

THE fusible plug or soft plug is another important safety device that all or nearly all traction engine boilers are equipped with. It consists of a brass plug having an opening in the middle filled with tin. Figure 69 shows two styles in which these plugs are made. In the one marked A, the hole in the plug is made tapering



FIG. 69.

so that when steam pressure acts on the tin filling it can not possibly be forced out by the pressure alone since the pressure acts on the large end of the tin plug. In B there is an enlargement in the middle that serves the same purpose.

In fire box boilers the plug is screwed into the highest point of the fire box and in return flue boilers it is located in the front end, in the smoke box, just above the main flue. The tin that it is filled with melts at a temperature of about 440° Fah., and if the water in the boiler gets so low as to leave the top of the plug bare the tin melts and water and steam blow out. If this happens in a fire box boiler the fire will be put out. Many return flue boilers do not have a fusible plug, but all fire box boilers do, and they are needed.

In case a plug melts out any one can fill it by melting a little tin in a suitable dish and pouring the hole in the plug full. If the plug is stood up on an iron plate it will prevent the tin from running through. After the plug is filled the tin should be tamped in with a hammer and punch. In filling be sure there is no moisture in the plug. If there is, the hot metal will turn it quickly into steam and there will be a little explosion and some one is apt to get burned with the hot tin. The plug should be filled at the beginning of every season. If left too long it becomes crystallized and does not melt readily. It is a good plan to take the plug out every time the boiler is cleaned and see that the top is not covered with scale. A little scale on the top can easily prevent the steam from blowing out even if the tin has melted. It is also a good plan to coat the threads of the plug with graphite so that it will unscrew easily next time. Oil put on the threads will burn, forming a deposit of carbon that will make it stick and consequently oil should not be used. In concluding this bit of advice in regard to fusible plugs it may be well to add that an iron plug such as a spike is a very poor substitute for tin and is not to be recommended although some fellows who claim to be engineers use it occasionally. Babbitt is not good either although it is better than the spike.



Practical Talks to Threshermen

Conducted by PROFESSOR P. S. ROSE

TALK No. XVIII.

The reason babbitt is not very good is that it has a rather uncertain melting point, depending upon its composition, and may be too high. Pure tin is by all odds the best and every engine should be provided with a bar to be kept in the tool box for emergency.

The next safety device we will consider is the safety valve or spring pop valve, a sectional cut of one type of which appears in Figure 70. It is made of brass throughout except the springs and the handle. The lower end G screws into the steam space in the boiler and admits steam to the lower side of the main valve A. A rod B rests on the top of this valve and is held down by means

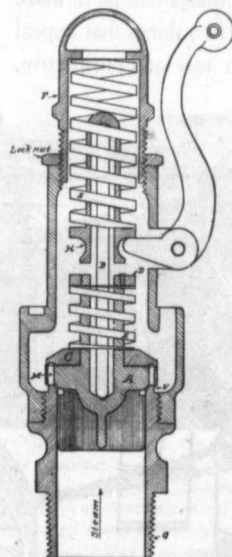


FIG. 70

of the cap H and main spring S. In order for valve A to rise it must compress the spring S. A lock nut holds the top of this spring in place and if it is screwed down it puts more load on the spring and of course more load on the top of the main valve. A full turn of this lock nut by the way, is equivalent to the adding about thirty pounds pressure on the top of the valve. It doesn't pay, therefore, to use a monkey wrench very freely on this lock nut unless you want to carry a tremendous pressure on the boiler. On the top of the valve A there is another valve C called an auxiliary valve. This valve is held to its seat by an auxiliary spring E. It will be noticed that

this valve and spring are attached firmly to the stem of the main valve and must move with it. The purpose of this auxiliary valve will presently be described.

All pop valves are provided with what is called a pop chamber, into which the steam first expands after it passes the main valve. This is shown at M in the figure. When the pressure in the boiler is less than the compressive force on spring S the main valve remains seated, but when it rises to a point just a trifle above the load on the spring, the valve rises and steam flows out around the valve seat V and up into the pop chamber M underneath the valve C. In expanding, the steam acquires considerable velocity, which is changed to pressure when stopped by the valve C. The force that now opens the main valve is the steam pressure acting on the lower side of A plus the pressure on C in the pop chamber. This total pressure is more than sufficient to open the main valve and it pops wide open. It would remain open until the steam in the boiler had fallen a considerable amount below the popping off point if there was not some provision made to relieve the pressure in the pop chamber. This is accomplished in this machine by making the compressive force on spring E much less than on spring S. This allows the valve C to lift and let the steam escape from the pop chamber. The load on spring E can be regulated by means of the nut D. If this is made heavy the pressure in the boiler will fall a considerable amount before the main valve returns to its seat. If made light, on the other hand, there will be only a slight fall in pressure. It is set correctly when it leaves the factory and needs no further attention unless the pressure at which the main valve works is changed a great deal. In that case it may be necessary to make some adjustment.

In other types of pop valves there are different methods used to accomplish the same object that the auxiliary valve does in the pop valve above described. These devices are known as regulators and provide means for relieving the pressure in the pop chamber at varying rates. In almost all pop valves except the one described this regulator must be adjusted whenever the load on the main valve is changed very much, otherwise, the pressure in the boiler

will be either reduced by too small an amount, or else too much pressure will be lost every time the pop valve acts. In general, the regulator should be set to reduce the pressure in the boiler about three pounds.

The pressure at which the pop valve is set on a new engine is what the manufacturer considers the safe working pressure for his boiler. While the boiler will undoubtedly be safe with somewhat higher pressure when new it is not good sense to screw down the pop and increase the pressure. As the boiler grows older it is not able to stand such high pressures as when new and the "pop" should be set lower. It may be set down as a general rule, though not applicable in every case, that the engineer who has a hankering to screw down the pop valve is a fellow who needs pretty close watching. It might be safer to let him haul water.

How To Get Rid Of Straw.

Many farmers in "the West", and some in what we call "the East" are troubled as to what they shall do with the piles of straw which lie about their fields. Upon the same farms with these nearly useless straw piles, many head of stock are kept, and many more might be kept, which could be made useful in reducing the straw to a condition in which it would serve as manure. If the already urgent necessity for manure upon the western and southern fields were realized, there would be little hesitation in taking measures to remove the difficulty. The chief obstacle is, that these involve either personal or hired labor; the first is objectionable to many, and the second cannot be had for want of the money necessary to pay for it. The least laborious method of using this straw and making it serve the double purpose of a shelter for stock and a fertilizer for the field upon which it has been grown is as follows: Some poles are set in the ground, and rails or other poles are laid upon them so as to form a sloping roof. This is made near or around the place chosen for threshing the grain. The straw from the threshing machine is heaped upon the rails, making a long stack, which forms three sides of a square, with the open side towards the south, and leaving a space between it in which cattle may be sheltered from storms. In this enclosure some rough troughs or racks may be placed, from which to feed corn. Here the cattle will feed and lie, or will lie at nights under shelter, while feeding during the day upon corn in the field. As the straw that is given them becomes trampled and mixed with the droppings, a further supply is thrown down