PENNSYLVANIA RAILROAD

LINES EAST OF PITTSBURGH

Locomotive Maintenance Instructions No. L-11-A

(Superseding Instructions No. L-11, Dated Dec. 8, 1913.)

ISSUED ALTOONA, PA.

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Instructions for Adjusting and Repairing Safety Valves Used on Locomotive and Other Boilers

The various parts of all safety valves must conform to standard tracings showing these details.

SETTING SAFETY VALVES.

Adjusting Opening Pressure.

To set valve to pop at desired pressure (see figure on page 2) slack off locknut 10 and adjust spring bolt 8 by the use of special wrenches for this purpose. For more pressure screw down on spring bolt, and for less pressure unscrew spring bolt. When setting safety valves, two steam gauges must be used, as required by Locomotive Maintenance Instructions L-18. After spring bolt is adjusted, locknut must be tightened. One valve must be set to pop at boiler pressure, and the other valve to pop at one (1) pound higher than allowed boiler pressure.

Adjusting Closing Pressure.

To regulate the pressure at which valve closes (blow back), remove adjusting ring bolt 12 and by means of any pointed instrument move adjusting ring 11. Valves should be adjusted to give a blow back of five (5) pounds. If the valve closes with too great a drop in boiler pressure, move the adjusting ring to the left a notch or two at a time; if the valve closes with too small a drop in boiler pressure, move ring to the right. After adjustment, replace adjusting ring bolt 12, being careful that it enters one of the notches in adjusting ring 11, and then firmly screw it into place. Its omission or improper application may seriously affect the operation of the valve.

To Examine Inside of Valve.

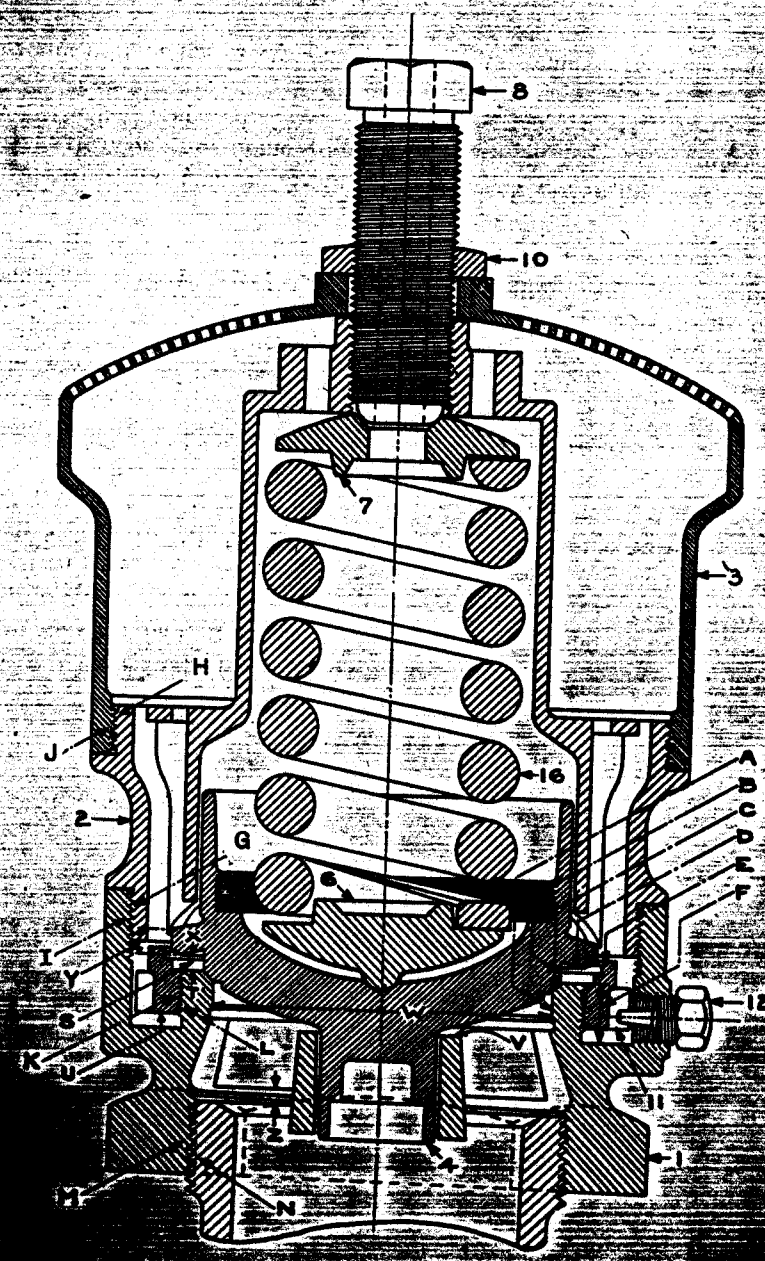
To examine inside of valve, unscrew locknut 10 and slack off spring bolt 8, to relieve tension on spring, then unscrew dome 3 and spring case 2, when the internal arrangement of the valve will be exposed.

Do not hammer any part of the safety valve in order to remove muffler dome from spring case, or spring case from base.

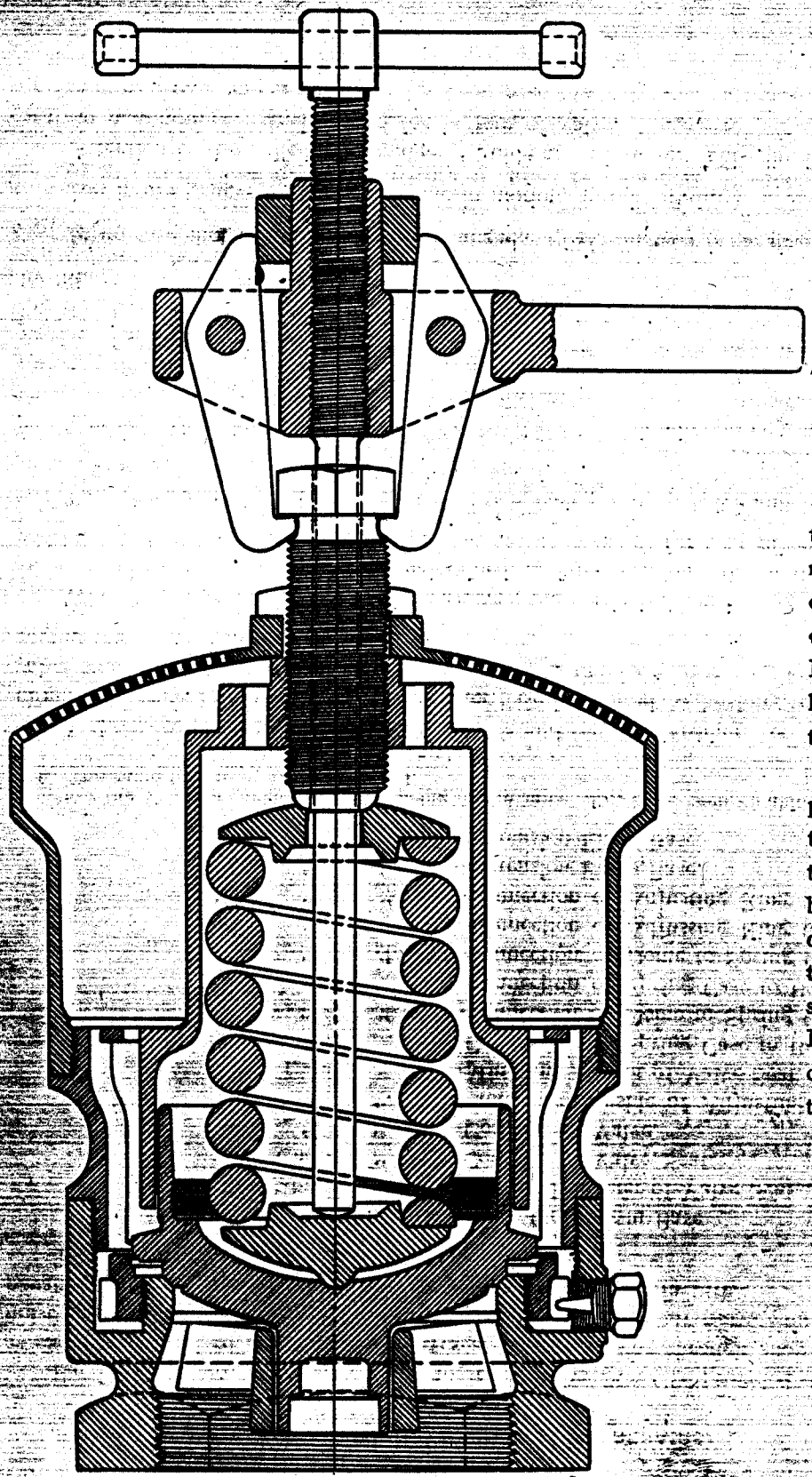
Removing Safety Valve From Boiler.

Do not use hammer, set, pipe, or alligator wrench to remove safety valve from its fitting on the boiler. Use special solid wrenches for this purpose, as shown on standard tracings.

COALE MUFFLED SAFETY VALVE.



1—Base.
2—Spring Case.
3—Muffler Dome.
4—Valve.
6—Lower Spring Button.
7—Upper Spring Button.
8—Spring Bolt.
10—Lock Nut.
11—Adjusting Ring.
12—Adjusting Ring Bolt.
16—Spring.



APPLICATION OF SPECIAL TOOL FOR HYDROSTATIC BOILER TESTS.

When making hydrostatic test, the valve must not be removed or the adjustment altered. The valves must be held closed by special tool, as shown. In no case must the valve be held closed by screwing down the spring bolt on the spring.

One of these tools shall be applied to each safety valve, and the setting of the valve allowed to remain the same as when the boiler is in service. The spindle of the tool which projects down through the hollow spring bolt should be screwed down by HAND ONLY, which is sufficient to secure the valve for test.

RENEWALS AND REPAIRS.

Standard Gauges.

Each shop where repairs are made to safety valves must be provided with gauges, as shown on standard tracings. All valves and parts passing through shop for repairs must be made to conform in all respects to gauge, and all repair parts shipped to outlying points for application must be passed by standard gauge at point of manufacture.

The following gauges are to be used:

	Plug	Gauge	A—Valve Opening in Base.
	Caliper	"	B—Outside Diameter of Valve Seat.
	Check	"	C—Contour of Valve Seat.
	"	"	D—Contour of Valve.
	"	"	E—Contour of Inside of Adjusting Ring.
	Limit	"	F—Minimum Height of Valve Seat.
Ring	Thread	"	*G—Connection of Spring Case to Base.
"	"	"	*H—Connection of Dome to Spring Case.
Plug	"	"	* I—Connection of Spring Case to Base.
"	"	"	* J—Connection of Dome to Spring Case.
"	"	"	K—Connection of Adjusting Ring to Base.
Ring	"	"	L—Connection of Adjusting Ring to Base.
Plug	"	"	M—Extension Fit to Base.
Ring	"	"	N—Extension Fit to Base.

***For the 5" valve gauges G and H, being of the same size, have been combined in one gauge, known as Gauge GH. The same is true of gauges I and J.**

Relation Between Base and Bushing.

A clearance between webs of guide in base and top of bushing, as shown at Z (Figure on page 2) must be maintained after base is secured to bushing, otherwise the valve seat may become distorted when screwing on the base, due to the bushing engaging the guide webs.

When the reseating of a valve is necessary, the vertical dimensions at S (Fig. on page 2), as found on all new valves, must be accurately maintained, and the seat on valve and base must not exceed ⅛" in width. Angle of seat should be maintained at 45°, same as for new valves.

Top of base at T should be faced off when facing seat on valve and base. This part should never be reduced more than ⅛", as determined by gauge F.

Adjusting Ring.

The adjusting ring at U must also be faced off to maintain proper clearance for valve, otherwise ring cannot be run down sufficiently for proper adjustment. Adjusting ring should not be reduced in thickness more than ⅛" below that shown on tracing. When an adjusting ring is found to stick, do not use a chisel to loosen it, but have it turned out in a lathe. If adjusting ring is found to fit too tight, a proper fit should be made by chasing the threads in a lathe, and not by filing.

In no case should Diameter W be changed. *(This diameter is the size of valve.)*

Never use gauges on surfaces while in motion, as this produces excessive wear of gauges.

Attention is also called to top edge of guide at V, in base. This should be faced off when facing valve seat to maintain proper clearance for bottom of valve.

When turning back the face X on valve, to maintain dimensions at S it is necessary to turn face X slightly under, as shown on cut, and as found on all new valves. When facing seat of valve the valve must be chucked with the thread on the inside of top guide of valve, and when facing seat on base the base must be chucked with the thread in the bottom of base to maintain original centers and avoid difficulty by leakage.

Facing Valve and Seat.

When facing valve, thickness of head of valve, as shown at Y, should never be less than $\frac{1}{8}$".

It is very important, in ordering springs for safety valves, to specify the pressure with which they are to be used, and safety valve springs should be used only for valves and pressures shown in the following table.

Springs.

When a safety valve spring is found to have taken a permanent set of $\frac{1}{4}$", that is to say, when its free height is $\frac{1}{4}$" less than that given in the table, it must be scrapped and a new spring applied.

The table given below shows the springs to be used with the various sizes of Coale safety valves, for different pressures. The springs are stamped near the end as shown under column headed "Marking."

SPRINGS FOR COALE SAFETY VALVES.

Size of Valve.	Pressure From	Pressure To	Free Height.	Marking.
2½"	60	110	4¼"	2½-A
	110	160		2½-B
	160	200		2½-C
	200	240		2½-D
3¼"	110	160	4⅝"	3¼-B
	160	200		3¼-C
3½"	100	160	5⅛"	3½-B
	160	200		3½-C
	200	240		3½-D
4"	110	160	5½"	4-B
	160	200		4-C
	200	240		4-D
4½"	160	200	6⅛"	4½-C
	200	245		
5"	200	240	5⅝"	5-D

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