Superior Automatic Soot Blowers

"Increase locomotive capacity and reduce boiler maintenance
by keeping important heating surfaces clean"

Overview

The Superior Automatic Soot Blower (manufactured by Superior Railway Products Corp. of Pittsburgh, PA) was a device installed in the firebox for the purpose of clearing the rear tube sheet and flues of soot and cinder. Contrary to its name, the device is not automatic and is operated by a valve in the cab.

General Description

> "Prevention of honeycomb, soot and cinder on the back flue sheet, along the bottom of the combustion chamber, in the tubes and around the superheater return bends is of vital importance. These accumulations are responsible for a whole chain of undesirable factors which seriously interfere with the ability of the locomotive to deliver its full rated power output.
>
> Superior Automatic Soot Blowers prevent these accumulations. They will greatly assist in keeping locomotives in service and at constant, full working capacity without waste.
>
> Each Superior Automatic Soot Blower installation consists of five parts : two rigidly constructed blowers, a heavy-duty straight or angle globe valve, an especially designed pneumatically operated steam valve, and a rotary type cab operating valve.
>
> The blowers, compact and perfectly sealed units, installed on opposing sides of the firebox, house a turbo-mechanism which actuates the cleaning nozzles. The materials used in their construction have been selected to eliminate abnormal difficulty from corrosion. As a further safeguard, these parts are submerged in a bath of oil.
>
> The blower nozzles extend through the side water legs of the firebox. When in use, they are oscillated by the blower turbine over an arc covering the full elevation of the back flue sheet (see Fig. 5.70 on opposite page). The motion of each nozzle is timed to produce the best results and the blast of steam from each sweeps over approximately 60 per cent of the flue sheet surface. The particular shape of the nozzle orifice produces a jet of steam of tremendous velocity.
>
> The steam flow is controlled by a pneumatically operated duplex valve connected by air lines to the cab valve. The cab valve is conveniently located within easy reach of the fireman when sitting on his box.
>
> Because of exposure to the terrific heat of the firebox the nozzles are designed for long life and are made of materials chosen for heat-resisting qualities. Further protection is afforded by means of a check valve arrangement which permits cool air to be drawn through the nozzles when they are inactive- this check valve automatically closes to the outside air when steam is admitted to the blower.

Installation

> Initial installations of the Superior Automatic Soot Blowers are made under the careful supervision of experts and require only a few hours. Subsequent installations can then be readily handled by regular shop mechanics, as no unusual operations are required. The only work on the boiler proper is the removal of a staybolt and the substitution of a stay tube 3½" in outside diameter, usually a piece of standard arch tube.
>
> Illustrations on this and the opposite page show clearly the locations of the various parts and also how flue sheets, superheater return bends, and combustion chamber bottoms are kept free of accumulations of soot and cinders. The Manufacturer will gladly supply complete information and, convincing evidence of the effectiveness of the Superior Automatic Soot Blower."

On The CNR

A study of photographs suggest that installations were limited to the GTW's U-3-b and U-4-b class Northerns (which were probably built with them), several of the ex-GTW U-3-a class Northerns, the S-4-b class of Mikados, and S-1-f class Mikado #3487 (which most likely received its Soot Blower later in life), although there may have been others. In the case of the Northerns, the Soot Blower is clearly visible above the running boards, immediately ahead of the firebox.

For additional information, look up Patent #1709065 at the United States Patent and Trademark Office.

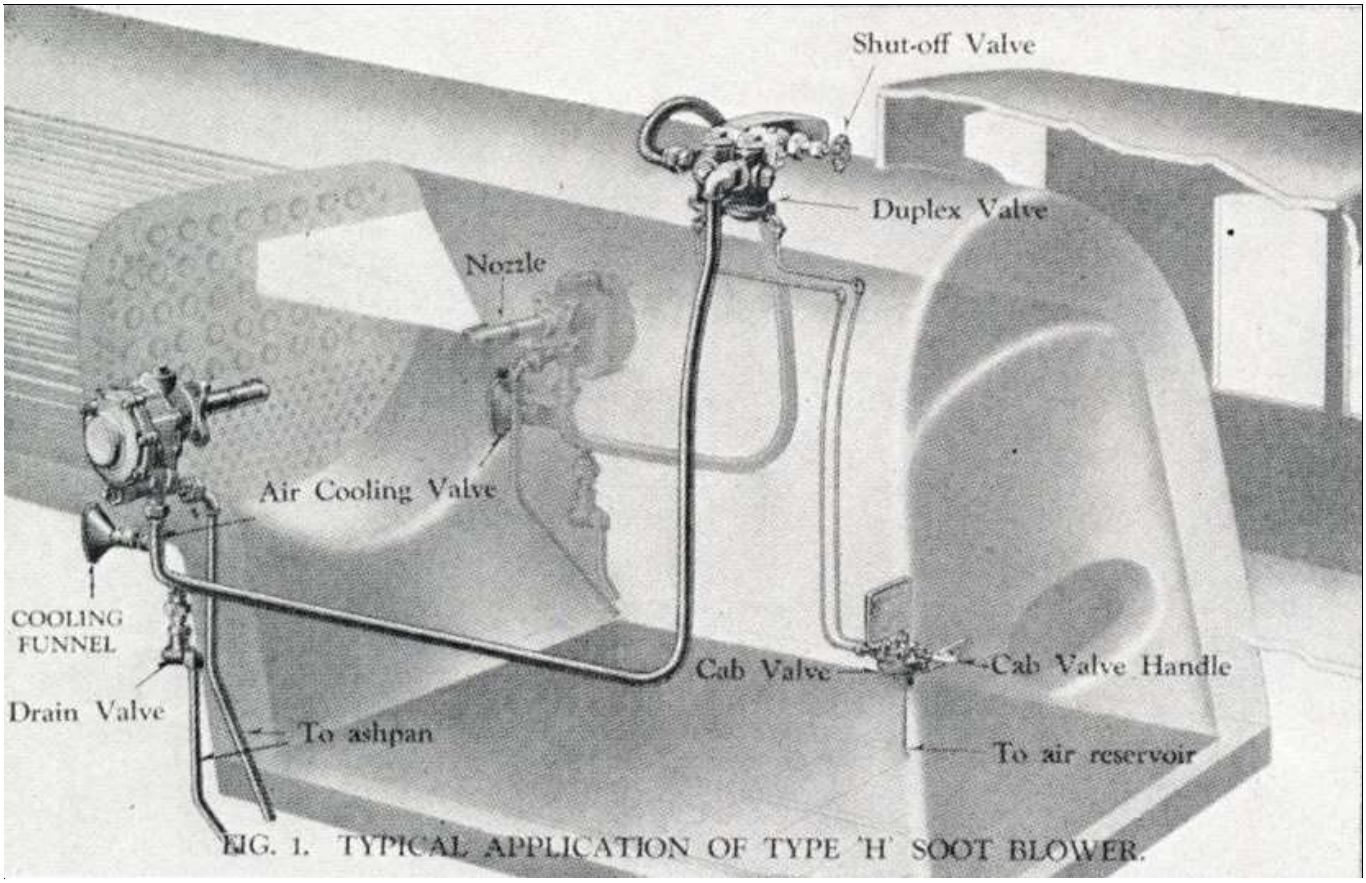


FIG. 1. TYPICAL APPLICATION OF TYPE 'H' SOOT BLOWER.

Typical Application Of Type "H" Soot Blower.

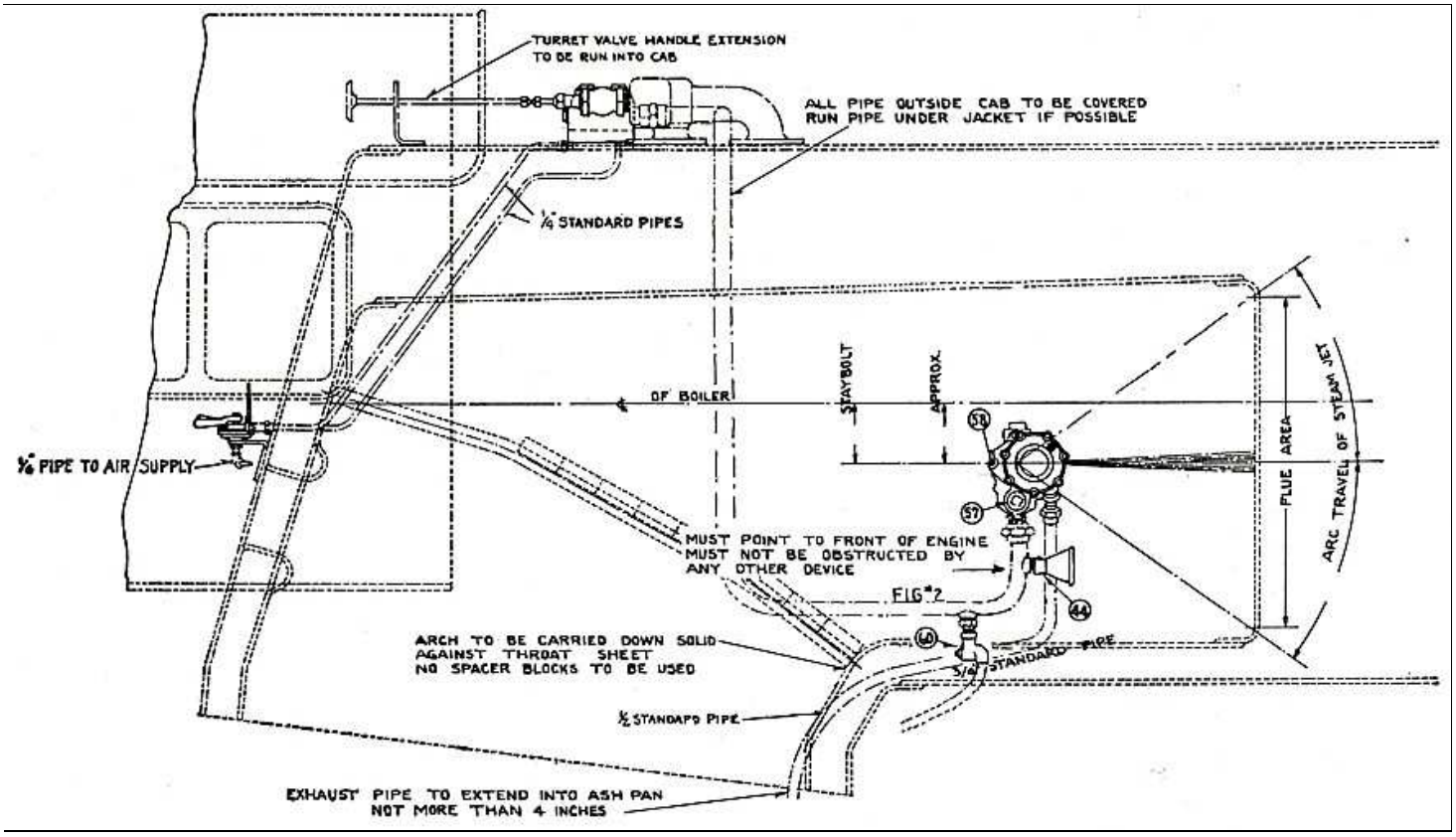
Cab Valve within easy reach of the fireman.

Important Advantages of Superior Automatic Soot Blowers

1- Eliminates engine failures caused by dirty and plugged flues.
2- Eliminates frequent dumping of fires for cleaning flues and combustion chamber.
3- Eliminates honeycomb or soot formation on the flue sheet and return ends of superheater units.
4- Decreases maintenance on superheater units- beads and flues, seams and staybolts in combustion chamber.
5- Increases boiler efficiency to the point of fuel saving.
6- Increases life of arch brick by eliminating their frequent removal for manual cleaning and inspection of flues.
7- Sustains greater steaming capacity, making possible longer engine runs.
8- Removes all soot, cinder and ash deposits from combustion chamber, which may have formed between blower operations.
9- Increases superheat temperatures and decreases back pressure in exhaust passage of engine cylinders.
10- Reduces forced firing of engine by eliminating non-conductors of heat.

Superior Automatic Soot Blowers

Additional Photos



Application of Type "H" Superior Automatic Soot Blower.

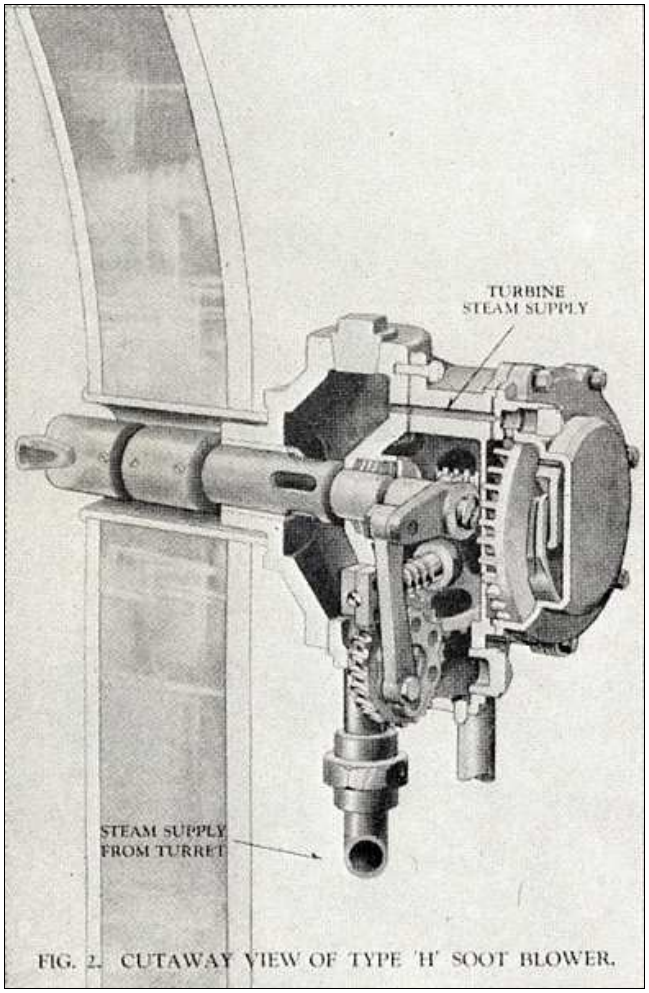
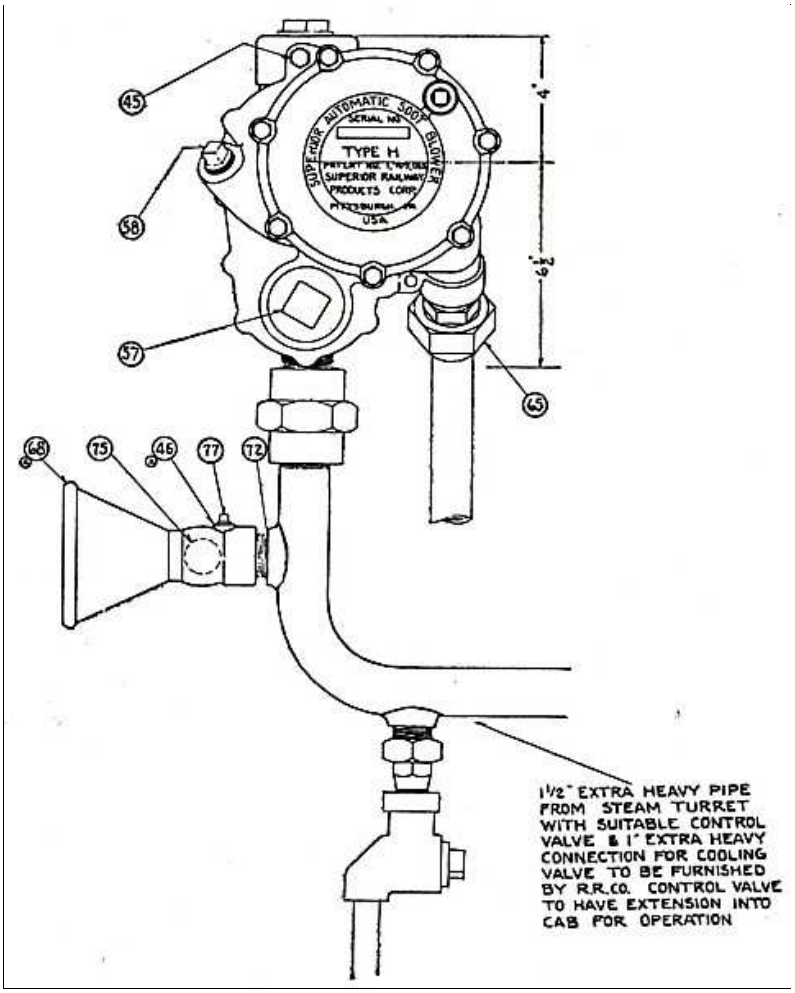
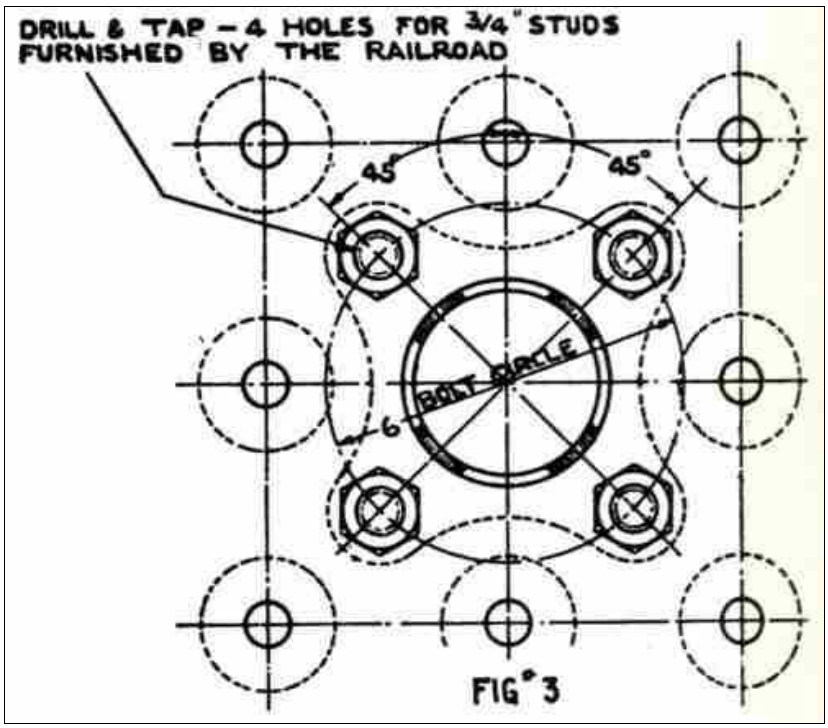


FIG. 2. CUTAWAY VIEW OF TYPE 'H' SOOT BLOWER.

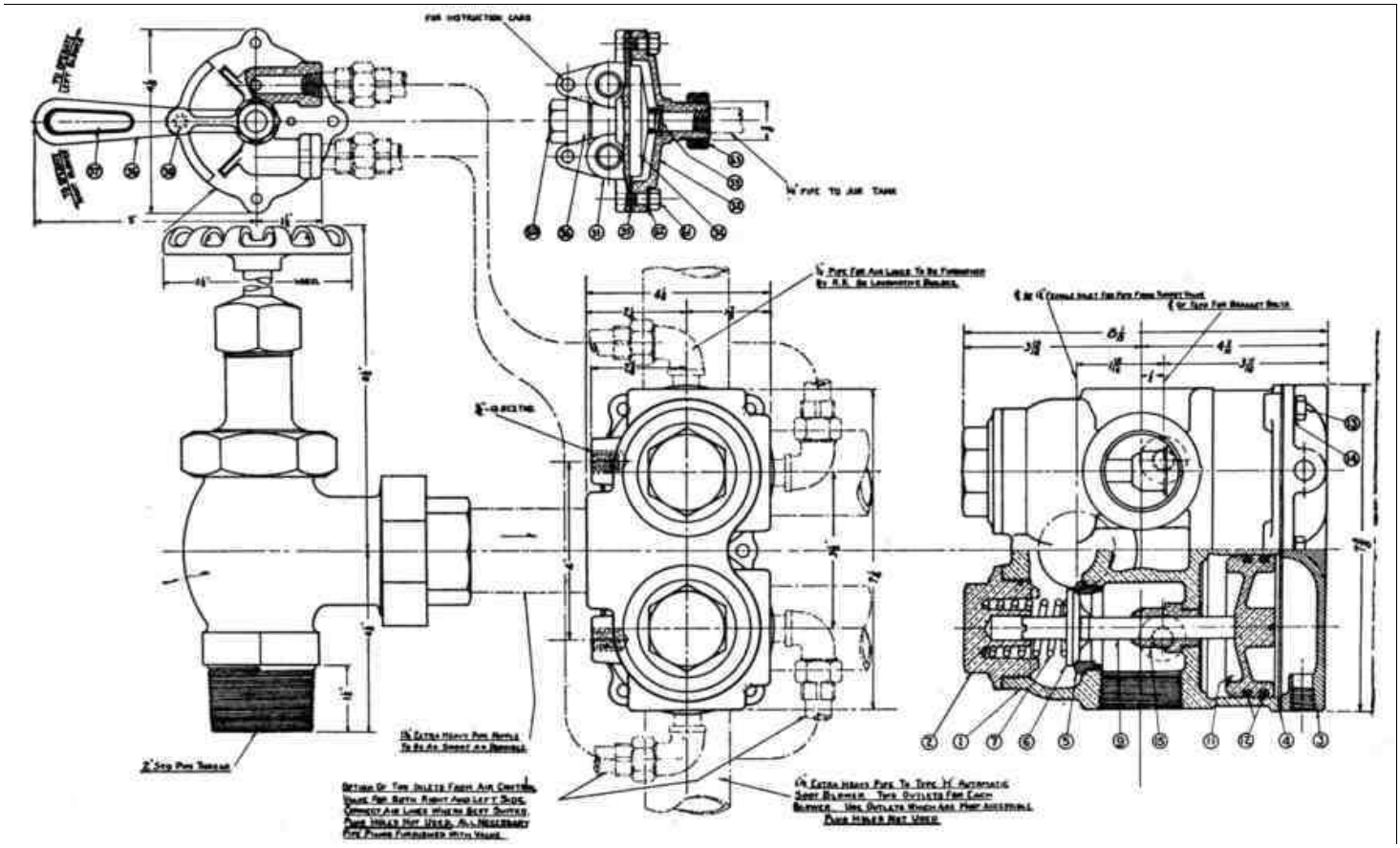
Cutaway View of Type "H" Soot Blower.



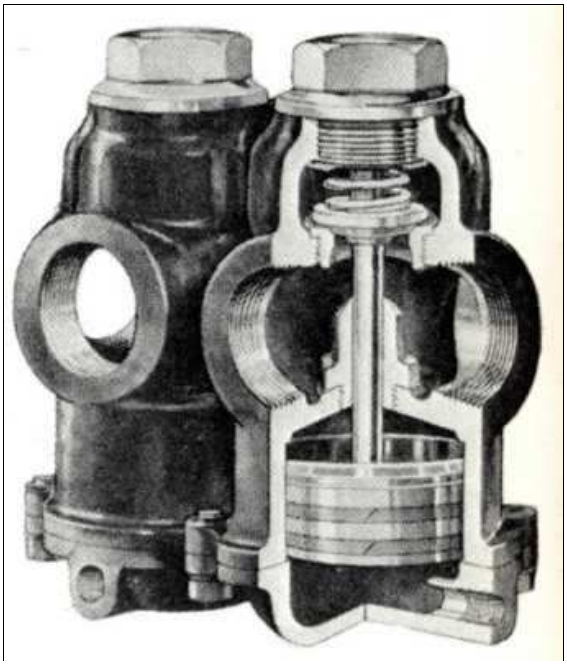
Front View



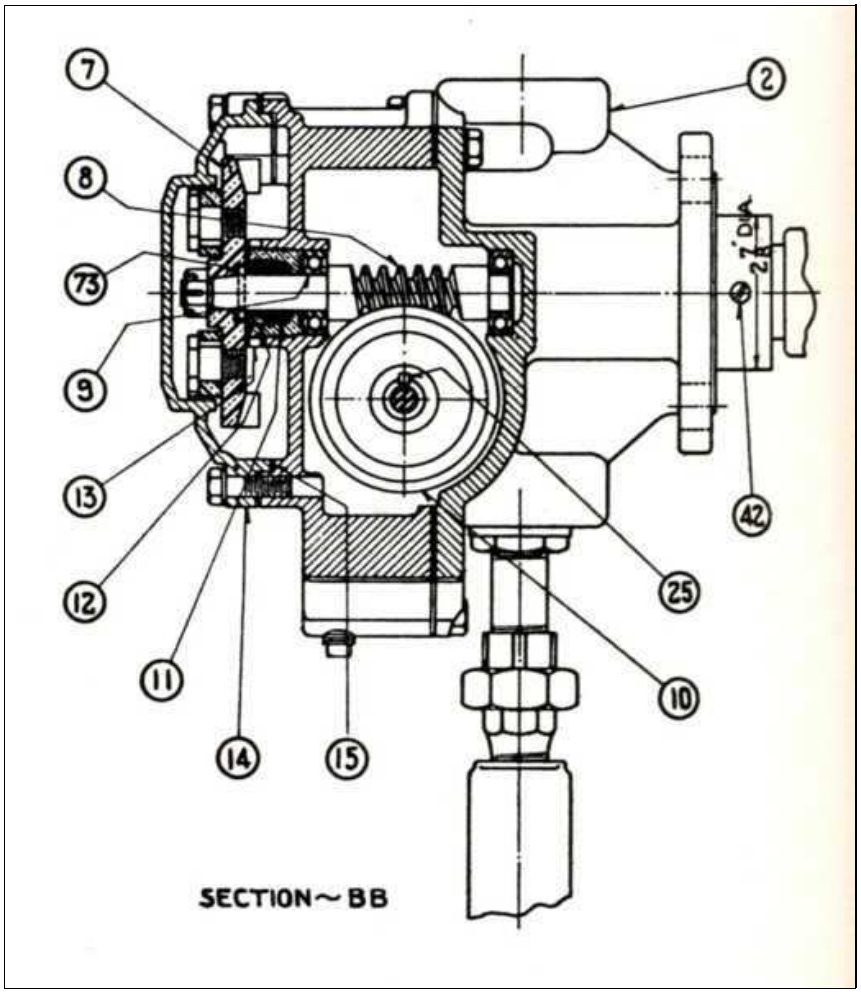
Layout of Stay Tube and Studs In wrapper Sheet For Blower.



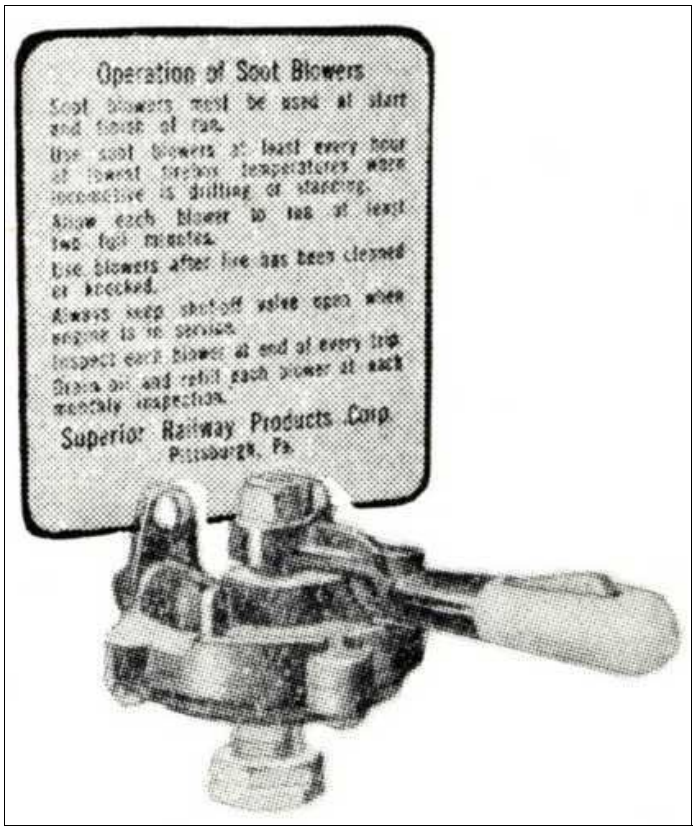
Valve Assembly Drawings (Click here to see full size version)



Duplex Pneumatic Valve



Duplex Pneumatic Valve



Operation of Soot Blowers

Soot blowers must be used at start and finish of run.

Use soot blowers at least every hour at lowest firebox temperatures were locomotive is drifting or starting.

Allow each blower to run at least two full minutes.

Use blowers after fire has been cleaned or banked.

Always keep shutoff valve open when engine is in service.

Inspect each blower at end of every trip.

Drain oil and refill each blower at each monthly inspection.

Superior Railway Products Corp
Pittsburgh, PA

Cab Operating Valve