duced in a specimen at a single grip. It is thus seen that the stress is produced by the screw O and lever L G K, while the beam A B and the weights in the scale pan T simply indicate the intensity of that stress.

The specimen H H is held in position by means of wedges, as shown in Fig. 2. The faces of these wedges next the specimen are shaped to suit its form, and being cross-cut like the surface of a file, are enabled to grip it securely. Just before securing the specimen in the lower holder F, the lever M is depressed, causing K and G to ascend. While in this position, the piece is finally secured and the nut N screwed up tightly against the frame at S. K is thus caused to descend slightly, and a stress is produced in the specimen. This stress may vary from 6,000 to 12,000 lbs. according to the strength of the operator. A total stress of 50,000 lbs. may with safety be produced in the specimen. The sectional area, the strength per square inch can be readily calculated. In the case of steel, which is more ductile than cast or wrought iron, it is often necessary to take a second grip before the piece can be broken.

The importance of the testing machine and the knowledge which it affords us is every day becoming more keenly felt. Many structures in which perfect security was desired have been erected with no better knowledge of the strength of the materials used than that obtained by calculation, or from the results of a very few exper-