

T. OLSEN.
Apparatus for Testing the Tensile Strength of
Metals.
 No. 142,937. Patented September 16, 1873.

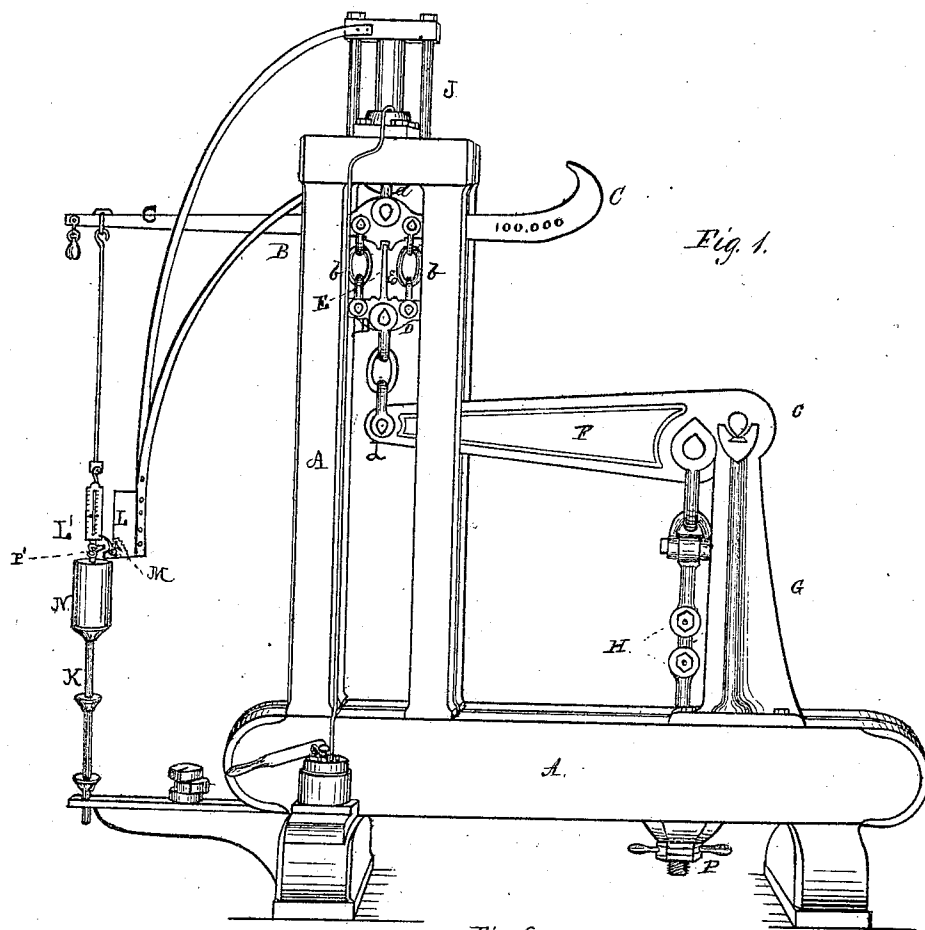


Fig. 2.

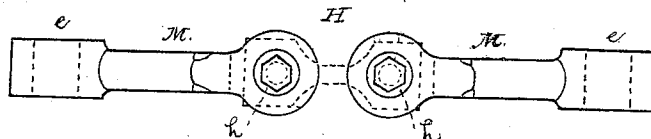
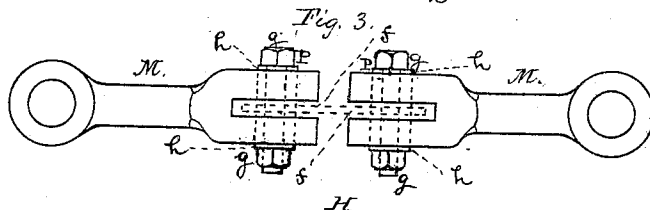


Fig. 3.



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UNITED STATES PATENT OFFICE.

TINIUS OLSEN, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO RIEHLÉ BROS., OF SAME PLACE.

IMPROVEMENT IN APPARATUS FOR TESTING THE TENSILE STRENGTH OF METALS.

Specification forming part of Letters Patent No. **142,937**, dated September 16, 1873; application filed October 31, 1872.

To all whom it may concern:

Be it known that I, TINIUS OLSEN, of the city and county of Philadelphia and State of Pennsylvania, have invented a new and useful Improvement in Apparatus for Testing the Strength of Metals, &c.; and I do hereby declare the following to be a clear and exact description of the nature thereof, sufficient to enable others skilled in the art to which my invention appertains to fully understand, make, and use the same, reference being had to the accompanying drawings making part of this specification, in which—

Figure 1 is a perspective view of the device embodying my invention. Figs. 2 and 3 are views of detached parts.

Similar letters of reference indicate corresponding parts in the several figures.

This invention relates to a device for testing or ascertaining the strength of iron, stone, wood, and other materials, in any form whatsoever, and with any manner of strain, whether tensile, torsional, crushing, indenting, or otherwise. It consists of a compound parallel beam, mechanism for holding the test-piece, mechanism for straining, and an intermediate lever.

Referring to the drawings, A represents a suitable frame-work, from the upper end of which is suspended, by a clevis, *a*, a compound parallel beam, B, which consists of the beam proper, C, and an auxiliary piece, D, which is suspended from the beam C by means of two clevises, *b b*. Of the three knife-edges on piece D, for attachment of clevises, the middle one is not quite equidistant from the others, but is a very little nearer to the one below the short arm of beam C. By this construction of the parallel beam a very powerful leverage is obtained. From the piece D there rises a finger, E, which is adapted to sweep over the side of the beam C, or vibrate in a notch or space on the under side of the said beam. F represents a beam or lever, which has a fulcrum at one end, *c*, on a chair or other suitable support, G, rising from the base of the frame-work. The article or piece to be tested is secured to a gripe or holder, H, which may be connected to the parallel beam B and the lever F, or, as shown in the drawing, to the lever F and the base of the frame-work. The straining mechanism in the present case consists of a hydraulic

jack, J, which may be arranged on the frame A, either above the compound beam B or below the beam F, or other suitable place. If the jack is located above the beam B, the latter is suspended from and connected by clevis to the plunger or movable head of the former. If the jack is located below the beam F, it may be connected by clevis to the lower end of the gripe or holder H; or, if the latter is located between the two beams B F, the jack may be connected to a rod attached to the end *d* of lever F, the holder H being in this case attached to said lever at a point near the fulcrum *c*. If a long piece is to be tested it may be placed between the entire device, and the pump or straining mechanism arranged on separate frame or support in some suitable portion of the shop or location away from the device. The lever F may in such case be a lever of the first order, whose long arm is connected with the parallel beam B above it, and its short arm with the holder H, which is interposed between said lever and the jack. In this arrangement the lever F may be a bent lever, (instead of straight, as shown in the drawing,) and the jack may operate in a horizontal direction. The pump of the jack will be located in any proper or convenient manner on the frame, or elsewhere; but the jack and pump may be dispensed with, and some other mechanism be employed for the purpose of straining, the operation of which will be hereinafter stated. The beam C carries a weight-rod, K, which may be provided with a scale or dial, L'.

When it is desired to test the strength of any article, a proper piece thereof is secured to the gripe or holder H, which may consist of two connecting-pieces, M, the outer end of each of which is formed with an eye, *e*, for the attaching-clevis. The inner ends of said pieces, or ends which are adjacent, are formed with longitudinal channels or spaces *f* for the reception of the ends of the test-piece, and with enlarged eyes for the clamping screws or bolts *g*, on which are placed thimbles *h*, which fit in said enlarged eyes. For each screw or bolt there are two thimbles, which, when the test-piece is in position, bear against the latter on opposite sides, and, when the bolt is passed through the thimbles and an opening in the test-piece, a nut is tightened on each bolt, so

as to press the thimbles against the test-piece, the latter thus connecting the two parts of the gripe or holder, and while the said piece is firmly clamped and held in place the parts of the pieces surrounding the openings (which weaken said piece) are braced and stiffened to prevent unintentional breakage of the piece at said openings. The test-piece having been secured to the gripe the slack is taken up, which in the present case is by means of a screw and nut, P, connected, by clevis or otherwise, to the lower portion of the gripe, and arranged on the bottom of the frame-work A. The pump or straining mechanism being operated, the strain is applied, and the beam B is kept in equilibrium by placing weights on the dish of the weight-rod K, the equilibrium being indicated by the finger E. Additional weights are applied, alternating with the operation of the pump or straining mechanism. This acts on the beam B and gripe H, and consequently on the test-piece, and is continued until the said piece is torn apart or broken. The weights are then counted off, the pressure being thereby indicated; or, in other words, the strain is weighed.

It is evident that the piece may be subjected to various tests, and determine its entire or partial capacity, whether to be strained, crushed, indented, or otherwise.

If it is necessary or desirable to obtain a very accurate result, a weighing attachment may be applied to the device.

L represents a reservoir, which may be attached to the jack, lever, or frame, and is designed to contain shot, water, or other appropriate substance. At the bottom or side of the reservoir is located a valve, stop-cock, or other means of exit, M, which is to be opened and closed automatically by the movements

of the jack or levers through the medium of a toe-piece, P', or by hand operation, as most desirable or necessary. A vessel, N, is attached to the rod K, with its opening convenient to the place of exit of the reservoir L, so that its contents may flow into the said vessel N. When the beam rises the toe-piece P' on the rod K strikes the valve M, opens the latter, whereby a sufficient quantity of the contents of reservoir L is permitted to flow into the vessel, and this ceases as soon as equilibrium is restored, the toe-piece releasing the valve by the sinking of the beam. The automatic arrangement to operate the valve or stop-cock may be dispensed with, and the said operation be performed by hand. The pressure in either case will be indicated on the scale or dial L or vessel N, or by other visible means.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination of the compound parallel beam B, the gripe or holder for the test-piece, and the lever F, substantially as and for the purpose set forth.

2. The combination of the compound parallel beam B, the lever F, the gripe or holder H, and the hydraulic straining power, substantially as set forth.

3. The combination of the compound parallel beam B, the lever F, the gripe or holder H, and the adjusting screw-block P, substantially as and for the purposes explained.

The above signed by me this 14th day of October, 1872.

TINIUS OLSEN.

Witnesses:

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F. W. BAKER.