

LIST OF SPRINGS

FOR FORM R - LOCOMOTIVE SAFETY VALVES

2" R (SQUARE STEEL SPRING)										2 1/2" R (SQUARE STEEL SPRING)										3" R (SQUARE STEEL SPRING)										4" R (SQUARE STEEL SPRING)													
SPRING NUMBER	FREE LENGTH	INSIDE DIAMETER	SIZE STEEL	COILS	LOAD	LOAD DEFLECTION	DEFLECTION RATE	DEFLECTION AT LOAD (MAX)(MIN)	MIN. RESERVE DEFLECTION	MIN. TOTAL DEFLECTION	SPRING NUMBER	FREE LENGTH	INSIDE DIAMETER	SIZE STEEL	COILS	LOAD	LOAD DEFLECTION	DEFLECTION RATE	DEFLECTION AT LOAD (MAX)(MIN)	MIN. RESERVE DEFLECTION	MIN. TOTAL DEFLECTION	SPRING NUMBER	FREE LENGTH	INSIDE DIAMETER	SIZE STEEL	COILS	LOAD	LOAD DEFLECTION	DEFLECTION RATE	DEFLECTION AT LOAD (MAX)(MIN)	MIN. RESERVE DEFLECTION	MIN. TOTAL DEFLECTION	SPRING NUMBER	FREE LENGTH	INSIDE DIAMETER	SIZE STEEL	COILS	LOAD	LOAD DEFLECTION	DEFLECTION RATE	DEFLECTION AT LOAD (MAX)(MIN)	MIN. RESERVE DEFLECTION	MIN. TOTAL DEFLECTION
5	10	3/16	3/16	11	18	.24	2.6	.22			5	4 5/16	2 1/2	1/2	12	25	.35	3.8	.32			5	5 1/2	2	3/8	8 1/2	192	.48	5.3	.43			100	5 1/4	2 1/8	1/2	7	1730	.48	5.3	.43		
15	15	3/16	3/16	10 1/2	26	.24	2.6	.22			10	4 5/16	1 5/8	1/2	10 1/2	49	.35	3.8	.32			15	5 1/2	2	3/8	8 1/2	192	.48	5.3	.43			200	5 1/4	2 1/8	1/2	7	1924	.48	5.3	.43		
20	20	3/8	3/8	10	35	.24	2.6	.22			15	4 5/16	2	1/2	9 1/2	74	.35	3.8	.32			20	5 1/2	2	3/8	8 1/2	192	.48	5.3	.43			250	5 1/4	2 1/8	1/2	7	2120	.48	5.3	.43		
25	25	3/8	3/8	10	35	.24	2.6	.22			20	4 5/16	1 3/4	1/2	10	98	.35	3.8	.32			25	5 1/2	2	3/8	8 1/2	192	.48	5.3	.43			300	5 1/4	2 1/8	1/2	7	2310	.48	5.3	.43		
30	30	3/8	3/8	9 1/2	53	.24	2.6	.22			25	4 5/16	1 3/4	1/2	9 1/2	133	.35	3.8	.32			30	5 1/2	1 7/8	1/2	9	385	.48	5.3	.43			350	5 1/4	2 1/8	1/2	7	2500	.48	5.3	.43		
40	40	3/8	3/8	10	71	.24	2.6	.22			30	4 5/16	2	1/2	8 1/2	147	.35	3.8	.32			40	5 1/2	1 7/8	1/2	9	385	.48	5.3	.43			400	5 1/4	2 1/8	1/2	7	2686	.48	5.3	.43		
50	50	3/8	3/8	9 1/2	88	.24	2.6	.22			40	4 5/16	1 5/8	1/2	8 1/2	196	.35	3.8	.32			50	5 1/2	1 7/8	1/2	9	385	.48	5.3	.43			500	5 1/4	2 1/8	1/2	7	2886	.48	5.3	.43		
60	60	3/8	3/8	10	106	.24	2.6	.22			50	4 5/16	2	1/2	7 1/2	295	.35	3.8	.32			60	5 1/2	2 1/8	1/2	7	577	.48	5.3	.43			600	5 1/4	2 1/8	1/2	7	3080	.48	5.3	.43		
80	80	3/8	3/8	9 1/2	141	.24	2.6	.22			60	4 5/16	1 5/8	1/2	7 1/2	393	.35	3.8	.32			80	5 1/2	2 1/8	1/2	7	710	.48	5.3	.43			800	5 1/4	2 1/8	1/2	7	3460	.48	5.3	.43		
100	100	3/8	3/8	10 1/2	177	.24	2.6	.22			80	4 5/16	1 5/8	1/2	7 1/2	491	.35	3.8	.32			100	5 1/2	2 1/8	1/2	7	962	.48	5.3	.43			1000	5 1/4	2 1/8	1/2	7	4000	.48	5.3	.43		
120	120	3/8	3/8	10 1/2	212	.24	2.6	.22			100	4 5/16	1 5/8	1/2	7 1/2	590	.35	3.8	.32			120	5 1/2	2 1/8	1/2	7	1154	.48	5.3	.43			1200	5 1/4	2 1/8	1/2	7	4500	.48	5.3	.43		
140	140	3/8	3/8	9 1/2	247	.24	2.6	.22			120	4 5/16	1 5/8	1/2	7 1/2	688	.35	3.8	.32			140	5 1/2	2 1/8	1/2	7	1347	.48	5.3	.43			1400	5 1/4	2 1/8	1/2	7	5000	.48	5.3	.43		
160	160	3/8	3/8	10 1/2	283	.24	2.6	.22			140	4 5/16	2 1/4	1/2	6 3/4	786	.35	3.8	.32			160	5 1/2	2 1/8	1/2	7	1540	.48	5.3	.43			1600	5 1/4	2 1/8	1/2	7	5500	.48	5.3	.43		
180	180	3/8	3/8	9 1/2	318	.24	2.6	.22			160	4 5/16	2 1/4	1/2	6 3/4	885	.35	3.8	.32			180	5 1/2	2 1/8	1/2	7	1730	.48	5.3	.43			1800	5 1/4	2 1/8	1/2	7	6000	.48	5.3	.43		
200	200	3/8	3/8	10 1/2	353	.24	2.6	.22			180	4 5/16	2 1/4	1/2	6 3/4	982	.35	3.8	.32			200	5 1/2	2 1/8	1/2	7	1924	.48	5.3	.43			2000	5 1/4	2 1/8	1/2	7	6500	.48	5.3	.43		
220	220	3/8	3/8	9 1/2	388	.24	2.6	.22			200	4 5/16	2 1/4	1/2	6 3/4	1080	.35	3.8	.32			220	5 1/2	2 1/8	1/2	7	2120	.48	5.3	.43			2200	5 1/4	2 1/8	1/2	7	7000	.48	5.3	.43		
240	240	3/8	3/8	10 1/2	424	.24	2.6	.22			220	4 5/16	2 1/4	1/2	6 3/4	1180	.35	3.8	.32			240	5 1/2	2 1/8	1/2	7	2310	.48	5.3	.43			2400	5 1/4	2 1/8	1/2	7	7500	.48	5.3	.43		
260	260	3/8	3/8	9 1/2	459	.24	2.6	.22			240	4 5/16	2 1/4	1/2	6 3/4	1280	.35	3.8	.32			260	5 1/2	2 1/8	1/2	7	2500	.48	5.3	.43			2600	5 1/4	2 1/8	1/2	7	8000	.48	5.3	.43		
280	280	3/8	3/8	10 1/2	494	.24	2.6	.22			260	4 5/16	2 1/4	1/2	6 3/4	1380	.35	3.8	.32			280	5 1/2	2 1/8	1/2	7	2686	.48	5.3	.43			2800	5 1/4	2 1/8	1/2	7	8500	.48	5.3	.43		
300	300	3/8	3/8	9 1/2	529	.24	2.6	.22			280	4 5/16	2 1/4	1/2	6 3/4	1480	.35	3.8	.32			300	5 1/2	2 1/8	1/2	7	2886	.48	5.3	.43			3000	5 1/4	2 1/8	1/2	7	9000	.48	5.3	.43		
320	320	3/8	3/8	10 1/2	564	.24	2.6	.22			300	4 5/16	2 1/4	1/2	6 3/4	1580	.35	3.8	.32			320	5 1/2	2 1/8	1/2	7	3080	.48	5.3	.43			3200	5 1/4	2 1/8	1/2	7	9500	.48	5.3	.43		
340	340	3/8	3/8	9 1/2	599	.24	2.6	.22			320	4 5/16	2 1/4	1/2	6 3/4	1680	.35	3.8	.32			340	5 1/2	2 1/8	1/2	7	3280	.48	5.3	.43			3400	5 1/4	2 1/8	1/2	7	10000	.48	5.3	.43		
360	360	3/8	3/8	10 1/2	634	.24	2.6	.22			340	4 5/16	2 1/4	1/2	6 3/4	1780	.35	3.8	.32			360	5 1/2	2 1/8	1/2	7	3480	.48	5.3	.43			3600	5 1/4	2 1/8	1/2	7	10500	.48	5.3	.43		

1. SEE SPEC. FOR NO. 10 - INSIDE DIA. 5.3-5.4
 2. ADDED POINT LOAD
 3. MINIMUM DEFLECTION PER SPRING IS 1/2" TOL. ± 1/8"
 4. DEFLECTION AT LOAD (MAX)(MIN)
 5. DEFLECTION RATE
 6. MIN. RESERVE DEFLECTION
 7. MIN. TOTAL DEFLECTION
 8. SPRING NUMBER
 9. FREE LENGTH
 10. INSIDE DIAMETER
 11. SIZE STEEL
 12. COILS
 13. LOAD
 14. LOAD DEFLECTION
 15. DEFLECTION RATE
 16. DEFLECTION AT LOAD (MAX)(MIN)
 17. MIN. RESERVE DEFLECTION
 18. MIN. TOTAL DEFLECTION

FINISH - SANDBLAST
 BONDERSIZE SPRAY BLACK
 S. & W. NO. 10, AND SEND TO STOCK.

SPRING CHART FOR FORM R LOCOMOTIVE SAFETY VALVES

FREE LENGTH LIMITS AT END OF SPRING
 FOR I.D. NOT OVER 1" - TOL. ± 1/32"
 FOR I.D. NOT OVER 2" - TOL. ± 1/16"
 FOR I.D. NOT OVER 4" - TOL. ± 1/8"
 FOR I.D. NOT OVER 8" - TOL. ± 1/4"
 FOR I.D. NOT OVER 12" - TOL. ± 3/8"
 FOR I.D. NOT OVER 18" - TOL. ± 1/2"
 FOR I.D. NOT OVER 24" - TOL. ± 5/8"
 FOR I.D. NOT OVER 30" - TOL. ± 3/4"
 FOR I.D. NOT OVER 36" - TOL. ± 7/8"
 FOR I.D. NOT OVER 42" - TOL. ± 1"
 FOR I.D. NOT OVER 48" - TOL. ± 1 1/8"
 FOR I.D. NOT OVER 54" - TOL. ± 1 1/4"
 FOR I.D. NOT OVER 60" - TOL. ± 1 1/2"
 FOR I.D. NOT OVER 66" - TOL. ± 1 3/4"
 FOR I.D. NOT OVER 72" - TOL. ± 1 7/8"
 FOR I.D. NOT OVER 78" - TOL. ± 2"
 FOR I.D. NOT OVER 84" - TOL. ± 2 1/8"
 FOR I.D. NOT OVER 90" - TOL. ± 2 1/4"
 FOR I.D. NOT OVER 96" - TOL. ± 2 1/2"
 FOR I.D. NOT OVER 102" - TOL. ± 2 3/4"
 FOR I.D. NOT OVER 108" - TOL. ± 2 7/8"
 FOR I.D. NOT OVER 114" - TOL. ± 3"
 FOR I.D. NOT OVER 120" - TOL. ± 3 1/8"
 FOR I.D. NOT OVER 126" - TOL. ± 3 1/4"
 FOR I.D. NOT OVER 132" - TOL. ± 3 1/2"
 FOR I.D. NOT OVER 138" - TOL. ± 3 3/4"
 FOR I.D. NOT OVER 144" - TOL. ± 3 7/8"
 FOR I.D. NOT OVER 150" - TOL. ± 4"
 FOR I.D. NOT OVER 156" - TOL. ± 4 1/8"
 FOR I.D. NOT OVER 162" - TOL. ± 4 1/4"
 FOR I.D. NOT OVER 168" - TOL. ± 4 1/2"
 FOR I.D. NOT OVER 174" - TOL. ± 4 3/4"
 FOR I.D. NOT OVER 180" - TOL. ± 4 7/8"
 FOR I.D. NOT OVER 186" - TOL. ± 5"
 FOR I.D. NOT OVER 192" - TOL. ± 5 1/8"
 FOR I.D. NOT OVER 198" - TOL. ± 5 1/4"
 FOR I.D. NOT OVER 204" - TOL. ± 5 1/2"
 FOR I.D. NOT OVER 210" - TOL. ± 5 3/4"
 FOR I.D. NOT OVER 216" - TOL. ± 5 7/8"
 FOR I.D. NOT OVER 222" - TOL. ± 6"
 FOR I.D. NOT OVER 228" - TOL. ± 6 1/8"
 FOR I.D. NOT OVER 234" - TOL. ± 6 1/4"
 FOR I.D. NOT OVER 240" - TOL. ± 6 1/2"
 FOR I.D. NOT OVER 246" - TOL. ± 6 3/4"
 FOR I.D. NOT OVER 252" - TOL. ± 6 7/8"
 FOR I.D. NOT OVER 258" - TOL. ± 7"
 FOR I.D. NOT OVER 264" - TOL. ± 7 1/8"
 FOR I.D. NOT OVER 270" - TOL. ± 7 1/4"
 FOR I.D. NOT OVER 276" - TOL. ± 7 1/2"
 FOR I.D. NOT OVER 282" - TOL. ± 7 3/4"
 FOR I.D. NOT OVER 288" - TOL. ± 7 7/8"
 FOR I.D. NOT OVER 294" - TOL. ± 8"
 FOR I.D. NOT OVER 300" - TOL. ± 8 1/8"
 FOR I.D. NOT OVER 306" - TOL. ± 8 1/4"
 FOR I.D. NOT OVER 312" - TOL. ± 8 1/2"
 FOR I.D. NOT OVER 318" - TOL. ± 8 3/4"
 FOR I.D. NOT OVER 324" - TOL. ± 8 7/8"
 FOR I.D. NOT OVER 330" - TOL. ± 9"
 FOR I.D. NOT OVER 336" - TOL. ± 9 1/8"
 FOR I.D. NOT OVER 342" - TOL. ± 9 1/4"
 FOR I.D. NOT OVER 348" - TOL. ± 9 1/2"
 FOR I.D. NOT OVER 354" - TOL. ± 9 3/4"
 FOR I.D. NOT OVER 360" - TOL. ± 9 7/8"
 FOR I.D. NOT OVER 366" - TOL. ± 10"
 FOR I.D. NOT OVER 372" - TOL. ± 10 1/8"
 FOR I.D. NOT OVER 378" - TOL. ± 10 1/4"
 FOR I.D. NOT OVER 384" - TOL. ± 10 1/2"
 FOR I.D. NOT OVER 390" - TOL. ± 10 3/4"
 FOR I.D. NOT OVER 396" - TOL. ± 10 7/8"
 FOR I.D. NOT OVER 402" - TOL. ± 11"
 FOR I.D. NOT OVER 408" - TOL. ± 11 1/8"
 FOR I.D. NOT OVER 414" - TOL. ± 11 1/4"
 FOR I.D. NOT OVER 420" - TOL. ± 11 1/2"
 FOR I.D. NOT OVER 426" - TOL. ± 11 3/4"
 FOR I.D. NOT OVER 432" - TOL. ± 11 7/8"
 FOR I.D. NOT OVER 438" - TOL. ± 12"
 FOR I.D. NOT OVER 444" - TOL. ± 12 1/8"
 FOR I.D. NOT OVER 450" - TOL. ± 12 1/4"
 FOR I.D. NOT OVER 456" - TOL. ± 12 1/2"
 FOR I.D. NOT OVER 462" - TOL. ± 12 3/4"
 FOR I.D. NOT OVER 468" - TOL. ± 12 7/8"
 FOR I.D. NOT OVER 474" - TOL. ± 13"
 FOR I.D. NOT OVER 480" - TOL. ± 13 1/8"
 FOR I.D. NOT OVER 486" - TOL. ± 13 1/4"
 FOR I.D. NOT OVER 492" - TOL. ± 13 1/2"
 FOR I.D. NOT OVER 498" - TOL. ± 13 3/4"
 FOR I.D. NOT OVER 504" - TOL. ± 13 7/8"
 FOR I.D. NOT OVER 510" - TOL. ± 14"
 FOR I.D. NOT OVER 516" - TOL. ± 14 1/8"
 FOR I.D. NOT OVER 522" - TOL. ± 14 1/4"
 FOR I.D. NOT OVER 528" - TOL. ± 14 1/2"
 FOR I.D. NOT OVER 534" - TOL. ± 14 3/4"
 FOR I.D. NOT OVER 540" - TOL. ± 14 7/8"
 FOR I.D. NOT OVER 546" - TOL. ± 15"
 FOR I.D. NOT OVER 552" - TOL. ± 15 1/8"
 FOR I.D. NOT OVER 558" - TOL. ± 15 1/4"
 FOR I.D. NOT OVER 564" - TOL. ± 15 1/2"
 FOR I.D. NOT OVER 570" - TOL. ± 15 3/4"
 FOR I.D. NOT OVER 576" - TOL. ± 15 7/8"
 FOR I.D. NOT OVER 582" - TOL. ± 16"
 FOR I.D. NOT OVER 588" - TOL. ± 16 1/8"
 FOR I.D. NOT OVER 594" - TOL. ± 16 1/4"
 FOR I.D. NOT OVER

1/2

2

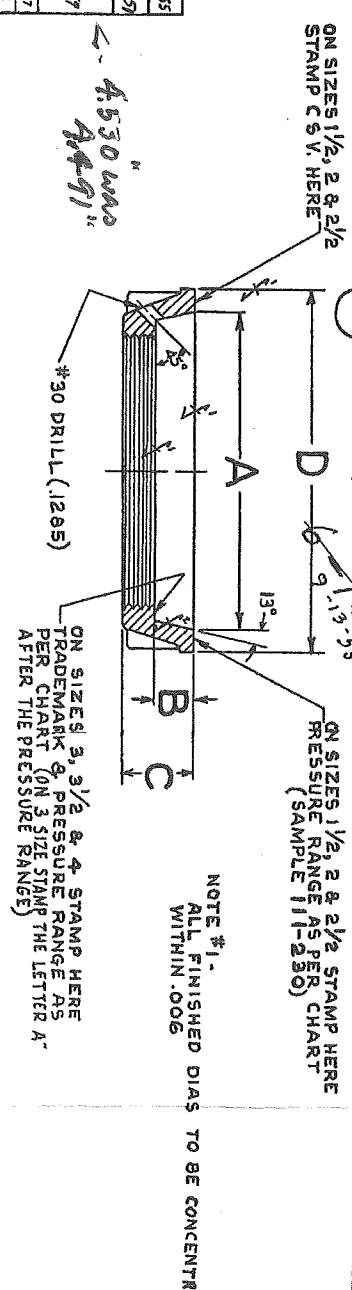
2 1/2

3

3 1/2

4

PATTERN NO.	DWG. NO.	SEMI FINISHED PART NOS.	MATERIAL	FINISHED PART NOS.	PRESSURE RANGE	SEMI FINISHED PART NOS.	MATERIAL	FINISHED PART NOS.	PRESSURE RANGE	SEMI FINISHED PART NOS.	MATERIAL	FINISHED PART NOS.	PRESSURE RANGE	SEMI FINISHED PART NOS.	MATERIAL	FINISHED PART NOS.	PRESSURE RANGE	SEMI FINISHED PART NOS.	MATERIAL	FINISHED PART NOS.	PRESSURE RANGE	SEMI FINISHED PART NOS.	MATERIAL	FINISHED PART NOS.	
ABC	DEF	GH	IJK	LMN	OPQ	RST	UVW	XYZ	ABC	DEF	GH	IJK	LMN	OPQ	RST	UVW	XYZ	ABC	DEF	GH	IJK	LMN	OPQ	RST	UVW
PATTERN NO. 6292	U-5260-J	71745 78111	ASTM B62 M.M.#30	U-5261-B 81109	74# TO 110# 260 MAX 250 MIN	71746 81110 81109	ASTM B62 M.M.#30	U-5251-L 81107	74# TO 110# 462 MAX 452 MIN	71747 81108 81105	ASTM B62 M.M.#30	U-5249-2 81105	74# TO 140# 448 MAX 438 MIN	71748 81105	ASTM B62 M.M.#30	U-5244-N 81103	74# TO 140# 541 MAX 531 MIN	71749 81680 81103	ASTM B62 M.M.#30	U-5258-H 81101	74# TO 140# 541 MAX 531 MIN	71750 81102 81101	ASTM B62 M.M.#30		
PATTERN NO. 6158																									
PATTERN NO. 7810																									
PATTERN NO. 7809																									
PATTERN NO. 7805																									
PATTERN NO. 7798																									



CHART

OF ADJUSTING RING DIAS. FOR 1/2 TO 4 TYPES 1560 & 1561 LOCOMOTIVE SAFETY VALVES

MANNING, MAXWELL & MOORE, INC.
AMERICAN INDUSTRIAL INSURANCE CONSOLIDATED SAFETY VALVES
ASHCROFT GAUGES

TOLERANCE ± .007 ON DECIMAL, DIMENSIONS UNLESS OTHERWISE SPECIFIED.
TOLERANCE ± 1/64 ON FRACTIONAL, DIMENSIONS UNLESS OTHERWISE SPECIFIED.
CODE OF FINISH MARKS

11 3000 TOOL FINISH
12 FINE TOOL FINISH

Part 1
Part 2
R.F.P. 10-25-47
10-27-47

T-5260-D

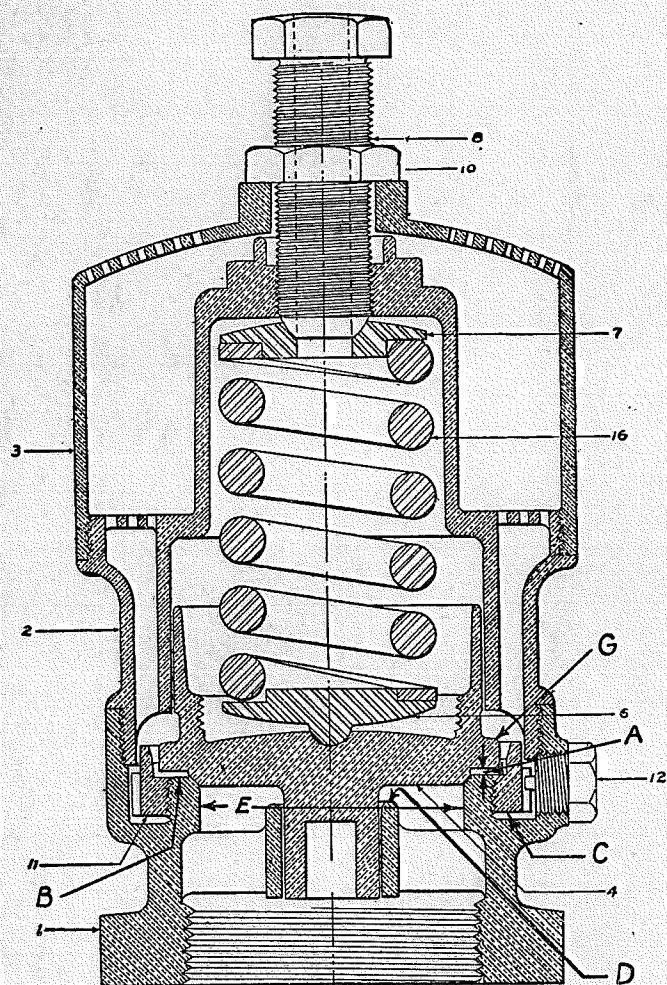
COALE MUFFLER & SAFETY VALVE CO., BALTIMORE, MD.

REVISED

Field Information on Service Troubles "COALE" Safety Valves

DRAWING No. 513-B

FIRST MADE 5-10-27



Names of Parts

- | | |
|-----------------------------------|--------------------|
| 1 Base. | 8 Spring Bolt. |
| 2 Spring Case. | 10 Lock Nut. |
| 3 Dome (For Muffled Valves Only). | 11 Adjusting Ring. |
| 4 Feather Valve. | 12 Keeper Bolt. |
| 6 Lower Spring Button. | 16 Valve Spring. |
| 7 Upper Spring Button. | |

BEFORE installing Safety Valves on new locomotives, or ones that have undergone heavy repairs to boilers, particularly where stay bolts have been replaced, great care should be exercised in removing all metal chips from boiler, especially the thread-like chips that shear off inside the stay bolt holes when driving stay bolts, and also the mill scales that are loosened in the fabrication along with the egg-shell-like scales that are set free by expansion and contraction of a boiler that has been in service.

All such particles, while having a greater specific gravity than water, should settle, but nevertheless they will be carried to the surface by the circulation there in combination with other impurities which form a scum on the water that supports them, and are carried by the steam to the first orifice through which steam is liberated in large volume at high velocity, namely the Safety Valves.

This foreign matter frequently adheres to the Seats after the first few discharges, and if not thoroughly removed, will cause simmering and change of blow-back moment.

Chips under the Seat of the Valve will cause serious leaks, and if the Adjusting Ring is carried up high in an effort to stop the leak, it will cock the Feather Valve, and pop prematurely, causing increase in the blow-back.

When setting Valve on new boiler, or on one after repairs to boiler have been made, if the Valve holds tight up to the popping pressure at the first popping, and shows a leak or simmer immediately after, or before the second popping, it clearly indicates there is something under the Seat.

If this occurs, do not attempt to correct the leak by screwing down the Spring Bolt, or changing the Adjusting Ring, as such procedure will cause serious damage to Seat. In such case unscrew Spring Bolt, allowing a good, heavy and free blowing to dislodge any impediment on the Seat.

It is good practice when installing Valves on a new boiler, or a boiler that has undergone heavy repairs, to run the Adjusting Ring to its highest point, which will give the maximum blow-down on the first popping. This will clear out all of the scale or chips that are usually carried over by steam into the Valve after the new boiler is first fired up.

If after closing, the Valve shows a heavy simmer or leak, permit it to pop several times without changing the Spring Bolt or Ring, after which if Valve shows tight, lower the Adjusting Ring, then screw down on Spring Bolt until proper pressure has been reached. If this does not correct the trouble, the Valve must be removed, cleaned out and reground before replacing on the boiler.

Chips under the Seat will cause indentations that may be very slight, but sufficient to cause small leak, and should be thoroughly ground out. Do not ever assume that they will not cause trouble.

Another cause of Safety Valve failure is the screwing of the Valve down hard on a Spud that may be out of round, distorting the Seats; also in shopping Valve for repairs, pinching the hex on Base too tight in vise when disassembling the Valve. A pipe plug should be screwed into Base before catching in vise, and retained there while grinding and reassembling.

Safety Valves should be installed as close to boiler shell as possible. Nipples should not be longer than two diameters of the pipe size of Valve. Long Nipples and Elbows frequently cause hammering and breaking of Valve Parts.

Where it appears necessary to use long Nipples, or Elbows, sketch of proposed layout should be sent to this office for review before Valves are installed.

If the Safety Valves are properly set in shop or roundhouse to pop at required pressure, and adjusted to the proper blow-down, with Lock Nut on Spring Bolt set firmly, and Keeper Bolt in Adjusting Ring tight, in proper place, there can be no change in popping pressure or blow-back while in service unless for one or more of the causes above stated.

All Safety Valves before leaving our Shop are thoroughly tested by steam, and adjusted to the required pressure and blow-back, and are guaranteed to function properly at pressure set as long as the Valves are maintained in good condition.

Our Engineers are ready at all times to render any assistance to customers on all matters pertaining to products of the Coale Muffler and Safety Valve Company.

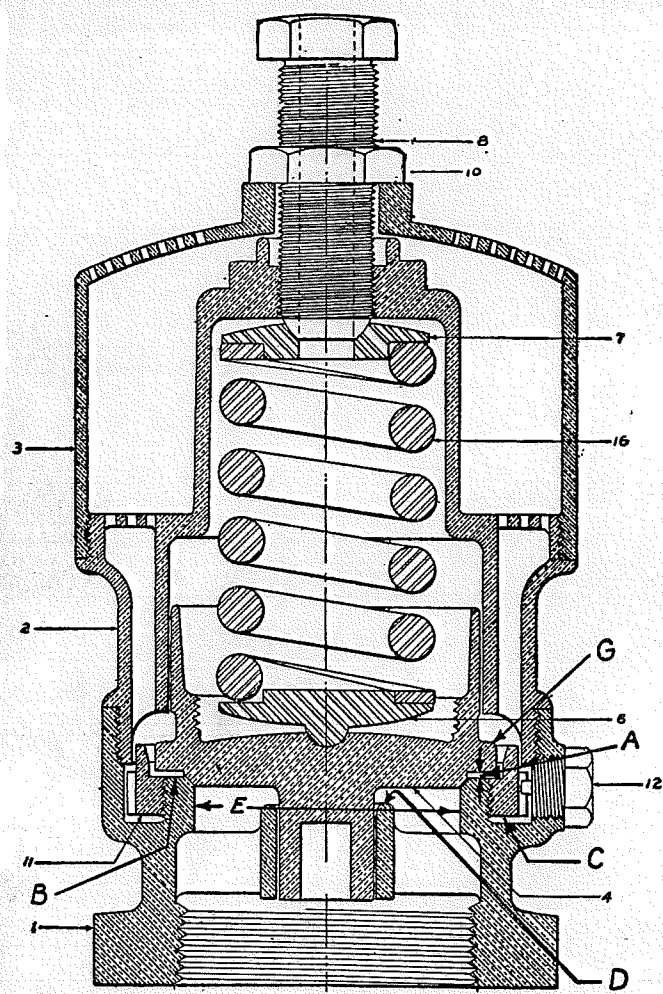
COALE MUFFLER & SAFETY VALVE CO., BALTIMORE, MD.

REVISED

Instructions for Repairing and Setting "COALE" Safety Valves

DRAWING No. 348-B

FIRST MADE 11-2-25



Names of Parts

- | | |
|-----------------------------------|--------------------|
| 1 Base. | 8 Spring Bolt. |
| 2 Spring Case. | 10 Lock Nut. |
| 3 Dome (For Muffled Valves Only). | 11 Adjusting Ring. |
| 4 Feather Valve. | 12 Keeper Bolt. |
| 6 Lower Spring Button. | 16 Valve Spring. |
| 7 Upper Spring Button. | |

PROCEDURE

TO disassemble Valve, loosen Lock Nut (10), slack off Spring Bolt (8) to relieve tension on Spring (16), unscrew Dome (3), then Spring Case (2) from Base (1), remove Keeper Bolt (12), releasing Adjusting Ring (11), after which Valve is ready for inspection or repair.

When re-seating Valve, the contours must be accurately maintained, and Seat on Valve and Base at **B** must be exactly 45°, same as on new valves.

When facing Seat of Feather Valve it must be chucked with the thread on the inside. Diameter of Lifting Lip **G** should not be changed, as it will seriously affect the action of Valve. When facing Seat on Base, the Base must be chucked with the thread in the bottom of Base to maintain original centers. If seat in Base runs out after chucking, center it up with the vertical wall at **E**, which should run true with guide **D**. In no case should diameter **E** be changed. (This diameter is the size of Valve).

The Guide at **D** should be faced off the same amount as the Adjusting Ring Hub and Seat in Base to maintain proper clearance for bottom of Valve.

The Adjusting Ring at **C** must also be faced off to maintain proper clearance for Valve, otherwise Ring cannot be run down sufficiently for proper adjustment.

Examine Keeper Bolt (12) carefully, and see that point is long enough to enter notch in Ring (11) at least one-half the depth of notch, but not long enough to jam on body of Ring.

Springs must be carefully checked, and when found to have taken a permanent set of $\frac{1}{4}$ " under listed dimensions, they must be discarded and new Springs used. Shimming or over-setting the Spring Bolt will cause hammering of Seats, and failure to relieve properly.

When using Gages for repairs on Feather Valves, care must be exercised to have Gage fit on Lifting Lip **A**, and Seat **B**, accurately.

Contour below Seat and top of Pilot may be rough turned to a point where Gage will clear.

Care must be taken in setting Valves to see that the Adjusting Ring is properly located, and under no condition must the top edge of Ring come below the lower edge of Lifting Lip of Feather Valve. If Ring must be run down to this point to obtain proper blow-down, it indicates that the top of Ring has eroded, and must be replaced by a new Ring. An improperly fitted Ring causes simmering and chattering, preventing Valve lifting properly, and seriously reducing discharge capacity of Valve.

Change of Pressure:—Loosen Lock Nut (10), to increase, screw down Spring Bolt (8); to decrease, unscrew Spring Bolt (8), and after desired pressure has been obtained, tighten Lock Nut (10) firmly.

To regulate closing action of the Valve, remove the Bolt (12), and by means of any pointed instrument the Adjusting Ring (11) may easily be moved either up or down. If the Valve closes with too much blow-down, move the Adjusting Ring (11) down, a notch or two at a time. To increase the blow-down, move the Ring (11) up. After the Valve is adjusted as desired, replace the Bolt (12). It must enter a notch in Adjusting Ring, and then be firmly screwed into place.

Note:—Chattering and humming of Valves are due to loose Parts, or Spring Set, and not to the construction of the Valve.

New unit Gages will be furnished to users of "Coale" Valves at reasonable prices according to size, and complete set of instructions covering the repair of "Coale" Valves, with detailed drawings of Feather Valve and Base will be furnished on request.

Gages should be returned annually to manufacturer for rechecking—which will be done without charge to users of "Coale" Valves.

COALE MUFFLER & SAFETY VALVE CO., BALTIMORE, MD.

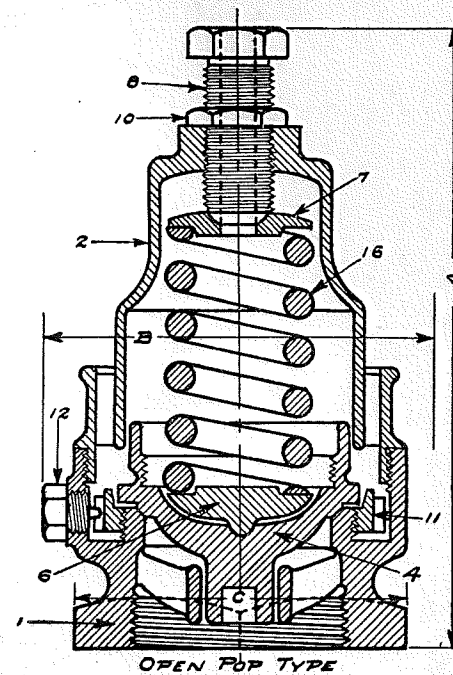
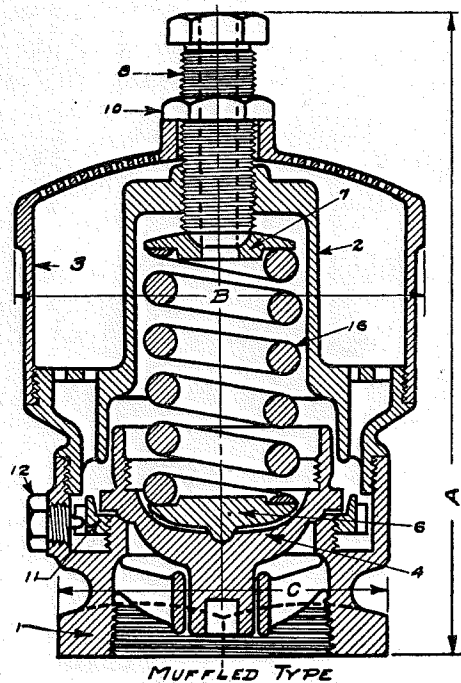
"COALE" SAFETY VALVES

Locomotive Type

DRAWING No. 539-B

FIRST MADE 8-10-36

REVISED



LIST OF PARTS

No.	Parts	No.	Parts
1	Base	8	Muffler Spring Bolt
2	Muffler Spring Case	10	Lock Nut
3	Dome	11	Adjusting Ring
4	Feather Valve	12	Keeper Bolt
6	Lower Spring Button	16	Valve Spring (Specify Pressure)
7	Upper Spring Button		

LIST OF PARTS

No.	Parts	No.	Parts
1	Base	8	Open Pop Spring Bolt
2	Open Pop Spring Case	10	Lock Nut
4	Feather Valve	11	Adjusting Ring
6	Lower Spring Button	12	Keeper Bolt
7	Upper Spring Button	16	Valve Spring (Specify Pressure)

DIMENSIONS OF STANDARD VALVES

Size	Type	A	B	C	These Sizes TYPE "F"	
1½"	Muffled	8½"	4"	2⅝"		<p>(Have flat type: feather valve)</p>
	Open Pop	7¾"	4"	2⅝"		
2"	Muffled	8½"	4¾"	3"		
	Open Pop	8¼"	4¾"	3"		
2½"	Muffled	11"	5⅝"	3⅝"	<p>(Have dished type feather valve)</p>	
	Open Pop	10¼"	5⅝"	3⅝"		
3"	Muffled	10⅝"	6¼"	4½"		
	Open Pop	10"	6"	4½"		
3½"	Muffled	12⅞"	6½"	5"		
	Open Pop	11"	6⅞"	5"		
4"	Muffled	13¼"	7½"	5⅝"		
	Open Pop	12¼"	7⅞"	5⅝"		
4½"	Muffled	13⅞"	9"	6⅝"		
	Open Pop	13⅝"	9"	6⅝"		
5"	Muffled	13"	9¾"	6⅝"		
	Open Pop	13"	9¾"	6⅝"		

Dimension "A" can be furnished about 1" less, if desired

— NOTES —

Standard Valves have Female Base Threads, Iron Pipe size, but can be furnished with Male Base, Special Threads or Flanged Base. State working steam pressure.

The 3", 3½" and 4" sizes are also made in type "F", and are approximately 1" higher than dimension "A" given in table for type "D" Valves. Type "F" will not be furnished unless so specified. Drawing will be sent upon request.

When ordering Repair Parts, give size, type, number and name of Part required, also whether for Muffled or Open Pop Valve.

LOAD DEFLECTION	DEFLECTION RATE	DEFLECTION AT LOAD (MAX)(MIN.)	MIN. RESERVE DEFLECTION	MIN. TOTAL DEFLECTION	SPRING NUMBER	FREE LENGTH	INSIDE DIAMETER	SIZE STEEL	COILS	LOAD	LOAD DEFLECTION	DEFLECTION RATE	DEFLECTION AT LOAD (MAX)(MIN.)	MIN. RESERVE DEFLECTION	MIN. TOTAL DEFLECTION	
SQUARE STEEL SPRING)					3 1/2 R.					(SQUARE STEEL SPRING)						
3 .35		.38 .32			5											
3 .35		.38 .32			10											
4 .35		.38 .32			15											
3 .35		.38 .32			20	5 1/4	2	3/8	8 3/4	192	.48		.53	.43		
3 .35		.38 .32			25											
1 .35		.38 .32			30											
5 .35		.38 .32			40	5 1/4	1 7/8	7/16	9	385	.48		.53	.43		
					50											
5 .35		.38 .32			60	5 1/4	2 1/8	1/2	7	577	.48		.53	.43		
3 .35		.38 .32			80	5 1/4	1 3/4	1/2	8 3/8	770	.48		.53	.43		
1 .35		.38 .32			100	5 1/4	2 1/16	9/16	7 1/2	962	.48		.53	.43		
3 .35		.38 .32			120	5 1/4	1 7/8	9/16	7 1/2	1154	.48		.53	.43		
3 .35		.38 .32			140	5 1/4	1 25/32	9/16	7 3/4	1347	.48		.53	.43		
3 .35		.38 .32			160	5 1/4	2 1/16	5/8	7	1540	.48		.53	.43		
5 .35		.38 .32			180	5 1/4	1 15/16	5/8	7	1730	.48		.53	.43		
2 .35		.38 .32			200	5 1/4	1 7/8	5/8	7	1924	.48		.53	.43		
3 .35		.38 .32			220	5 1/4	2	1/16	6 1/2	2120	.48		.53	.43		
3 .35		.38 .32			240	5 1/4	1 5/32	1/16	6 1/2	2310	.48		.53	.43		
1 .35		.38 .32			260	5 1/4	2	1/16	6 1/2	2500	.48		.53	.43		
3 .35		.38 .32			280	5 1/4	1 7/8	1/16	6 1/2	2690	.48		.53	.43		
3 .35		.38 .32			300	5 1/4	1 7/8	1/16	6 1/2	2886	.48		.53	.43		
					320	5 1/4	1 3/4	1/16	6 1/2	3080	.48		.53	.43		
					340											
					360	5 1/4	2	3/4	6 3/4	3460	.48		.53	.43		
SQUARE STEEL SPRING)					4 R.					(SQUARE STEEL SPRING)						
1 .42		.46 .38			100	5 1/16	2 3/8	5/8	7	1257	.55		.60	.50		
1 .42		.46 .38			120	5 1/16	2 1/8	3/8	7 3/8	1510	.55		.60	.50		
1 .42		.46 .38			140	5 1/16	2 5/8	2 1/32	7	1760	.55		.60	.50		
1 .42		.46 .38			160	5 1/16	2 1/4	1/16	6 5/8	2010	.55		.60	.50		
1 .42		.46 .38			180	5 1/16	2 3/32	1/16	6 7/8	2260	.55		.60	.50		
1 .42		.46 .38			200	5 1/16	2 3/8	3/4	6 1/2	2514	.55		.60	.50		
1 .42		.46 .38			240	5 1/16	2 1/8	3/4	6 1/2	3020	.55		.60	.50		
					260	5 1/2	2 3/16	2 7/32	5 3/4	3270	.55					
- ROUND WIRE - REDUCED HEIGHT																
INSIDE DIAMETER LIMITS AT END OF SPRING																
FOR I.D. NOT OVER 1" - TOL. + 1/32 - 0 - FOR I.D. NOT OVER 4" - TOL. + 3/32 - 0																
FOR I.D. NOT OVER 2" - TOL. + 1/16 - 0 - FOR I.D. OVER 4" - TOL. + 1/8 - 0																
FREE LENGTH LIMITS																
FOR FREE LGTH. ON SIZE 1 1/2" - TOL. ± 1/32 - FOR FREE LGTHS. ON SIZES OVER 1 1/2" - TOL. ± 1/16																
FINISH: - SANDBLAST, SPRING CHART																
BONDERIZE, SPRAY BLACK FOR FORM "R"																
S. & W. No. 70, AND SEND TO STOCK. LOCOMOTIVE SAFETY VALVES																

M. P. 3-15-34
M. P.
T-5136-D

CONSOLIDATED SAFETY VALVES
Repair Procedures

Base

1. In remachining the base seat it is imperative that the base itself runs true with the finished surface of the bore. Dial in the base on the lathe making sure that the bore is running true over its entire length. Check the seating surfaces that they are running perpendicular to the bore. Use a round pointed tool to machine the seat to a 45-degree angle. Face off the top surface of the base until the proper seat length is obtained. Seat length should be the same as the feather seat length.

BASE SEAT LENGTH

Valve Size.....	1.5"	2"	2.5"	3"	3.5"	4"
Seat Length	1/8"	5/32"	3/16"	7/32"	1/4"	

The limit amount that may be machined from the top of the base is given (in some cases) on the gauge. Otherwise the blowdown ring should be able to be screwed down two full turns below the top of the base and should have good thread engagement. DO NOT REMOVE any material from top of the bonnet or case threads in order to screw the blowdown ring further down.

COALE MUFFLER & SAFETY VALVE CO., BALTIMORE, MD.

VALVE SPRINGS

GENERAL SPECIFICATIONS

DRAWING No. 349-B

FIRST MADE 2-25-36

REVISED

Valve Size	Letter	Gage Press. Per Sq. In.	Average O. D.	Average I. D.	Compression	Free Height
1½"	A	30 to 60 lbs.	1½"	7"	5/8"	2¼"
	B	60 " 120 "				
	C	120 " 175 "				
	D	175 " 210 "				
1½"	A	30 to 60 lbs.	1¾"	1 1/16"	5/8"	3¼"
	B	60 " 120 "				
	C	120 " 175 "				
	D	175 " 225 "				
	E	225 " 275 "				
	F	275 " 325 "				
2"	A	40 to 75 lbs.	1¾"	1 1/16"	5/8"	3¼"
	B	75 " 125 "				
	C	125 " 175 "				
	D	175 " 225 "				
	E	225 " 275 "				
	F	275 " 325 "				
2½"	A	60 to 110 lbs.	2¼"	1 1/16"	5/8"	4¼"
	B	110 " 160 "				
	C	160 " 200 "				
	D	200 " 240 "				
	E	240 " 275 "				
	F	275 " 310 "				
3"	A	60 to 110 lbs.	2 7/16"	1 3/8"	5/8"	4¼"
	B	110 " 160 "				
	C	160 " 200 "				
	D	200 " 240 "				
	E	240 " 275 "				
	F	275 " 310 "				
3½"	A	60 to 110 lbs.	2¾"	1 1/2"	5/8"	5 1/8"
	B	110 " 160 "				
	C	160 " 200 "				
	D	200 " 240 "				
	E	240 " 275 "				
	F	275 " 310 "				
4"	A	70 to 110 lbs.	3 1/8"	1 5/8"	5/8"	5 1/2"
	B	110 " 160 "				
	C	160 " 200 "				
	D	200 " 240 "				
	E	240 " 275 "				
	F	275 " 310 "				
4½"	B	110 to 160 lbs.	3 1/2"	1 7/8"	5/8"	6 1/8"
	C	160 " 200 "				
	D	200 " 240 "				
	E	240 " 275 "				
5"	C	160 to 200 lbs.	3 5/8"	1 11/16"	3/4"	5 5/8"
	D—E	200 " 250 "				

Free Height Tolerance = $\pm \frac{1}{32}$ ".

Springs with a permanent set of $\frac{1}{8}$ " should be discarded.

All Springs stamped at large end with Size, Letter and H. T.—
This end should be placed UP in Valve.

COALE MUFFLER & SAFETY VALVE CO., BALTIMORE, MD.

REVISED

Relieving Capacities—Coale Safety Valves

Types: D, F, I, Superheated Steam,
and Throttle Line Valves

DRAWING No. 359-C

FIRST MADE 5-10-29

Gage Pressure: Pounds per Square Inch.
Relieving Capacity: Pounds of Steam per Hour.

These tables are from calculations based on average lifts of Coale Valves as follows:

<u>GAGE PRESSURE</u>	<u>LIFT</u>
0lb — 120lb	.11
120lb — 180lb	.15
180lb — 275lb	.17

GAGE PRESSURE	SIZE OF VALVE									
	1¼"	1½"	2"	2½"	3"	3½"	4"	4½"	5"	
100.....	2370	2840	4300	5360	6450	7520	8600	9670		
110.....	2580	3090	4690	5850	7030	8200	9360	10550		
120.....	2890	3350	5050	6300	7570	8830	10010	11360		
130.....	2990	3590	5420	6770	8120	9470	10810	12200		
140.....	3200	3840	5800	7250	8700	10150	11600	13050		
150.....	3410	4090	6180	7720	9260	10810	12360	13910		
160.....	3610	4330	6550	8170	9800	11410	13080	14710		
170.....	3820	4580	6920	8650	10400	12120	13870	14590		
180.....	4020	4820	7300	9110	10960	12780	14600	16410		
190.....		5060	7650	9580	11500	13410	15320	17260	19190	
200.....		5330	8040	10050	12040	14080	16090	18100	20190	
210.....		5560	8440	10510	12610	14720	16820	18910	21020	
220.....		5840	8810	10990	13180	15370	17510	19700	21890	
230.....		6070	9180	11460	13750	16010	18350	20610	22950	
240.....		6320	9550	11920	14330	16650	19100	21480	23880	
250.....		6560	9900	12380	14880	17290	19880	22420	24950	
260.....					15450	17980	20630	23320	25950	
270.....					16020	18570	21380	24220	26850	
280.....					16590	19210	22130	25120	27750	
290.....					17160	19850	22880	26020	28650	
300.....					17730	20500	23630	26920	29550	

Illustration of method of using table to select proper size of Safety Valves.

Discharge (in Pounds of steam per hr.) = Evaporation Factor × Heating Surface.
Evaporation Factor assumed 6.5, to illustrate Example.

Example

Gage Pressure of Boiler = 190lb
Heating Surface = 2910 sq. ft.
∴ Discharge = 2910 × 6.5.
" = 18,900lb Steam per hr.

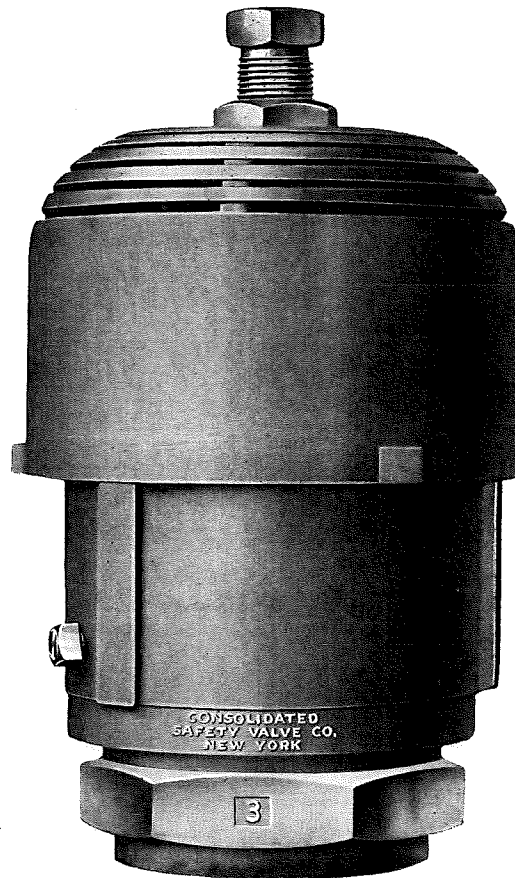
From table, P = 190lb
Can use 2—3" Valves
or 3—2" Valves

Discharge at intermediate pressures can be calculated by interpolation.

2011

Bulletin 205 A

CONSOLIDATED LOCOMOTIVE SAFETY VALVES



LOCOMOTIVE EQUIPMENT DIVISION

Manning, Maxwell & Moore, Inc.

Chrysler Building
NEW YORK

Field Building
CHICAGO

CONSOLIDATED LOCOMOTIVE SAFETY VALVES

IMPORTANT FEATURES: Consolidated Locomotive Safety Valves are reliable, have a large capacity and are economical to maintain.

RELIABILITY: Locomotive Safety Valves which operate more frequently than any other type, should be judged by their ability to unfailingly relieve the boiler under every condition of service. This requires absolute reliability of action as well as sufficient capacity.

MODERN: Consolidated Locomotive Safety Valve designs have been constantly improved to meet the requirements of larger locomotive boilers and higher working steam pressures.

LARGER CAPACITY VALVES ARE MORE ECONOMICAL: In selecting safety valve equipment two choices are open; a large number of low capacity valves or a smaller number of high capacity valves. Proper relief can be obtained with either selection, the difference is purely one of relative efficiency and economy. When using the higher capacity valves there are fewer connections to be kept tight and fewer seats to be ground; then too as the high lifts of larger capacity valves wiredraw the steam less than low lifts, the seats require less repairing. There are, also, less valves to be bought and less repair parts to be carried in stock.

EASILY INSPECTED AND REPAIRED: After fulfilling the exacting operating requirements of Locomotive service the next most important consideration is a form of construction which may be easily inspected and readily repaired. Consolidated Locomotive Safety Valves are easy to inspect and to repair.

SPECIAL CONSTRUCTION FOR LOCOMOTIVE SERVICE: Types 1560 Open and 1561 Muffled valves are specially designed for Locomotive service. The construction is identical and all parts are interchangeable excepting the two muffler shells which are added to the open valve to make the muffled valve. Hence, the same repair parts and the same instructions for their use apply to each valve. A muffled valve can be converted into an open valve by removing the muffler shells. To clean the muffler shells, it is not necessary to remove the valve from the loco-

motive or even to alter its adjustment; merely unscrew the outer muffler and lift off both shells. This removal may be made while the engine is under steam as the valve will work perfectly without the muffler shells.

EASY TO ADJUST: To adjust the valve it is only necessary to loosen the check nut a fraction of a turn. This nut cannot be lost or removed over the top of the large head of the compression screw.

VERTICAL DISCHARGE: The vent holes being in the top of the case, the discharge of steam is directly upward; there is no side blow.

FEW PARTS: There are only eleven parts to the Open Valve and three more to the Muffled.

RICHARDSON ADJUSTING RING USED: George W. Richardson invented the first successful spring-loaded Pop Safety Valve Sept. 25, 1866. The effectiveness of the Richardson adjusting ring which controlled the blow-down of the first safety valve has never been equalled.

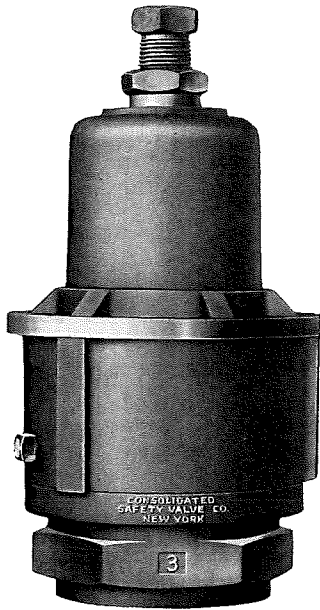
FEATURES OF DESIGN: The main features are the exceptionally large springs and their correspondingly low fibre stresses, the flexible mounting of both ends of the spring with top and bottom washers, each bearing upon a balled joint in the center and the long broadfaced wing guides of the valve feather. The top of the feather is not subjected to any back pressure nor influenced by back pressure when the valve is discharging. The lower end of the spindle is tapered to enable it to be easily withdrawn from the feather when packing of scale or cinders occurs.

POSITIVE ACTION: The action of the valve is clean and positive. The closing takes place from nearly the full lift of the valve; the steam discharge is cut off sharply, thus protecting the seat from the wire-drawing action of a low settling close.

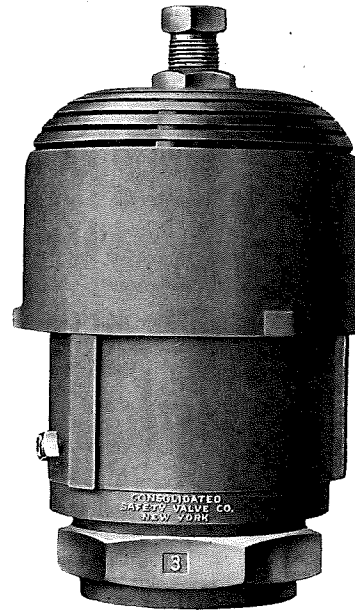
MEET REQUIREMENTS OF I.C.C. and A.S.M.E. Consolidated Locomotive Safety Valves meet the requirements of the Interstate Commerce Commission and also of the A.S.M.E. code when it applies to locomotive service.

CONSOLIDATED LOCOMOTIVE SAFETY VALVES

CONSOLIDATED
LOCOMOTIVE SAFETY VALVES



Type 1560—Open
(formerly Form R)



Type 1561—Muffled
(formerly Form S)

When ordering valves, specify: Size and type number of valve, pressure at which valve is to be set to blow, and threading desired in the base. We recommend and consider standard a straight thread to dimensions shown on page 4. When so specified standard pipe thread or other special threading will be furnished.

Standard practice is to furnish valves without bushings. Bushings are furnished at an extra charge, when so specified. Boiler end of bushing will be furnished blank unless threading details are specified.

Unless order specifies otherwise we will furnish "Standard Height" Valves per dimensions shown on page 5. Where clearances will not permit the use of "Standard Height" valves special "Reduced Height" designs are available in sizes 3", 3½" and 4"; for dimensions see page 5.

Standard valves are suitable for saturated steam pressures to 300 lbs. For saturated steam pressures from 301 lbs. to 350 lbs. certain parts are made of special materials. Special designs available for pressures above 350 lbs.

Guaranteed Relieving Capacities in Pounds of Steam per Hour—Open and Muffled Valves
(For A.S.M.E. requirements use 90% of these figures) Jan. 1, 1942

Gauge Pressure Lbs./Sq. In.	VALVE SIZES—Inches					
	1½	2	2½	3	3½	4
160	3840	5660	8940	11620	14980	18920
170	4000	5900	9275	12130	15600	19700
180	4140	6140	9630	12620	16250	20500
190	4300	6360	9975	13120	16880	21300
200	4450	6600	10320	13620	17500	22100
210	4555	6790	10550	13970	17970	22700
220	4670	6990	10800	14330	18470	23300
230	4780	7180	11050	14690	18970	23900
240	4895	7360	11300	15050	19460	24500
250	5000	7550	11530	15400	19950	25100
260	5175	7800	11925	15950	20650	26000
270	5355	8070	12340	16500	21350	26900
280	5535	8350	12720	17050	22050	27850
290	5715	8610	13110	17590	22740	28850
300	5890	8880	13510	18160	23450	29700

The above capacities are not guaranteed unless the instructions in regard to the use of the proper springs and adjusting rings for various pressures as given on Page 7 are strictly observed and the adjusting ring regulated for a blowdown of 2% for pressures of 200 pounds and lower and 2½% for pressures from 201 to 300 pounds.

Prices On Application

CONSOLIDATED LOCOMOTIVE SAFETY VALVES

VALVE BASES

The standard threading of Consolidated Locomotive Valve Bases is given below. Except in the 1½" valve, the threads are straight (not taper). The valve base seats on a shoulder of the spud bushing and the threading is always female in the valve base.

VALVE SIZE—Inches	1½	2	2½	3	3½	4
Threads per Inch.....	Standard 1½ inch pipe thread	11½	11½	11½	10	10
Outside Diam. of Thread—Inches.....		2½	3⅜	3⅜	3⅞	4½
For Spud Thread Height—Inches.....	⅝	1⅛	1⅛	1⅜	1⅜	⅞

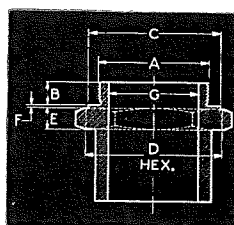
Unless otherwise ordered, the above threading is always furnished.

SPECIFICATIONS

PART	MATERIAL	PART	MATERIAL
Base.....	Bronze	Check Nut.....	Bronze
Case.....	Bronze	Spring.....	Steel
Feather.....	Bronze	Spindle.....	Steel
Adjusting Ring.....	Bronze	Outer Muffler Shell.....	Bronze
Ring Pin.....	Rod Brass	Inner Muffler Shell.....	Bronze
Spring Washers.....	Bronze	Muffler Shell Locking Screw.....	Rod Brass
Compression Screw.....	Bronze		

Dimensions are shown on page 5.

Standard Dimensions for Bushings Types 1560 and 1561



Valve Size Inches	A		B Spud Height	C Diam. Raised Seat	D Hex. Across Flats	E Thick- ness of Hex.	F Height Raised Shoulder	G Diam. Steam Passage	
	Diam.	Pitch						Standard	Minimum Allowable
1½	1½	Pipe Thd	⅝					1½	1¼
2	2½	11½	1⅛	3	3⅜	7/16	1/16	1⅜	1¾
2½	3⅜	11½	1⅛	3¾	4	1/2	1/16	2⅞	2⅞
3	3⅞	11½	1⅜	4½	4¾	9/16	1/16	2½	2½
3½	3⅞	10	1⅜	5⅞	5⅞	5/8	1/16	3	3
4	4½	10	7/8	5⅞	5⅞	11/16	1/16	3⅝	3⅝

THREADING: The tabulation given above shows the general form and important dimensions of the standard bushings. The thread to receive the safety valve should be cut so that the valve will screw down easily to the shoulder, and it is very important that the shoulder be faced square and true with the thread. A raised shoulder, at least equal to the diameter given in the accompanying table, is strongly recommended. With this construction a bruise or bump on the hex will not damage nor upset the squared surface against which the valve base is screwed.

Care should be taken to obtain sufficient opening in the bushing and nothing less than the minimum allowable opening used. When the opening in the bushing is restricted, the valve will chatter.

Particular care should be used in the application of the valve to the locomotive. In all

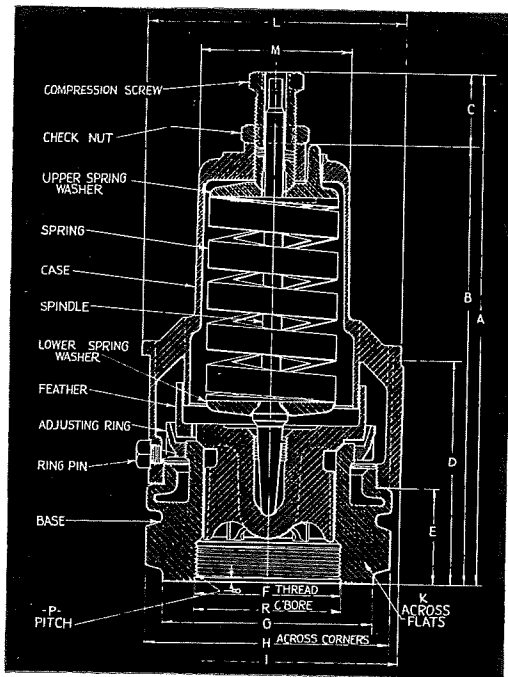
instances the bushing should be carefully threaded to fit the hole in the dome or boiler shell and applied separately from the valve.

TAPER THREAD NOT RECOMMENDED: A good valve may be spoiled by improper application to the boiler. Bushings that are out of shape or badly machined will distort a valve base and cause a leak or simmer. Pipe threads or any other taper threads in the valve bases are not recommended, for the reason that such threads are liable to be inaccurately cut by imperfect dies or otherwise, and the strain in the lower end of the base due to making the connection tight on a taper thread is liable to cause distortion.

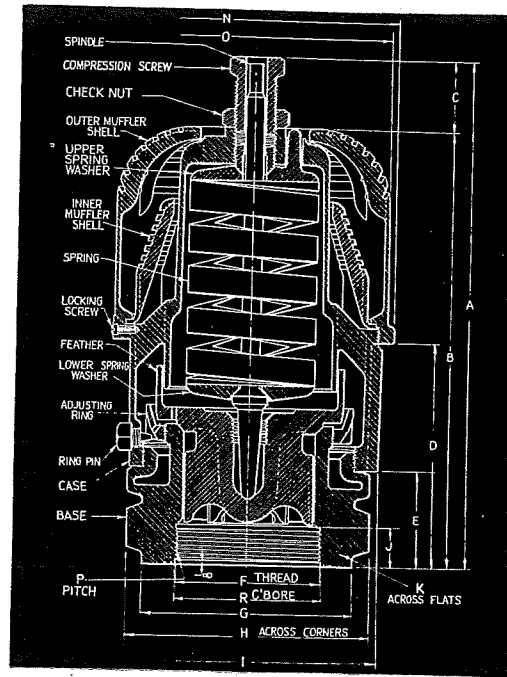
Great force and rough methods are frequently necessary to remove valves which have been screwed down hard on a taper thread and left in place for a considerable time. Many safety valves are seriously damaged in this way.

CONSOLIDATED LOCOMOTIVE SAFETY VALVES

REPAIR PARTS AND DIMENSIONS



Type 1560 Open (Form R)



Type 1561 Muffled (Form S)

In ordering repair parts, state plainly the name of part, size, type number and popping pressure of the valves for which they are required.

In ordering springs, spring washers and adjusting rings, specify valve size and popping pressure; spring washers should be ordered if a new spring replaces one of a different range. (See tables on page 7 for spring and adjusting ring ranges). Parts for Type 1560 are interchangeable with those for Type 1561, also with those for our former types RK and CB designs.

Springs should not be used for pressures beyond the range for which they are designed. This range is stamped on the end coil of each spring. (See Page 7). Repair Manual which will be sent on request, gives instructions on the adjustment and repair of these valves.

Prices on Repair Parts on Application

DIMENSIONS	Type	STANDARD HEIGHT						REDUCED HEIGHT		
		SIZE OF VALVE In Inches						SIZE OF VALVE In Inches		
		1/2	2	2 1/2	3	3 1/2	4	3	3 1/2	4
Extreme Height.....A	1560 and 1561	7 7/16	9 3/16	10 7/8	11 3/8	13 1/8	14 5/16	10 13/16	10 7/8	13 3/16
Bottom of Valve to Top of Case.....B		6 13/32	7 15/16	9	9 11/16	11 5/16	12 3/8	9 7/16	9 17/32	11 13/16
Top of Case to Top of Comp. Screw.....C		1 1/32	1 1/4	1 7/8	1 11/16	1 13/16	1 15/16	1 3/8	1 11/32	1 3/8
Bottom of Valve to Bot. of Case Flg.....D		3 3/16	3 3/4	4 1/4	5 1/16	5 13/16	6 5/8	5 7/8	5 9/32	6 5/8
Bottom of Valve to Bottom of Case.....E		1 9/32	1 7/16	1 3/4	2 1/4	2 1/2	2 13/16	2 1/4	2 3/32	2 13/16
Diameter of Base Thread.....F		*1 1/2	2 1/2	3 3/8	3 3/8	3 7/8	4 1/2	3 3/8	3 7/8	4 1/2
Diameter of Bottom of Base.....G		2 5/16	3	3 3/4	4 1/4	4 3/4	5 7/16	4 1/4	5 1/16	5 7/16
Across Corners of Hex.....H		2 13/16	4 1/16	4 3/4	5 5/8	6 9/16	6 15/16	5 5/8	6 1/16	6 15/16
Diameter at Case Lugs.....J		3 1/2	4 1/2	5 5/16	6 1/8	7	7 13/16	6 1/8	6 7/8	7 1/16
Depth of Threading.....K		5/8	27/32	7/8	1 1/16	1 1/16	1 1/8	1 1/16	1 5/16	1 7/8
Across Flats of Hex Base.....L	2 7/16	3 1/2	4 1/8	4 7/8	5 11/16	6	4 7/8	5 1/16	6	
Diameter of Case Flange.....M	3 11/16	4 11/16	5 7/16	6 1/4	6 7/8	7 3/4	6 1/4	6 15/16	7 3/4	
Diameter of Top of Case.....N	2	2 11/16	3 3/8	3 13/16	4	4 1/2	4 1/32	4 5/8	5 3/16	
Diameter of Muffer Shell Lugs.....O	4 9/16	5 5/8	6 5/16	7	7 11/16	8 1/16	7 1/4	7 15/16	.....
Diameter of Muffer Shell.....O	4 3/16	5 1/4	5 15/16	6 5/8	7 5/16	8 3/8	6 7/8	7 9/16	.....
Pitch of Thread.....F	1560	11 1/2	11 1/2	11 1/2	11 1/2	10	10	11 1/2	10	
Diameter of Recess.....R	1561	.....	2 17/32	3 5/32	3 13/32	3 29/32	4 17/32	3 13/32	3 29/32	4 17/32

* Briggs Pipe Tap.

CONSOLIDATED LOCOMOTIVE SAFETY VALVES

SPRING, SPRING WASHER AND ADJUSTING RING RANGES

SPRINGS: Consolidated locomotive safety valves are designed to use extremely generous springs whereby the working fibre stresses, are so far under the elastic limit of the material used that the springs do not take any permanent set during the life of the valve.

A valve should be adjusted to pop within the range of pressure stamped on the spring. If the range of pressure is exceeded, unsteady and erratic action may be expected. Standard springs are designed for the following pressure ranges:

131	151	171	191	211	231	251	271	291
to	to	to	to	to	to	to	to	to
150	170	190	210	230	250	270	290	310

Each spring before shipment is loaded to correspond with the pressure on it at the popping point and the compression or deflection must come within certain specified limits or it is rejected.

in all cases be turned to fit closely in the spring, otherwise, the springs are liable to be loaded on one side of the center and work badly.

SPRING WASHERS: All springs for the same size valve are of uniform length but the size of the steel and arbor diameters are varied to suit different popping pressures. For this reason spring washers are not interchangeable for various pressures in the same size valves and the shoulders should

ADJUSTING RING: It is also necessary to secure proper valve action and adjustment of blowdown that the correct adjusting ring for the popping pressure be used. The range is stamped on the machined surface on top of the ring. Standard Adjusting Ring ranges are as follows:

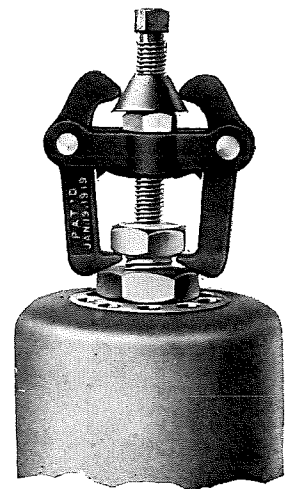
SIZE VALVE	RANGE IN POUNDS PER SQ. INCH
Inches	
1½	36 to 73, 74 to 110, 111 to 140, 141 to 230,
2	..... 74 to 110, 111 to 140, 141 to 230,
2½	..... 74 to 110, 111 to 140, 141 to 230, 231 to 300
3	..... 74 to 140, 141 to 230, 231 to 300, 301 to 350
3½	..... 74 to 140, 141 to 230, 231 to 300, 301 to 350
4	..... 141 to 230, 231 to 300

TEST GAG

When it is desired to test a locomotive boiler under a hydrostatic pressure which exceeds the working pressure of the boiler the Test Gag should be used. This gag will hold the valve to its seat without any strain on the spring.

The use of these gags not only saves the time necessary for the removal of pops and the application of caps for Test, but also saves considerable wear on the threads of valve bases and bushings.

Standard gag will fit all sizes of Consolidated Locomotive Pop Safety Valves, Types 1560 and 1561 from 2" to 4" inclusive. Gag for 1½" valves will be furnished on special order.



Type GA
Gag Mounted on
Open Valve