E. SCHNEIDER.

PROCESS AND APPARATUS FOR ASCERTAINING THE HARDNESS OF METAL PARTS.

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1,354,218. Patented Sept. 28, 1920.

Fig. 1.

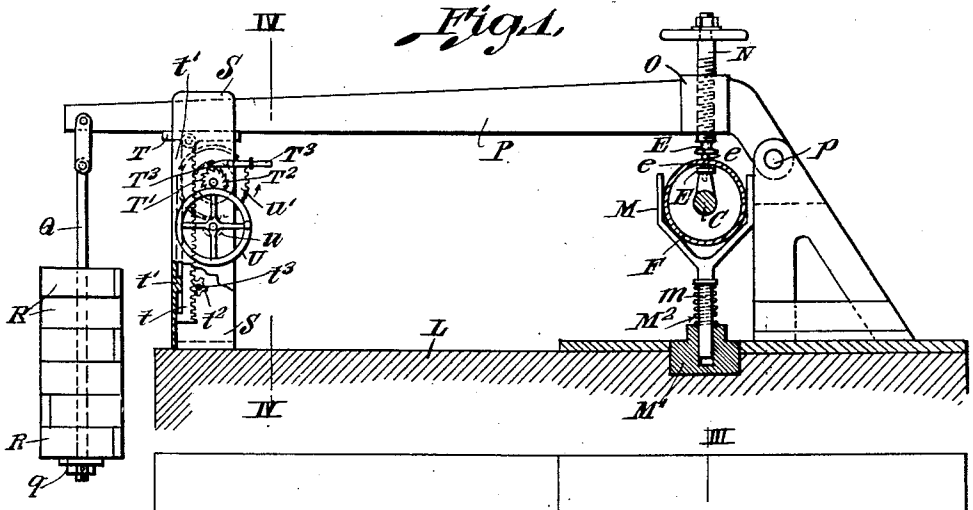


Fig. 2.

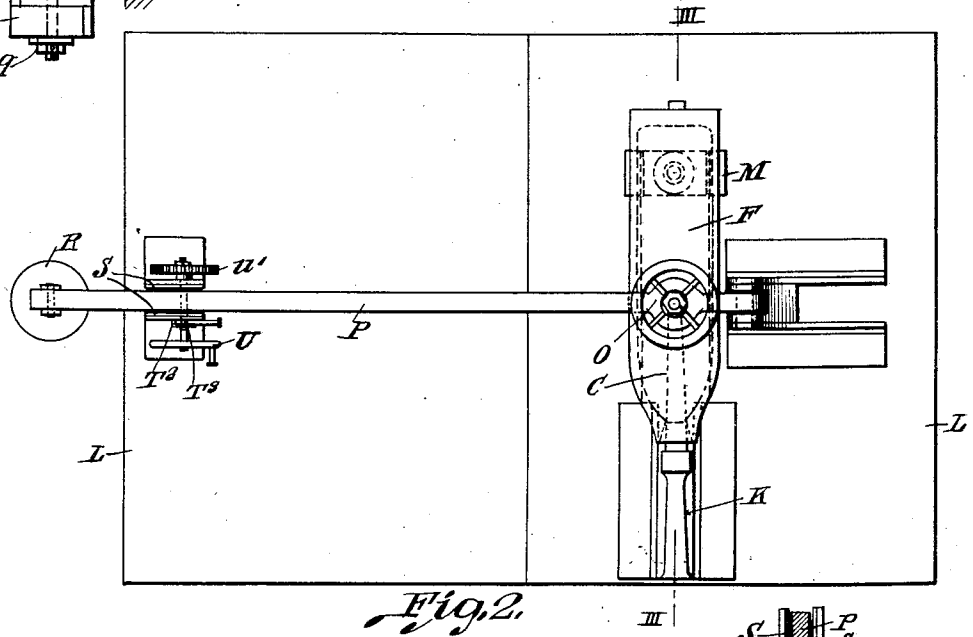


Fig. 3.

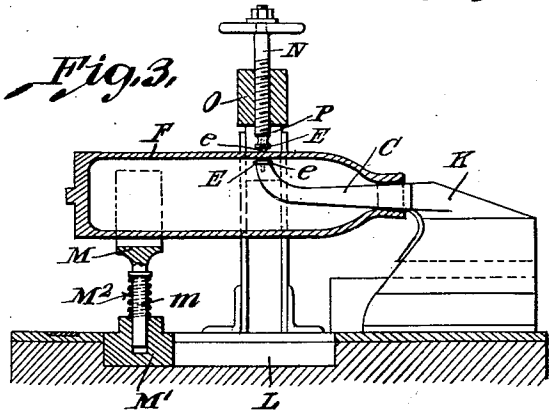
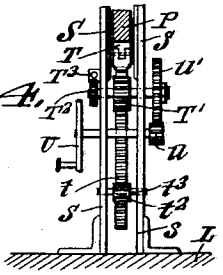


Fig. 4.



Inventor:
Eugène Schneider
by Howson Cameron, Sexton & Howson
Attorneys.

UNITED STATES PATENT OFFICE.

EUGÈNE SCHNEIDER, OF PARIS, FRANCE, ASSIGNOR TO SCHNEIDER & CIE., OF PARIS, FRANCE, A LIMITED JOINT-STOCK COMPANY OF FRANCE.

PROCESS AND APPARATUS FOR ASCERTAINING THE HARDNESS OF METAL PARTS.

1,354,218. Specification of Letters Patent. Patented Sept. 28, 1920.

Original application filed August 21, 1918, Serial No. 250,862. Divided and this application filed June 16, 1919, Serial No. 304,651. Renewed August 12, 1920. Serial No. 403,153.

To all whom it may concern:

Be it known that I, EUGÈNE SCHNEIDER, a citizen of the Republic of France, and a resident of Paris, France, have invented a new and useful Improvement in Processes and Apparatus for Ascertaining the Hardness of Metal Parts, which invention is fully set forth in the following specification.

In my application Serial No. 250,862 filed August 21, 1918, for the process and apparatus for ascertaining the hardness of metal parts of which the present application is a division, is described and claimed a method and apparatus whereby simultaneous pressures are caused to act under substantially identical conditions at two opposite points including between them the thickness of the article to produce indentations, thereby furnishing indications of the degree of homogeneity of the metal in the region where the test has been made.

The present invention relates to a constructional form of apparatus for carrying out the above method and is designed more particularly for testing the hardness of the walls of a hollow article such as a shell.

In order that the invention may be more readily understood, reference is had to the accompanying drawings in which—

Figure 1 is a side elevational view, partly in section, showing testing apparatus embodying my improvements.

Fig. 2 is a plan view of Fig. 1.

Fig. 3 is a cross-sectional view on line 3—3 of Fig. 2 showing the manner of testing a shell, and

Fig. 4 is a detail.

In the constructional form of the apparatus shown in the drawings C is an arm formed on or carried by a bracket K mounted on a bed L. This arm is so shaped as to be capable of entering a hollow article such as the nose of a shell F and while being strong may have a slight degree of springiness which gives it the character of a jaw of a pair of pincers. M is a cradle for supporting the shell to be tested and has its axis located in a longitudinal axial plane of the arm C. The cradle is preferably provided with a supporting stem m slidable in a foot-plate M′, which is adapted to slide in the bed L in the longitudinal axial plane of the arm C. M^2 is a spring bearing at one end against the underside of a shoulder on the cradle M and at its other end against the foot-plate M′. This spring is calibrated in such a manner that when the cradle is brought to the desired point, the spring M^2 will approximately balance the action of the weight of the shell F upon the end of arm C.

At the end of the arm C is mounted an indenting device, preferably removable, consisting, for example, of a ball e held in a small holder E adapted to be screwed into a threaded recess in arm C.

The other jaw of the tongs or pincers is constructed as follows: N is a screw to the end of which there can be alternately fixed the ball-holder E or a die-holder. This screw is movable in a nut O formed at an intermediate point of a lever P located in a plane at right angles to the longitudinal axial plane of the arm C. This lever is fulcrumed at one end on an axle pin p mounted in the framing of the apparatus. The force required for producing the simultaneous indentations, is applied at the opposite end or at any other suitable point of the lever P by any known means.

By way of example the drawing shows a simple means consisting in suspending near the free end of the lever P, a rod Q provided with a retaining collar or shoulder q, upon which a variable number of heavy disks R can be engaged.

The lever P may be guided between uprights S. Between these uprights there may be located a retractable support T. This support may be constituted for instance by a plate mounted on the end of a track t working between plain supports t^1 and a pinion t^2 loose on an axle pin t^3 carried by the said uprights S.

Normally the action of the weights R will be balanced by the support T which is maintained in engagement by an actuating pinion T^1 fixed to a ratchet wheel T^2 with which a pawl T^3 is adapted to be engaged.

In order to raise the lever P, the pinion T^1 will be operated by means of a hand-wheel U and gear u—u^1, after having first placed the pawl T^3 in its initial position.

For the purpose of producing the simultaneous indentations by means of the pincers arranged in this manner, first the upper ball holder E is brought into contact with the shell. It will then be necessary to move

away the support T by disengaging the pawl T^2 and thus allow the weight R to come freely into action. The support T will move away by its own weight.

After the external and internal indentations have been produced simultaneously by means of the improved apparatus, they may be reproduced in relief in a plastic material, by dismounting the ball holders E—*e* and replacing them by disks, that is to say, by similar holders bearing a plate of lead or other plastic material. The pressure for effecting the simultaneous moldings of the two indentations may be produced by means of the same weight R on the lever P, acting if desired for a shorter time, or by means of a suitably reduced weight.

It is to be understood that the improved apparatus for producing and then observing simultaneous indentations formed in varying regions of a test article under identical conditions of pressure, temperature and duration of indentation, while furnishing on one hand valuable indications as to the construction of the test article, is also capable of furnishing at the same time indications as to the apparatus for tempering or treating, or as to the nature of the metal; if the operations are carried out with a standard test piece or on a verified test piece. This invention can thus furnish simple and practical means for regulating a manufacture, because it allows of modifying according to the indications obtained, the apparatus for tempering or treating, as well as the nature of the metal.

What is claimed is:

1. In apparatus for testing the hardness of hollow articles by producing indentations in opposite surfaces of the article, the combination of an arm rigidly supported at one end, the free end adapted to enter the cavity of the test article and provided with indenting means, a lever fulcrumed at one end and provided with indenting means in alinement with said first-named indenting means, a yielding support for the article to be tested, and means for applying graduated power to the free end of said lever.

2. In apparatus for testing the hardness of hollow articles by producing indentations in opposite surfaces of the article, the combination of an arm adapted to be rigidly supported at one end, the free end adapted to enter the cavity of the test article and provided with indenting means, a lever fulcrumed at one end and provided with adjustable indenting means in alinement with said first-named indenting means, a yielding support for said article adjustably mounted and means for applying graduated power to the free end of said lever.

3. In apparatus for testing the hardness of hollow articles by producing indentations in opposite surfaces of the article, the combination of a slightly yielding arm adapted to be rigidly supported at one end, the free end adapted to enter the cavity of the article to be tested and provided with indenting means, other indenting means adjustably mounted in alinement with the first-named indenting means, a yielding support for the article to be tested and means for applying graduated indenting pressure to said last-named indenting means.

EUGÈNE SCHNEIDER.

Witnesses:
LOUIS GARDET,
HENRI MONIN.