punch .75" in diameter, with a load of 100,000 lbs. supplied by the Emery testing machine for a period of 10 seconds after commencing to load, in the manner expressed in Fig. 1.

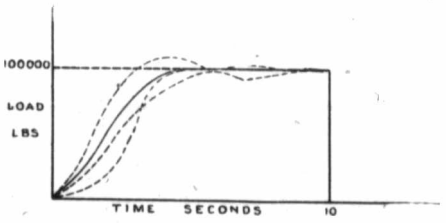

Fig. 1

The indentation was measured from the centre surface of the rail with an instrument reading to one-thousandth of one inch.

It is not known that any definite or satisfactory results were obtained from these tests, owing, probably, to the fact that the diameter of the indent at surface of specimen, or, in other words, the maximum diameter, should have been measured in addition to the identation, as it was afterwards found by the Author that this is the factor determining the relative hardness of the specimens; and also to the employment of the Emery machine instead of the Wicksteed, as the rate of loading by the Emery machine may vary over rather too wide a range for satisfactory results, there being a tendency to exceed the load desired in the effort to secure a balance. This feature in the loading by the Emery machine is illustrated by Fig. 1. Tests were made by the Author to determine this effect by applying loads as near as possible to rates of 5,000, 10,000, and 15,000 lbs. per second. For example, 100,000 lbs. would be applied at a fairly constant rate in 10 seconds and then dropped, 80,000 lbs. for 8 seconds, etc.

It may readily be seen by referring to curves 1, 2, 3, 4, and 5, how the rate of loading may affect the indentation made. It should be understood, however, that this effect is not so marked with an increase of time. For example, a certain indentation may be obtained by applying a load of 100,000 lbs. in 10 seconds; little or no difference might be found after holding the load on for 5, 10, or possibly 20 seconds, as a certain projected area of indent may have