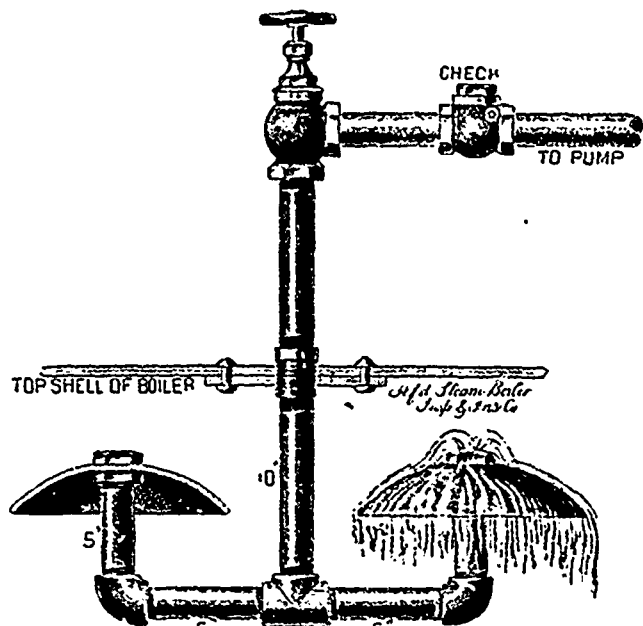


TOP FEED IN BOILERS.

PROBABLY few engineers or owners of steam boilers appreciate the effect that the introduction of feed-water has upon a boiler, so far as its life is concerned, says a writer in the *Locomotive*. If it could be introduced at a steady stream, and at a uniform temperature all the time the boiler is in operation, the location of the point of introduction would be of little importance, particularly if the water was free from scale-forming substances. Such favorable conditions, however, are rarely met with. Most boilers are fed intermittently, the feed varying in temperature between say, 60 degrees and 200 degrees. In every case its temperature is lower than that of the boiler, and if care is not taken it will chill the shell and start leaks or cracks, if it does nothing worse. Then, too, the deposit of scale cannot be considered to any great extent. The present article is designed to show how all expansion and contraction of shell-plates may be avoided, and deposit of scale largely prevented. These can be accomplished, in the writer's experience, by spraying the feed into the steam space of the boiler. Experience has shown that this can be done without noticeably increasing the moisture in the steam passing over to the engine.

A simple device for accomplishing this is shown in the accompanying cut. It is made of pipe of the same size as the feed line. The spray plates are 10 inches in diameter, made of iron (16 gauge being a good thickness), and hammered into convex



TOP FEED APPARATUS.

shape. The short upright pipes shown in the cut pass through them, and to these the plates are secured by lock nuts above and below. The water bubbles up to the top of the plates, and runs off as it would from an umbrella. The trap form of the arrangement prevents steam from entering the feed line and causing snapping or pounding noises from condensation. There are two free openings, each of which is the full size of the main feed pipe.

By spraying it into the steam space in this way, the water becomes thoroughly heated before mingling with that in the boiler below, and, as it is in small particles, it is carried along in the general circulation, and does not come in contact with the shell in such a way as to cause contraction. Furthermore, the scale-forming material is precipitated in a finely purulent form in the water, and not on the tubes or plates, so that instead of adhering to the boiler it remains in suspension, and is readily gotten rid of when the boiler is emptied for cleaning. My experience shows that boilers can often be kept clean by this method of feeding, when the scale was very troublesome with the ordinary arrangement.

When the water is very bad some scale will be deposited, though the amount will be much less than with any other method of feeding, and the location of the deposit can be pretty well controlled. It will form close to the feed pipe discharge.

We have next to consider the best place to put the delivery. No absolute rule can be given for this, but, generally speaking, it should be as near the front head as practicable, in tubular boilers; for the deposit, if it forms, will then be least likely to

injure the tubes or cause leakage. In long flue and plain cylinder boilers the rear end is preferable, for in these types the shell is most likely to receive the deposit, and the rear end is the coolest portion of the shell. In any case the spray feed should be as far from the main steam opening as possible, in order that the strong current of steam passing out may not catch the particles of water and carry them over into the engine.

In some sections of the country the top feed is used very generally, and in all cases it gives satisfactory results when properly set in.

MINING BY ELECTRICITY.

The *Free Press*, published at Nanaimo, B. C., tells as follows of how coal mining is done at the Union mines, Vancouver Island, by electricity:—

A *Free Press* representative called on A. Dick, Government Inspector of coal mines, on his return yesterday from an official visit to the Union Colliery at Comox. Mr. Dick then gave a description of the electric machine—the first of the kind he had seen—as wonderful and doing its work with the utmost ease and the precision of clockwork. He timed the machine while at work and found that it “mined” 6 feet by 39 inches, and four inches deep, in five minutes. It also took five minutes from the time of finishing cut until it commenced work on the next. To move it from one stall to another takes about half an hour. Mr. Dick expressed the opinion that it will greatly facilitate the mining of coal, and also that the coal will come out in a more merchantable condition. In fact Mr. Little, manager, and Mr. Russell, overman, said the refuse from the machine was not half that by the ordinary mode of mining.

D. N. Osyer, electrician of the Jeffrey Electric Company, of Columbus, Ohio, is at present at Union placing the machinery in order, and instructing the operators. Mr. John Ead is in charge of the cutting machine, having one helper, who, with an engineer in charge of the dynamo, is the entire working force. The steam is supplied from the colliery boilers.

Mr. Osyer expects to remain at Union about two weeks longer, and says that in the long stall system of coal mining the machines can do a much greater percentage of work than in the small stall system. The machine simply does the undermining, then the miner comes along, drills the holes, fires the shots, and loads away the coal.

Following is a brief technical description of the machine as given by the manufacturer.

The machine consists of a bed frame occupying a space two feet, by eight feet six inches long, composed of two steel channel bars firmly braced, the top plates on each forming racks with their teeth downward, into which the feed wheels of the sliding frame engage. Mounted upon and engaging with this bed frame, is a sliding frame similarly braced, consisting mainly of two steel bars, upon which are mounted, at the rear ends, the electric motor, from which power is transmitted through straight gear and worm wheel to the rack, by means of which the sliding frame is fed forward. Upon the front end of this sliding frame is mounted the outer bar, held firmly by two solid steel shoes, with suitable brass boxes. The cutter-bar contains bits, made of tool steel, held in place by set screws. When the cutter-bar is revolved by an endless curved link steel chain from the driving shaft, and as it is revolved, is advanced by the above mechanism into the coal or other material to be undercut to the desired depth.

The electric motor occupies a space of about twenty inches square. The current required is 50 amperes at a pressure of 220 volts; the motor is wound to develop 15 h.p., though frequently in some veins of coal the machine only uses 30 amperes or 7½ h.p. in making cuts. The machine is started by means of a switch located on a suitable resistance box, on the rear end of the motor, the same being arranged with buttons; the current is gradually turned on by simply passing the lever over these buttons. The armature of the motor is calculated to run at a speed of 1,000 revolutions per minute, from which the speed is reduced so as to run the cutter-bar 200 revolutions per minute. The momentum of the armature is such, that ordinary obstructions met by the cutter-bar in the coal are not perceptible, causing the machine to run steadily and comparatively quiet.

Mr. Harry Eckhardt, manager of the Bell Telephone Co.'s Brantford agency, was married a few days ago to Miss Mary Campbell.