signed to the requirements of each division of road to be operated. The analysis referred to once carefully prepared and put in graphic form should show the performance of each class of engine between stations, with a load line adjusted to conform to the requirements of minimum speed over long stretches of ruling grade. To obtain satisfactory results close co-operation is necessary between all departments affected.

The growth of the trade of the Dominion affecting transportation companies is so rapid that greater caution than ever should now be exercised in constructing new arteries of commerce. It would appear that in determining the main arteries of commerce of the future, greater consideration should be given to conditions affecting their future development than to questions of rapid transit and shortest route under present conditions. The fact must not be overlooked, however, that there will always be a limit to the extent to which physical obstacles can be removed from a route, and for this reason it may be necessary to look for developments along other lines. Some of the sources from which relief must be expected are already to some extent receiving attention from the principal transportation companies, such as greater facilities for a more speedy and continuous flow of traffic in both directions along the main arteries, with corresponding facilities for the better handling of freight at distribution and terminal points.

If the demand, however, for increased train loads should continue to find favor a change in the present principle of the application of tractive power to the hauling of trains must be expected. It is to be hoped the day is not far distant when it will be found more economical to combine the power now developed by such a huge fleet of locomotives into stationary engines for the distribution of power in a manner better adapted to modern requirements so that it shall no longer be necessary to have one or two portable power houses attached to each train unduly wasting the products of our mines and diffusing the sparks which destroy the combustible products of the forests and prairie.

THE USE OF EXPLOSIVES.

The mining engineering profession is accustomed to consider the use of high explosives as its especial field. It is probably not generally realized how widely explosives are used otherwise. Disregarding the strictly engineering work of excavation in rock or compact material on a considerable scale, explosives are finding an increased application in more varied lines. Dynamite seems to be not only available, but highly efficient for such purposes as extracting stumps; breaking subsoils to assist drainage and the entrance of plant roots; digging post holes; ditching, especially for drainage purposes; blowing out holes for planting trees; breaking up unwieldly boulders and excavating in connection with road work.

The National Paving Brick Manufacturer's Association will hold its tenth annual meeting at Cleveland, Ohio, on September 17 and 18. This is the first summer convention the association has held, the former custom of holding winter meetings having recently been altered to afford opportunity for investigating actual work on brick street and road construction. Officers of the National Paving Brick Manufacturers' Association are:—Charles J. Deckman, Cleveland, president; Will P. Blair, Cleveland, secretary.

INSULATION OF JOINTS IN PIPE LINES.*

By William R. Conard,
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SOME years ago it was the writer's privilege to secure pipe for carrying high-pressure gas, or rather that was the term used in speaking of it, and the thought was that it might be of interest to the New England Waterworks Association to have a short description of the manner in which these pipes were laid in an endeavor to get a line as nearly proof against electrolytic action as possible.

The pipe were of the ordinary bell and spigot type with the bell made 5 in. deep and with no lead groove (see Fig. 1), and were tested to 50 lb. of air per sq. in. at the foundry in addition to the regular hydrostatic test. In all there were about 15 miles of 6-in. pipe.

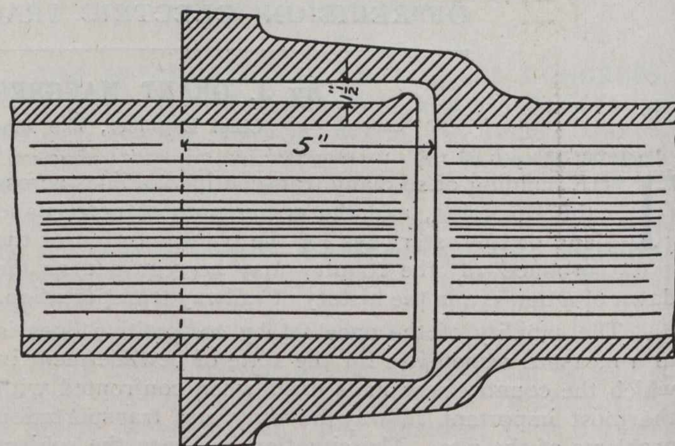

Fig. 1.—Cross-Section of Bell and Spigot.

In laying these pipe the joints were made up by placing at the base of the bell ¼-in. wooden ring, oil-soaked; the spigot of the pipe next to be used was then encircled with a rubber band about 1/16 in. thick and 2½ in. wide placed about 5½ in. from the spigot end of the pipe to prevent an iron ring, afterwards put on, coming in contact with the pipe; the pipes were then put together, the spigot going home against the wooden ring, and about 1½ in. of untarred jute packing calked tight; instead of lead being poured in to make the rest of the joint, an insulating compound about 3 in. deep, black in appearance, which melts readily at 200° F., was poured, after which a square rubber packing was put on, and then a No. 4½ Dresser coupling was applied to the joint and clamped tight (see Fig. 2).

To those unfamiliar with the Dresser coupling, it may be described as consisting of two split clamp rings; one split clamp ring fitting around the outside of the base of the bell, the other around the outside of the spigot end of the pipe, entering the bell, with a 1-inch square rubber packing ring between it and the bell. The two rings are connected and drawn towards one another by four bolts, one ring pressing against the square rubber packing.

The line, after laying and in sections, was tested with 20 lb. per sq. in. air pressure, and all the joints found tight.

Joints made up in this manner are as flexible as poured lead joints, acting just as readily as expansion joints,

*Read before the New England Waterworks Association, February 12, 1913.