special grip for the purpose. The design was based on the strength required to withstand a tensile stress equal to that necessary to break the largest size of screw tested, viz.: $\frac{3}{4}''$, and the bending moments set up in the jaws due to this strain, and also to be easily adjustable to the different sizes tested.

Allowing 50,000 lbs. as the tensile strength of wrought iron, there would be required in the jaws a strength sufficient to withstand a strain of 22,000 lbs. absolute, the minimum diameter of the $\frac{3}{4}''$ screw being 9-16″.

The jaws were designed to have a factor of safety of 5′ and consisted of a hollow cylindrical head of machinery steel cut internally with Whitworth thread (6 to the inch) and 3″ deep, with a solid base slotted at right angles to receive the heads of the four jaws. The jaws were tight fitting, and hung on $\frac{1}{2}''$ turned pins, 10″ in length and $\frac{5}{8}$ sq. in. smallest sectional area, and had case hardened blocks, fastened by a screw, to resist abrasion. The clamp that held the jaws firmly in the head of the screw was of the same material, machine steel. They, with 4 set screws, with case hardened tips resting in cup-shaped depressions in the jaws, as near as may be in the plane of the point of application of the force exerted on the screw head. This was to eliminate as far as possible the effect of bending in the jaws that would otherwise be great.

In applying the force necessary to draw the screw, care was taken to observe a uniform rate of loading so that each screw would be drawn in as nearly as possible the same length of time. This was done by attaching to the valve of the machine a pointer so that the fluid was allowed to flow uniformly in all cases. But, owing to the want of perfect uniformity in the structure of the wood, it was impossible to so regulate the feed that each screw would be drawn in the same time. To determine what effect, if any, this difference of time had upon the maximum load, experiments were made, the results of which are given in Table II.

*Table* I.—SUMMARY AND REMARKS.

1. When driven across the grain the *strength developed varied as the depth driven, i.e.*, depth of thread in wood. In no case were the screws driven deeper than the length of thread. Otherwise the friction between the stem of the screw and the wood would affect the maximum load, and the effect of a drift bolt would be added to the effect of the thread of the screw.