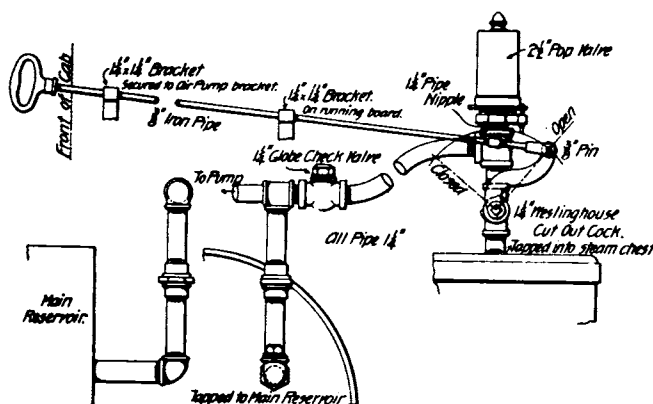


THE SWEENEY AIR COMPRESSOR.

This device, which is applied to the Santa Fe Pacific locomotives, illustrated elsewhere in this issue, is very well known and highly prized on some of the western roads having heavy grades, but is not used elsewhere. It is not an air compressor, but is an attachment applied to one or both main steam cylinders of the locomotive, whereby they are made to compress air into the main reservoir for temporary relief of the air brake pump. The originator, Thomas Sweeney, is a locomotive engineer on the Southern Pacific, and his purpose was to provide means for maintaining air pressure in the train pipe in case of failure of the air pump and in recharging when descending long mountain grades.

The device consists of a pipe connecting the top or side of the steam chest with the main air reservoir, the passage between the two being controlled by a stop cock at the steam chest and a check valve near the reservoir. A pop valve set to open at a pressure of 90 pounds, is mounted in the pipe and the apparatus is completed by a connection from the stop cock and the cab, whereby the engineer may open or close it.

When it is necessary to use the device, steam being shut off, the reverse lever is placed slightly back of center notch and



The Sweeney Air Compressor.

the cylinder cocks left open for three or four revolutions of the engine to allow water that may be in the cylinders to escape; then the stop cock is opened and the brake valve placed in charging position. The reverse lever must be left back of the center notch at least fifteen seconds after full pressure has been indicated on the air gauge. Before the reverse lever is moved forward the brake valve is placed on lap; and, in case the air pump is not working, the stop cock should be closed, as the pistons will draw air from the main reservoir before the check valve closes. By placing the brake valve on the lap and closing the stop cock before moving the reverse lever forward, sufficient pressure will be retained in the main reservoir to release the brake. After the cylinders have ceased to work as air compressors the brake valve should be left on the lap at least five seconds, so that the air will have time to equalize in the train. If the air is used immediately after moving the lever ahead, there being a higher pressure in the train pipe than in the auxiliary reservoirs, air will be wasted, as the air in the train pipe must be reduced to a lower pressure than in the auxiliary reservoirs to set the brakes; but, if time be allowed to let the air equalize, all the air that has been forced back may be used to advantage. The device is used only in emergencies, and the rules provide for testing it at the beginning of every trip, in order to insure its use if needed. It is confidently depended upon by the men and is fitted to many locomotives that are used on long, heavy grades on the Santa Fe, the Southern Pacific and mountain roads in the far Northwest.

Mr. H. J. Small, Superintendent of Motive Power of the Southern Pacific, writes us that this device originated with one of the oldest engineers on that road. Some years ago, when the question of the advisability of equipping mountain locomotives with two air pumps was considered, the Sweeney device was introduced and it proved satisfactory, so that the idea of using a second air pump was abandoned. Mr. Small reports that he is now using this device not only on the mountain grades, but also on valley divisions. It is used as an emergency or auxiliary to the air pump. In case anything happens to the air pump, this device is ready for instant use. A number of cases of failure of air pumps have occurred on that road, not only on mountain grades, but on level divisions, and the trains were brought in safely, using the air brakes for which the supply of air was furnished solely by the Sweeney auxiliary.

Mr. Small has very kindly sent us a report written by the Pacific Coast expert of the Westinghouse Air Brake Company, after witnessing the use of the Sweeney attachment on three different trains. In one of these cases one of the air valves of the locomotive air pump broke and a train of 560 tons was handled down a 3 per cent. grade, 25 miles long, with this device. There can be no doubt that with such grades, and even with shorter ones, and not as steep, this emergency apparatus will contribute to the safety of operation and also to the peace of mind of the engine and train crews.

BRAKE CONTROL OF DOUBLE-HEADED PASSENGER TRAINS.

There is an opportunity for an accident whenever two locomotives are attached to the same train from the possibility of conflict of the enginemen in applying the brakes. Some protection against this contingency is necessary and specially so on mountain grades, where double-heading of passenger trains is the rule. In discussing the practice of cutting out the brakes on the leading engine before the Master Mechanics' Association, Mr. T. R. Browne and Mr. A. W. Gibbs, of the Pennsylvania, stated that on this road the engineer of the leading engine did the braking, the arrangement of the engineer's valve permitted the engineman of the rear engine only to apply the brakes. It was expressly arranged that he would not be able to release the brakes, for the reason that should the forward engineman discover the necessity of applying the brakes, while the engineman of the second engine had left his brake in a released position, the result would be a brake failure. Therefore the brakes are so arranged with double-headed passenger trains that the forward engineman has control not only of his own brakes and the train brakes, but also those of the rear engine; the rear man not having the power to release, Mr. Browne said:

This condition is somewhat altered on the mountain division, where double-headers are used for short distance only, and under these circumstances the engine next to the train controls and applies the brakes. It would appear to me that the head engine being in the lead should have the ability to apply the brakes, as the crew is in a position to see all the signals, as well as the second engine. It seems to me that to cut out the head engine entirely removes to a certain extent the possibility of throwing a part of the responsibility on that crew and throws it all upon the engine behind. From the standpoint of my experience and judgment in that matter I would naturally feel inclined to say that both crews should have it within their power to apply brakes on double-headers, which usually means a heavy train.

German engineers are pursuing improvement in steam engine efficiency by the use of superheated steam, and one direction which their progress is taking is the use of poppet valves to avoid the earlier difficulties of cutting and tearing valves, valve stems and seats. There is so much to be gained by superheating that it is well worth while experimenting, even at considerable expense, in order to overcome the difficulties.