	BONNET BOLTS	4	STEEL*
25	TARGET PLATE "OPEN"	2	ALUMINUM
26	TARGET PLATE "SHUT"	2	ALUMINUM
27	OPERATING STEM NUT SET SCREW	2	BRASS
28	STEEL HOOK	1	STEEL

*Available with "O" ring seals.



SMITH Metropolitan Gate Valves
Terms & Warranty

1. Orders and Contracts are subject to acceptance and approval at our plant office at Chattanooga, Tennessee.
2. Credit Terms—as stated in quotation or in order acknowledgement.
3. Shipping schedules are estimated as accurately as conditions will permit and are contingent upon strikes, accidents, and other delays beyond our control.
4. Quotations are subject to acceptance in 30 days and to change thereafter without notice.
5. Goods must not be returned without our written consent.
6. Special specification material may not be returned or order may not be cancelled without our written consent and upon terms which will insure us against loss.
7. We reserve the right to correct clerical or stenographic errors.
8. Designs and material specifications are subject to change without notice.

We guarantee each product of our manufacture for a period of one year from date of shipment against defects in material and workmanship when the product is correctly installed and used for the purpose for which it was manufactured, misuse or abuse excepted. Material will be furnished to replace material proven to be defective within one year after shipment. No claim for damage or labor will be allowed.

SMITH Metropolitan Gate Valves
Ordering Information

To insure prompt and correct processing of inquiries and orders, the following information should be furnished:

1. Quantity—Gate Valves.
2. Size and Figure Number.
3. Working Pressure.
4. Type of End Connections—advise class or OD of pipe for Hub-End Valves 30″ and larger.
5. Type of Stem: Non-Rising (N.R.S.) or Outside Screw and Yoke (O.S.&Y.).
6. Directions to open: Counterclockwise (open left) or Clockwise (open right).
7. Manually Operated: Specify Nut, Handwheel, Chain Wheel, Floorstand or Indicator Post. Unless otherwise specified, operating nut will be 2″ Square.
8. Installation Position:
   (a) Vertical in Horizontal pipe.
   (b) Horizontal (on edge) in Horizontal pipe.
   (c) Flat Position (on face) in Vertical pipe.
9. Gearing: State type if required. Open or enclosed Spur Gears—open or enclosed Bevel Gear. State whether gears are to be Cast Iron or Cut Steel Teeth.
10. By-Pass Valves: State if required and indicate whether Nut or Handwheel operated.
11. Indicators: State type if required.
12. Floorstands:
    (a) State whether Non-Rising Stem (N.R.S.) or Rising Stem is required.
    (b) Advise if Position Indicator is required.
    (c) State distance from centerline of Valve to base of stand and, if stem guides are required, state distance from centerline of stem to wall.
    (d) If gears are required, state type.
    (e) If other than manually (Handwheel) operated, advise complete detail.
13. Hydraulic or Cylinder operation:
    (a) Specify maximum pressure (Head) against Valve gates (Discs) and minimum pressure available at cylinder.
    (b) Cast-iron bronze-lined cylinders will be furnished unless otherwise specified.
14. Electric Motor Operation:
    (a) Specify maximum pressure (Head) against Valve Gates (Discs).
    (b) Current characteristics: Voltage—AC or DC cycle or phase.
    (c) Specify controls required.
15. If other accessories are required, advise detail.

    Valve Boxes:
    (a) Type required.
    (b) Valve size and depth of trench.

    Indicator Posts:
    (a) Direction to open.
    (b) Valve size and depth of trench.
    (c) Unless otherwise specified operating nut will be 1¼ in. square.