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## APPARATUS FOR HIGH TEMPERATURE TENSILE TESTING OF MATERIALS

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This invention relates to testing of materials and relates more particularly to stress-rupture testing of materials at elevated temperature.

Objects and advantages of the invention will be set forth in part hereinafter and in part will be obvious herefrom, or may be learned by practice with the invention, the same being realized and attained by means of the instrumentalities and combinations pointed out in the appended claims.

The invention consists in the novel parts, constructions, arrangements, combinations and improvements herein shown and described.

The accompanying drawing, referred to herein and constituting a part hereof, illustrates one embodiment of the invention, and together with the description, serves to explain the principles of the invention.

Objects of the invention are: to provide a new and improved testing apparatus; and, to provide apparatus for making stress-rupture tests of materials under a pure tensile load and at elevated temperatures through the use of which the corrosion variable in tensile testing of materials at such temperatures is eliminated, or at least reduced to a very small, negligible value.

Of the drawing:

Figure 1 is a view in front elevation of a typical and illustrative embodiment of this invention; and

Figure 2 is a view taken along the line 2-2 of Figure 1.

In accordance with the illustrative embodiment of the invention, provision is made for mounting a tensile test specimen between holders in a space which may be evacuated and in which the specimen may be heated to the desired testing temperature, suitable means being provided for externally applying a load of desired magnitude to the specimen in its holders so as to produce and maintain pure tensile stress in the specimen from the applied load.

It will be understood that the foregoing general description and the following detailed description as well are exemplary and explanatory but are not restrictive of the invention.

Referring now more particularly to the accompanying drawing, a framework 10 preferably of steel is anchored firmly in an upright position to a suitable base such, for example, as the platform 11 to which it is braced preferably by means of a pair of rigid brace members 12.

The framework 10 as embodied is of sturdy construction with a column factor of sufficient magnitude to prevent buckling under compressive

loads of considerable magnitude and as here preferably embodied comprises vertical side rails 13 connected at their upper extremities by a horizontal top rail 14 and connected between their upper and lower extremities by a horizontal bottom rail 15, the top, bottom and side rails preferably forming an integral structure. The side rails 13 are provided between the top and bottom rails 14 and 15 with a pair of bracket members 16 each extending inwardly from its side rail in opposition to the other for supporting between the side rails a heater 17, to be described more fully hereinafter.

Means are provided for supporting a standard tensile test specimen 20 in the framework 10 and for applying a load to the test specimen which will produce in it pure tensile stress. The embodied means is readily demountable to permit ready installation and removal of the test specimen and preferably of a nature to permit at least approximate determination of the extent of elongation of the specimen under load. As here preferably embodied, upper and lower specimen holders 21 and 22, respectively, preferably of cylindrical contour throughout the major portion of their length threadedly engage either end of the test specimen 20 and support it therebetween. A bolt 23 having a bifurcated head portion 24 passes from beneath and through the top rail 14 in sliding engagement therewith and is threadedly engaged above the rail by an adjustment nut 25 which seats on the rail. The upper end of the specimen holder 21 is lodged between the arms of the bifurcated head portion 24 to which it is releasably pin-connected by a pin 26. In order to prevent rotation of the bolt 23 upon rotation of the nut 25, the top or supporting rail 14 is provided with a key 27 slidably lodged in a keyway 28 in the bolt shank.

A saddle formed by pair of plate members 30 is pin-connected removably to the lower extremity of the specimen holder 22 by a pin 31, the members 30 being located at either side of the specimen holder and being provided below the pin 31 with an opening 32 in each. The openings 32 are suitably located so as to be coaxial when the members 30 hang vertically and to have their common axis intersect the common longitudinal axis of the holders 21 and 22 in this condition.

A lever 33 positioned between the plate members 30 is provided intermediate its ends with a pair of knife edges 34 extending in aligned relation from opposite sides of the lever in the respective openings 32. One end of the lever extends under the bottom rail 15 and is provided