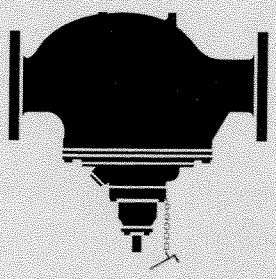
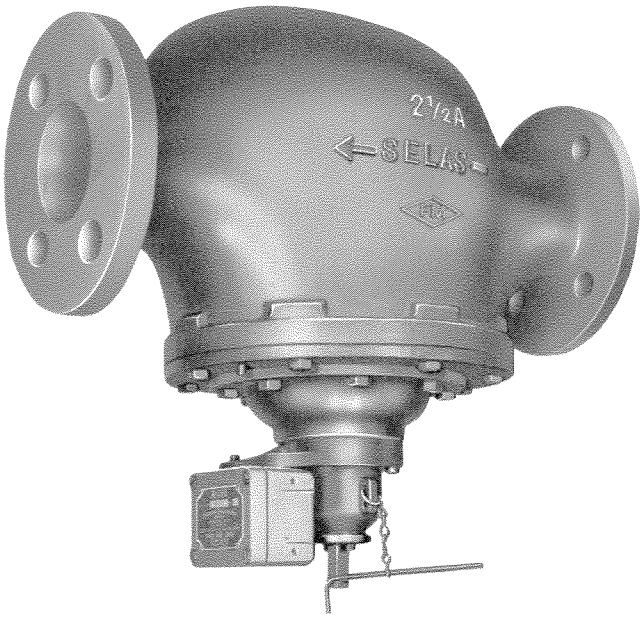
# Instructions for INSTALLATION OPERATION MAINTENANCE

## of the SELAS AUTOMATIC FIRECHECK



SERIES AF-A
AFS-A
AFSE-A




Selas Automatic Firechecks are employed in piping systems carrying gas-air mixture for the purpose of stopping and extinguishing backfires and for protecting combustion equipment from possible resulting damage. **CAUTION: A flashback can be explosive and dangerous. It is important that these instructions be understood and followed by responsible operating personnel.**

## UNCRATING

The spring-loaded valve disc No. 7, Fig. 1 in the Automatic Firecheck is shipped in the closed position to prevent damage to valve stem and other internal parts during handling and shipment. Do not open this valve until Firecheck is installed.

## INSTALLATION

### 1. LOCATION

For maximum protection, the Factory Mutual Approved Selas Automatic Firecheck should be installed in the piping system as close as possible to the burner or other potential backfire starting point. Maximum downstream piping length should be limited to 40 feet (12m) (sizes 8A through 20A), and 20 feet (6m) (size 24A), when used with gases containing up to 40% hydrogen.

**For gases with hydrogen content in excess of this value, or for piping configuration which deviates from the above recommendation, contact the Engineering Department of Selas Corporation of America for advice.**

A full throated gas cock or gate valve should be placed on the inlet side (upstream) of the Automatic Firecheck allowing mixture to be shut off while the valve is being reset or maintained.

**NOTE:** Factory Mutual approval is only valid on the above equipment if the downstream piping is no greater than the pipe size of the Firecheck in piping systems operating up to 6 psig. (.42 KG/cm²)

### 2. POSITION

The Firecheck can be installed in any position throughout 360°. The only stipulation is that enough clearance be made available for removal of the cartridge assembly Nos. 1 through 39, Fig. 1. (Clearance requirements given in Dimension H.) Installations with the reset stud No. 20 pointing down require additional force to overcome the weight of the check valve No. 34. For this reason, capacities for such applications will be approximately 80% of those shown on graph in Fig. 2.

### 3. WIRING

Series AFS-A and AFSE-A have precision snap action Micro switches mounted, adjusted and tested at our factory. The contact arrangement is single pole double throw and can be wired for normally closed or normally open circuits. See separate instructions in micro-switch housing. A ½"-14 N.P.S.M. internally tapped connection is located at one end of the switch enclosure. Provision should be made to disconnect the switch from the conduit line when removing the cartridge assembly. Flexible conduit is recommended. Series AFS-A is equipped with a Micro switch suitable for applications where the splash of oil, water or other coolants is present. Series ASFE-A has an explosion-proof switch listed by Underwriters' Laboratories for use in hazardous atmosphere of Class I, Group C and Group D; Class II, Group E, Group F and Group G.

### 4. PRESSURE TESTING

CAUTION: Although the AF-A Series Firecheck is equipped with an "O"-ring seal No. 15, we recommend you do not exceed 15 psig (1.05 KG/cm²) (or the pressure limit of other auxiliary equipment) when pressure testing the system. Should leaks develop at the surfaces between the cartridge No. 33 and the body No. 40 and the cartridge and the bottom cover No. 12, disassemble, clean machined surfaces and regrease with Esso "Andok B" or equivalent grease. Refer to MAINTENANCE section for correct assembly.

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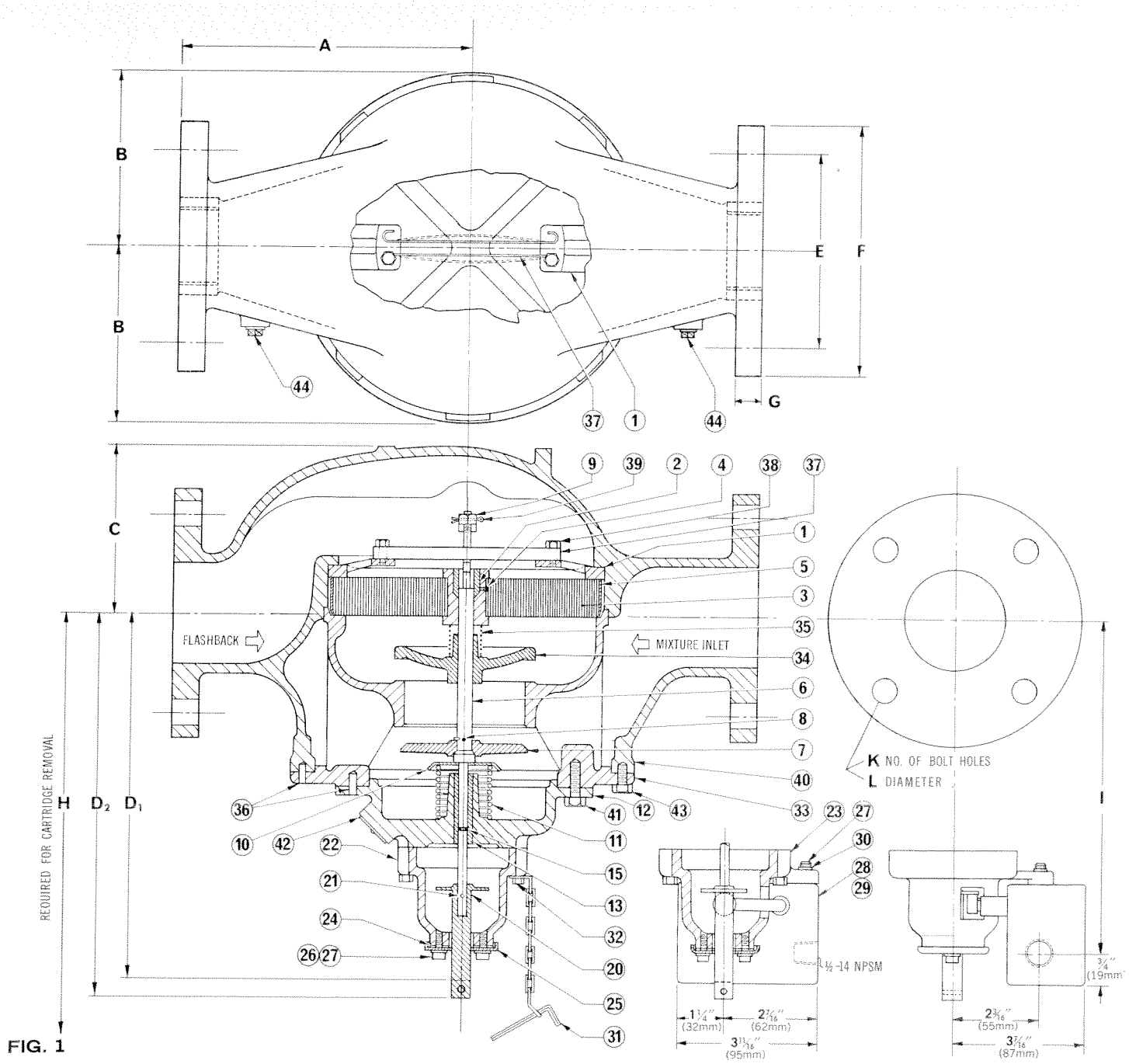

A
B
B
E
F
G
C
H
D2
D1
REQUIRED FOR CARTRIDGE REMOVAL
FLASHBACK
MIXTURE INLET
K NO. OF BOLT HOLES
L DIAMETER
I
½-14 NPSM
¾" (19mm)
1¼" (32mm)
2⁷⁄₁₆" (62mm)
3¹¹⁄₁₆" (95mm)
2³⁄₁₆" (55mm)
3⁷⁄₁₆" (87mm)

FIG. 1

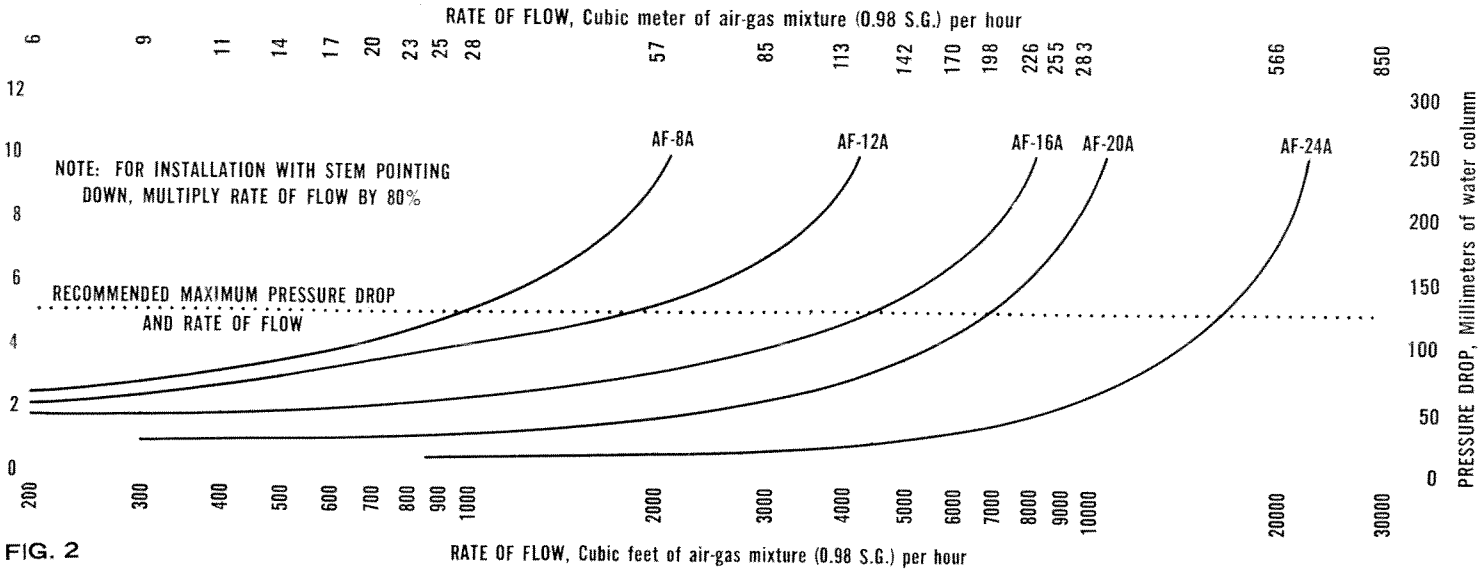

RATE OF FLOW, Cubic meter of air-gas mixture (0.98 S.G.) per hour
RATE OF FLOW, Cubic feet of air-gas mixture (0.98 S.G.) per hour
PRESSURE DROP, Millimeters of water column
AF-8A
AF-12A
AF-16A
AF-20A
AF-24A
NOTE: FOR INSTALLATION WITH STEM POINTING DOWN, MULTIPLY RATE OF FLOW BY 80%
RECOMMENDED MAXIMUM PRESSURE DROP AND RATE OF FLOW

FIG. 2

## PARTS LIST

| INDEX NO. | NAME OF PART | NUMBER NEEDED ON AF-A | AFS-A | AFSE-A |
|---|---|---|---|---|
| 1 | Spool ┐ | 1 | 1 | 1 |
| 2 | Bushing │ | 1 | 1 | 1 |
| 3 | Screen │ Supplied as Sub-Assembly | 1 | 1 | 1 |
| 4 | Drive │ | | | |
| | Screw ┘ | 1 | 1 | 1 |
| 5 | Band ┘ | 1 | 1 | 1 |
| 6 | Valve Stem | 1 | 1 | 1 |
| 7 | Valve Disc | 1 | 1 | 1 |
| 8 | Cotter Pin | 1 | 1 | 1 |
| 9 | Positioning Nut | 1 | 1 | 1 |
| 10 | Spring Socket | 1 | 1 | 1 |
| 11 | Spring | 1 | 1 | 1 |
| 12 | Bottom Cover | 1 | 1 | 1 |
| 13 | Bushing | 1 | 1 | 1 |
| ‡15 | "O"-Ring | 1 | 1 | 1 |
| 20 | Reset Stud Ass'y | 1 | 1 | 1 |
| 21 | 3/32 x 7/16 Spring Pin | 1 | 1 | 1 |
| 22 | Cap | 1 | 0 | 0 |
| *23 | Cap | 0 | 1 | 1 |
| 24 | TEST-SET Disc | 1 | 1 | 1 |
| 25 | Manual Test Disc | 1 | 1 | 1 |
| 26 | #10 Pattern Washer | 2 | 2 | 2 |
| 27 | #10-32 x 1/2 Soc. Hd. C.S. | 2 | 4 | 4 |
| *28 | Micro Switch | 0 | 1 | 0 |
| *29 | Micro Switch | 0 | 0 | 1 |
| *30 | #10 Shakeproof Washer | 0 | 2 | 2 |
| 31 | Wrench Ass'y | 1 | 1 | 1 |
| 32 | 1/4-20 x 1 Fil. Hd. C.S. | 4 | 4 | 4 |
| 33 | Cartridge | 1 | 1 | 1 |
| 34 | Check Valve | 1 | 1 | 1 |
| 35 | Spring | 1 | 1 | 1 |
| 36 | 3/16 x 5/8 Spring Pin | 2 | 2 | 2 |
| ‡37 | Bimetal Strip | 2 | 2 | 2 |
| 38 | Strip Holder Screw | 4 | 4 | 4 |
| 39 | Cotter Pin | 1 | 1 | 1 |
| 40 | Body | 1 | 1 | 1 |
| 41 | Hex Head Machine Screw | See B/M | | |
| 42 | Nameplate | 1 | 1 | 1 |
| 43 | Hex Head Machine Screw | See B/M | | |
| 44 | 1/8 Pipe Plug | 2 | 2 | 2 |

‡ Recommended spare parts
* Required to convert AF-A to AFS-A

## DIMENSION SCHEDULE

| CATALOG NO.* | PART NUMBER | PIPE SIZE | | A | B | C | $D_1$ | $D_2$ | E | F | G | H | I | K | L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AF-8A | 75374-01 | 1" | SCREWED | 4½" | 3¼" | 3½" | 8¾" | 9¼" | — | — | — | 15" | 7⅝" | — | — |
| AFS-8A | 75374-02 | | | 115 | 83 | 89 | 222 | 235 | | | | 381 | 194 | | |
| AFSE-8A | 75374-03 | | | | | | | | | | | | | | |
| AF-12A | 75375-01 | 1½" | | 5½" | 3⅝" | 3 11/16" | 9½" | 10⅛" | — | — | — | 16" | 8½" | — | — |
| AFS-12A | 75375-02 | | | 140 | 92 | 94 | 242 | 257 | | | | 406 | 216 | | |
| AFSE-12A | 75375-03 | | | | | | | | | | | | | | |
| AF-16A | 75376-01 | 2" | | 6¾" | 4⅛" | 4⅛" | 9½" | 10⅛" | 4¾" | 6" | ⅝" | 16" | 8½" | 4 | ¾" |
| AFS-16A | 75376-02 | | | 172 | 105 | 105 | 242 | 257 | 121 | 153 | 16 | 406 | 216 | | 19 |
| AFSE-16A | 75376-03 | | | | | | | | | | | | | | |
| AF-20A | 75377-01 | 2½" | FLANGED | 8" | 4¾" | 4¾" | 10" | 10⅝" | 5½" | 7" | 11/16" | 18" | 9" | 4 | ¾" |
| AFS-20A | 75377-02 | | | 204 | 121 | 121 | 254 | 270 | 140 | 178 | 18 | 457 | 229 | | 19 |
| AFSE-20A | 75377-03 | | | | | | | | | | | | | | |
| AF-24A | 71186-01 | 3" | | 9½" | 5 13/16" | 6⅝" | 11¾" | 12⅝" | 6" | 7½" | 15/16" | 20" | 10¾" | 4 | ¾" |
| AFS-24A | 71186-02 | | | 242 | 148 | 168 | 299 | 321 | 153 | 191 | 24 | 508 | 273 | | 19 |
| AFSE-24A | 71186-03 | | | | | | | | | | | | | | |

* **AF**
Automatic Firecheck without Micro switch

**AFS**
Automatic Firecheck with enclosed Micro switch

**AFSE**
Automatic Firecheck with explosion-proof Micro switch

(Light figures=mm)

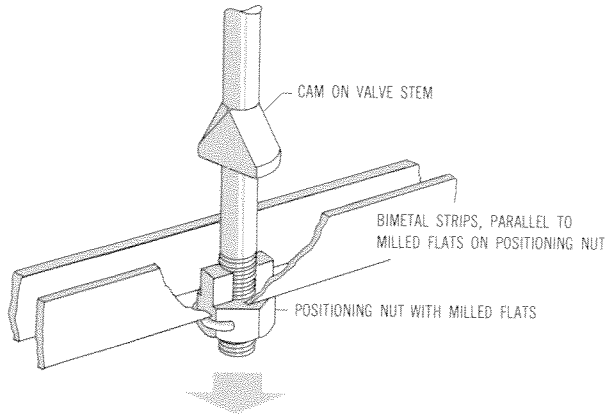



FIG. 3a
**ASSEMBLY VERTICALLY DOWN**

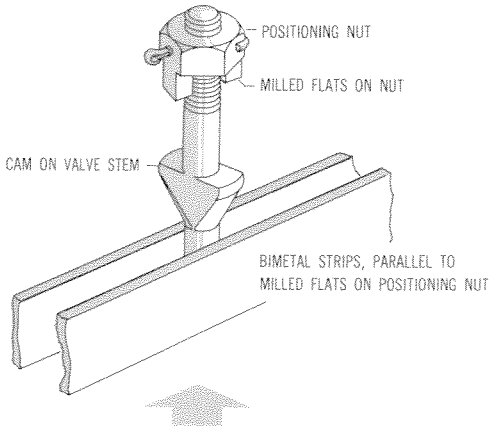


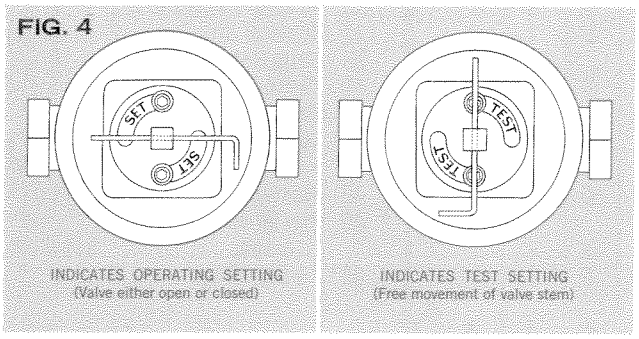

FIG. 3b
**ASSEMBLY VERTICALLY UP OR HORIZONTALLY**

## OPERATION

### 1. INITIAL SETTING

To prepare the Firecheck for normal operation, TEST-SET disc No. 24 must be in the SET position. See Fig. 4 on page 4. Insert wrench No. 31 through hole in reset stud No. 20 and pull. This will cock valve disc No. 7 in the open position.

FIG. 4




### 2. FUNCTION

When backfire occurs in piping protected by the Automatic Firecheck, any resulting shock wave will immediately close the check valve No. 34 as the impulse moves upstream. Combustion will be arrested by the cooling effect of the wound metallic screen No. 3 above which the flame is held. While burning at this point, the flame heats the bimetal strips No. 37 which move to the dotted position shown on the top view in Fig. 1. This releases the spring-loaded valve stem No. 6, causing valve disc No. 7 to shut off mixture supply, thereby extinguishing flame. If a switch No. 28 or 29 is attached to the Firecheck, it will function when the valve closes to sound alarms, turn off a Combustion Controller or perform other intended operations. Series AF-A can be converted to employ a switch by replacing cap No. 22 with cap No. 23, which has provisions for mounting switch.

### 3. RESETTING

After a backfire, and before resetting Automatic Firecheck, close the gas cock on the upstream side and examine the combustion system to determine and correct the cause of backfire. When the bimetal strips No. 37 have cooled, insert wrench No. 31, through hole in reset stud No. 20 and pull to reset the Automatic Firecheck. If the reset stud fails to remain in the extended position, check the bimetal strips for possible damage. Distortion of any kind or discoloration due to overheating (light blue to blue black in color) will require the installing of new bimetal strips. Damaged or distorted bimetal strips must be replaced. Refer to MAINTENANCE section for correct assembly. After the Automatic Firecheck has been correctly reassembled, it can be reset by pulling out reset stud No. 20, which will cock valve disc No. 7 in the open position. The Firecheck is now ready for operation, and burners may be relighted according to normal procedure.

## TESTING

It is important that all tests for proper operation of Automatic Firechecks (except for pressure loss) be made without gas-air mixture in the piping. Monthly tests are recommended for determining freedom of valve movement. These tests are made by loosening the two socket head cap screws No. 27, which hold the manual test disc No. 25 secure; and turning disc as far as slots will allow to TEST position, whereupon the valve should snap shut. If the valve is sluggish or fails to shut, the valve stem No. 6 and screen bushing No. 2 should be cleaned and the test repeated. After a satisfactory test, the manual test disc No. 25 must be returned to the SET position and locked by tightening the two socket head cap screws No. 27. The valve is now ready to be reset. Check clearance between reset stud No. 20 and TEST-SET disc No. 24. Sufficient clearance is required to prevent binding.

Pressure loss through the Firecheck can be measured by using the two plugged pipe connections No. 44, located near the inlet and outlet of the Firecheck. The graph in Fig. 2 should be used as a guide. If the pressure drop through the device exceeds the graph values by 50%, it is recommended that the screen No. 3 be cleaned.

## MAINTENANCE

### 1. CARTRIDGE REMOVAL

The cartridge assembly, consisting of Nos. 1 through 39, is removed as a unit by removing hex head screws No. 41. Two threaded holes are available, if necessary, to use as jack screws.

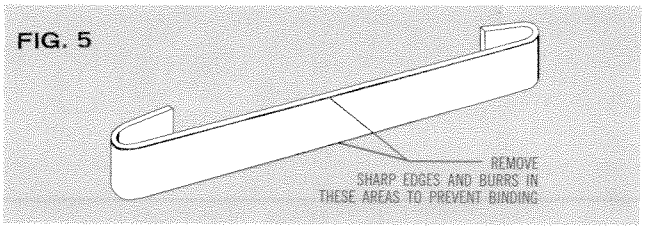
### 2. CLEANING THE SCREEN

Rinse the screen thoroughly in a solvent, blow through with compressed air, then wipe dry.

### 3. INSPECTION OR REPLACEMENT OF BIMETAL STRIPS

Inspect bimetal strips No. 37 periodically. More frequent inspections will be required if repeated or violent backfires occur. Sharp edges and burrs must be removed, (Fig. 5) since these may cause defective operation and binding of the valve stem No. 6. Bimetal strips distorted or discolored (lite blue to blue black) due to overheating, must be replaced.

FIG. 5




## REASSEMBLY

### 1. CLEANING

Flange surfaces on cartridge No. 33 and Bottom Cover No. 12 must be cleaned, and then coated with Esso "Andok B" or equivalent grease. All internal parts must be clean and dry, free from grease.

### 2. POSITIONING OF BIMETALS

Figure 1 shows the correct positioning of bimetals and their assembly to spool No. 1.

Move TEST-SET disc No. 24 to the SET position. Rotate screen spool assembly No. 1 so that bimetals No. 37 are parallel to milled flats on positioning nut No. 9 (Angular deviations of plus or minus 20° will not affect the operation of the valve ).

**2a. VERTICALLY DOWN** (Refer to Fig. 3a.)

Bimetals No. 37 will rest on positioning nut No. 9, parallel with and straddling the milled flats on the nut. Insert the cartridge and locate the bolt holes. With screws No. 41, bolt the cartridge assembly to valve body No. 40.

**2b. VERTICALLY UP OR HORIZONTALLY**

(Refer to Fig. 3b.) Bimetals No. 37 are parallel with the milled flats on the positioning nut No. 9 and below the cam on valve stem No. 6 (Screen spool assembly is seated in cartridge). Insert the cartridge assembly in the valve body No. 40 and fasten with screws No. 41. Pull out reset stud No. 20 to set Firecheck.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