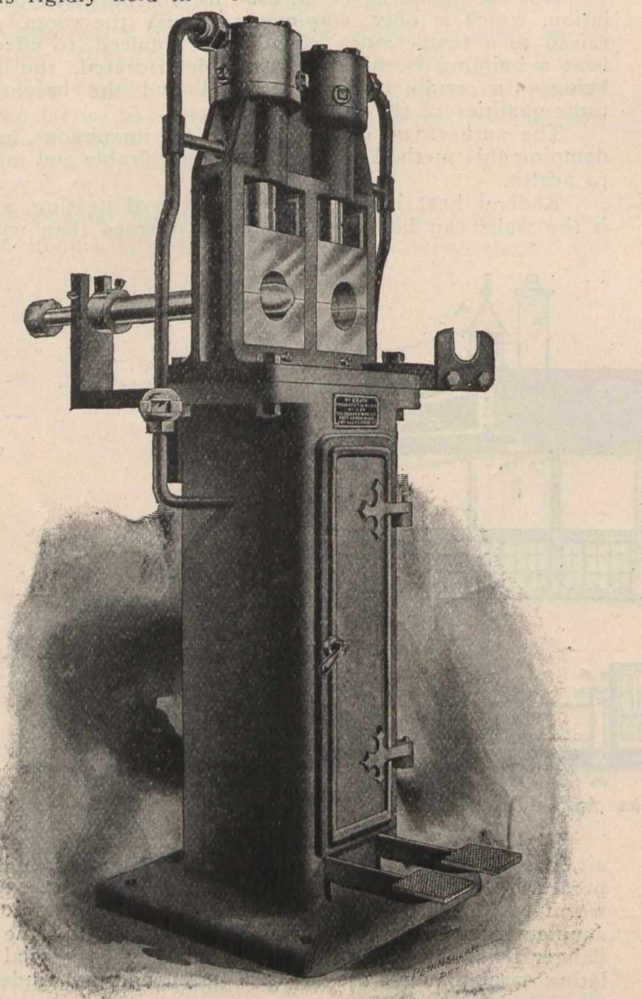
PNEUMATIC FLUE WELDING.

The pneumatic flue welder, which we are enabled to illustrate through the courtesy of the Draper Manufacturing Co., Port Huron, Michigan, was designed to expedite and lessen the cost of welding and swadging locomotive boiler flues. The machine consists of a double cylinder pneumatic hammer, set on a base occupying less than two feet square of floor space, and standing about 4'-6" high. The pistons are 3 1-16" at their largest diameter, made of solid tool steel and hardened and ground to fit the cylinder. They are tapered 6° on each side, being parallel to the cylinder sides for 1½". Below the head, they are shouldered down to 2⅝". The lower end is attached to the top die and is held with a key. The lower die is rigidly held in the steel frame. The dies are bored



The McGrath Flue Welder

to the outside size of the flues, thus allowing for expansion when hot, while the mandrel is nearly the size of the inside diameter of the flue and is provided with a collar to suit the length of safe ends required. The ¾" pipes admitting the air are connected through the back of the valve box inside the base. The two valves are operated by foot levers as shown, each side of the machine working independently. To operate this hammer it is only necessary to press the foot levers, which operation allows the air to exert pressure under the shoulder of the piston, thus forcing it up. When the piston is up it pushes back the small valves, which project into the cylinder, thus admitting air above the piston, and as its area is larger than below the shoulder, it is pushed down until the dies come together. The exhaust occurs through the small holes, shown in the piston, as soon as they come below the cylinder. Immediately after the blow is delivered the piston is again carried up by the air pressure, which is always under the shoulder when the foot-valve is open. The piston will deliver 2,000 or more blows per minute, with 100 lbs. pressure, and as the top die and piston together weigh about 40 lbs., the hammer will strike upwards of 40 blows per second, which is amply sufficient to weld flues. It is claimed that a tube can be welded and swadged in five seconds. The machine will weld flues up to 4½" diameter, and there is no practical limit to the length of ends that may be welded. This machine may have one side equipped for scarfing flues, if desired.

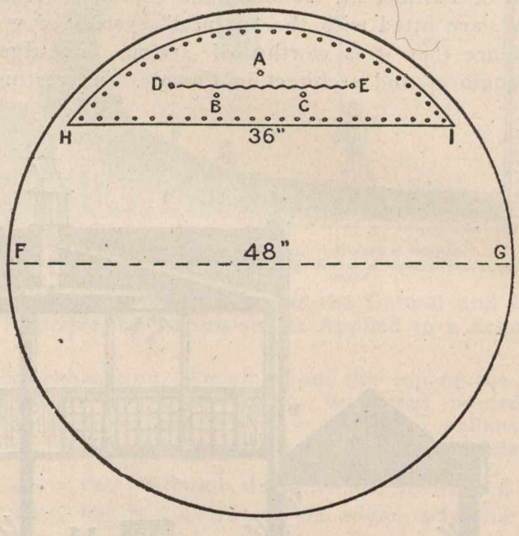
REPAIRING A CRACKED CYLINDER.

The method for repairing a cracked cylinder head as herein described was brought to our notice recently by the Smooth-On Manufacturing Co., of Jersey City, N. J.

The repair was made as follows:

1. While the cylinder was hot a partial vacuum was created in it and Smooth-On Elastic Cement was painted over the crack. The vacuum drew the cement in and this operation was continued until the crack would take up no more cement.

2. Holes were then drilled and tapped at the end of the crack, D and E. and bolts put in to prevent a further extension of the crack.



3. The patch was cut as represented.

4. The crack was then painted with Smooth-On and the patch laid in position. Then it was carefully removed. The imprint of the crack was now shown on the under side of the patch—the Smooth-On sticking to it. The patch was then dished along the line of the imprint to make a recess to hold sufficient cement.

5. The plate was then warmed, and a compound composed of Smooth-On Iron Cement No. 1 and Smooth-On Elastic Cement, mixed half and half, applied to the warm plate with a small trowel, making a thin, even coating.

6. Then the patch was laid in position. The three centre bolts, A, B and C, nearest the crack were brought up (just taut). Then the outside bolts were brought up tight as possible, which forced the cement into the crack. The steam was turned on and the crack was tight.

A SUBSTITUTE FOR CELLULOID.

A discovery of a complete substitute for celluloid, which is not yet patented nor on the market, it is stated overcomes all shortcomings, while retaining all the desirable qualities of celluloid.

The substitute is but little dearer than glass, which is much cheaper than celluloid, and of about the same weight. The new material is very elastic, absolutely non-inflammable, and very easy to work by the turner. By a simple method a lasting polish can be put on all articles made from it, which is a great advantage over celluloid. The material is absolutely without smell. The inventor is a young chemist who has made exhaustive trials of the material with the best results, especially as to durability in heat and permanency of color under sunlight, and in water.

It should be mentioned that the material is a non-conductor of electricity, and can be used for insulation. The invention promises to be of great importance to the whole celluloid industry. Patents have been applied for, and the inventor is sanguine of practical results.