C. E. ALBRIGHT.

APPARATUS FOR DEMONSTRATING THE LAWS OF ELASTIC DISTORTION.

APPLICATION FILED APR. 6, 1908.

903,262. Patented Nov. 10, 1908.

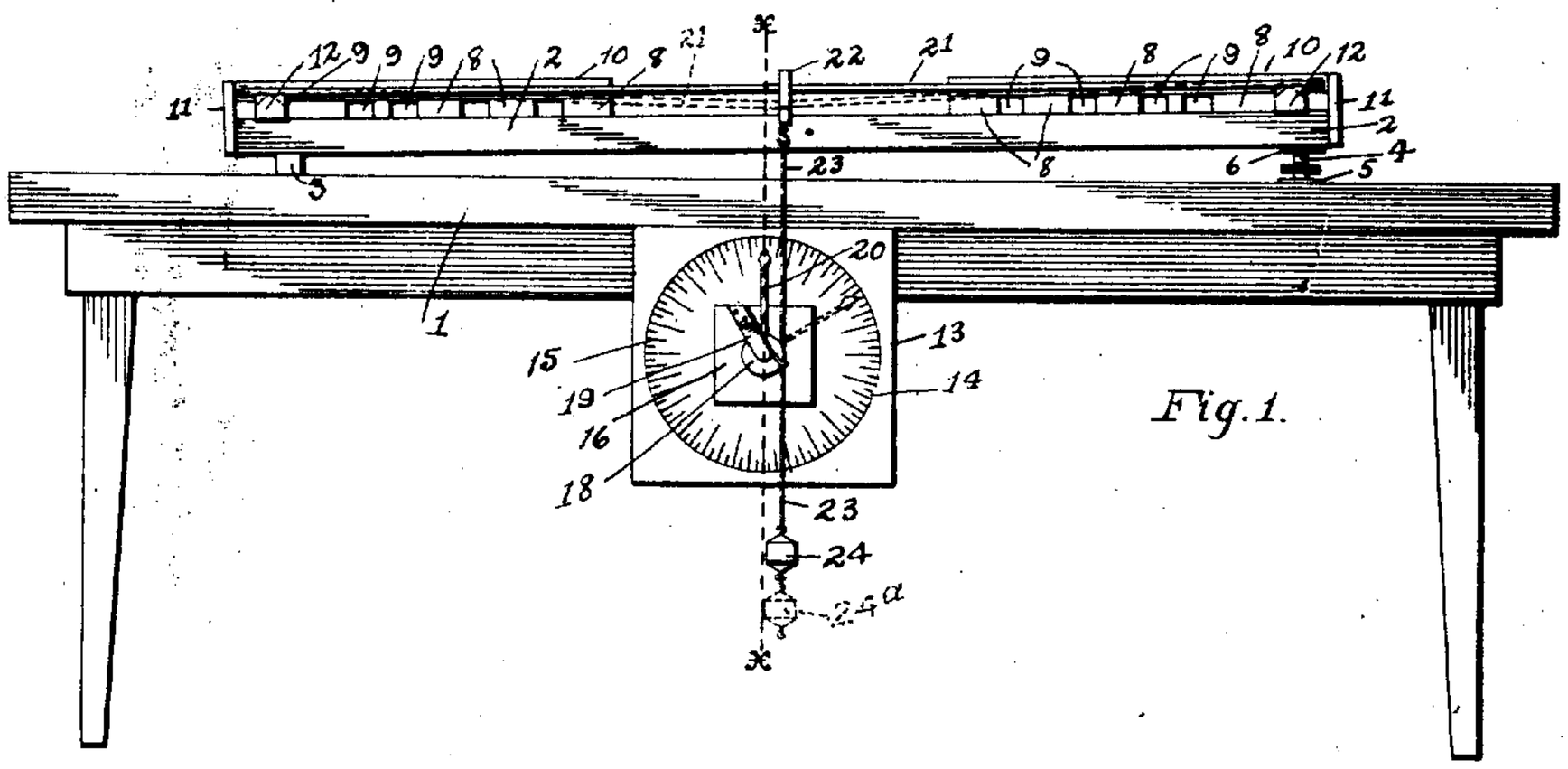

Fig. 1.

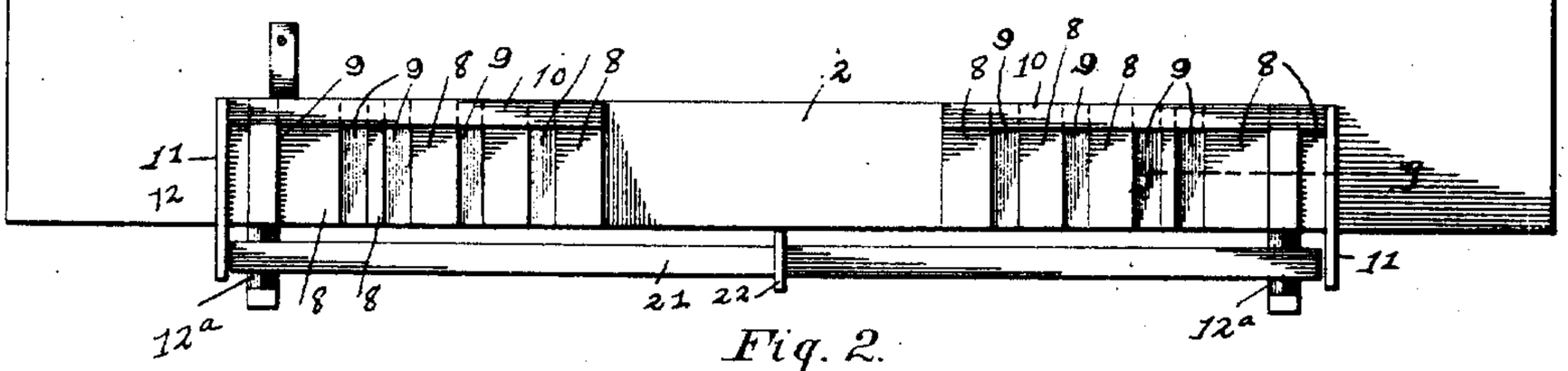

Fig. 2.

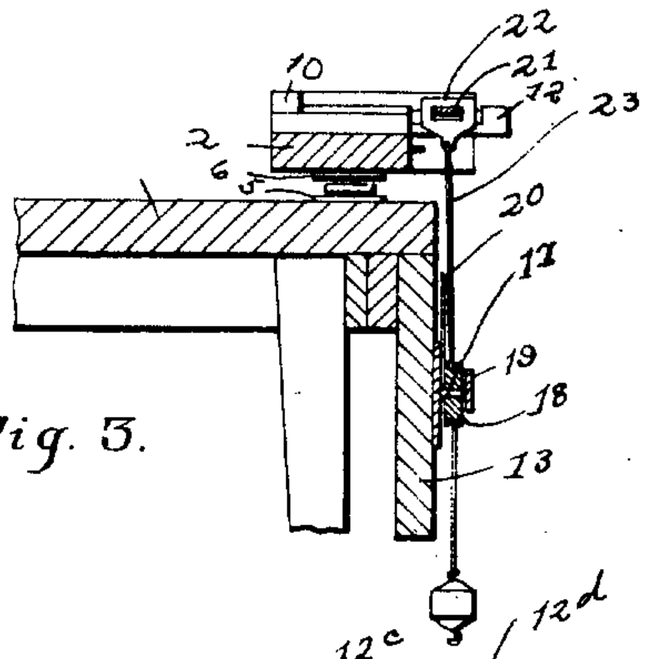

Fig. 3.

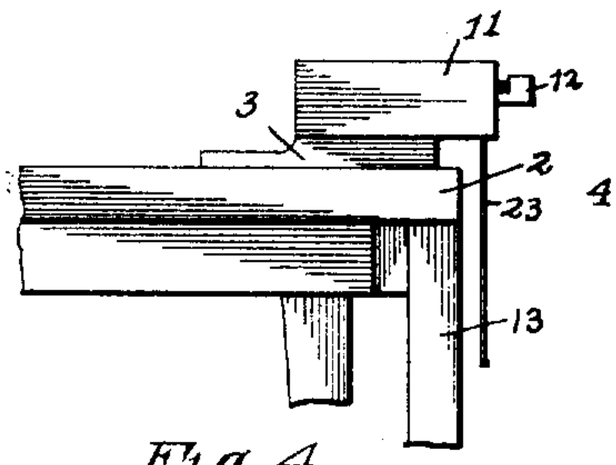

Fig. 4.

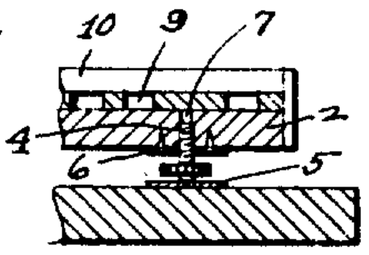

Fig. 5.

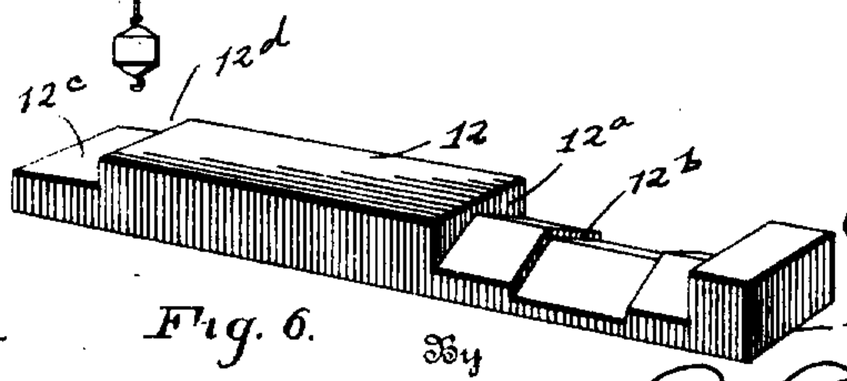

Fig. 6.

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APPARATUS FOR DEMONSTRATING THE LAWS OF ELASTIC DISTORTION.

No. 903,262. Specification of Letters Patent. Patented Nov. 10, 1908.

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To all whom it may concern:

Be it known that I, CHARLES E. ALBRIGHT, a citizen of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented certain new and useful Improvements in Apparatus for Demonstrating the Laws of Elastic Distortion, of which the following is a specification.

My invention relates to the improvement of apparatus for indicating the elasticity of metal or other bodies, and the objects of my invention are to provide an improved apparatus of this character wherein is embodied comparatively simple means for demonstrating the laws of elastic distortion of a metal or other body; indicating the elastic fatigue of a metal or other body with stress applied and indicating a given deflection with unit ratio when a given stress is applied to said body and to produce other improvements which will be more fully pointed out hereinafter. These objects I accomplish in the manner illustrated in the accompanying drawing, in which:

Figure 1 is a front elevation of my improved apparatus showing a metallic bar in position for testing thereon, Fig. 2 is a plan view of the same, Fig. 3 is a sectional view on line *x*—*x* of Fig. 1, Fig. 4 is an end view, Fig. 5 is a detail section on line *y*—*y* of Fig. 2, and, Fig. 6 is a detail view in perspective of one of the removable bearing blocks which I employ in the manner hereinafter described.

Similar numerals refer to similar parts throughout the several views.

1 represents a suitable table having a horizontal top plate, from and above which is supported in a horizontal or substantially horizontal position, a board 2. This board has its underside near one end bearing upon a suitable supporting bar 3, which rests upon the table top and at its opposite end said board is adjustably supported upon a vertical adjusting screw 4, the lower end of which is pivotally supported in a bearing plate 5 upon the table top and the upper threaded portion of which passes through a threaded opening in a plate 6 on the bottom of the bar 2 and extends loosely within an opening 7 in said board.

The board 2 which forms the base of the support for the metallic bar or rod to be tested, is provided on its upper side and at each side of the center of its length with a plurality of transverse and parallel blocks 8, which result in the formation of transverse ways or recesses 9.

10 represents stop bars, one of which is secured upon the upper sides and rear portions of the blocks 8 of each group. As indicated at 11, I provide each end of the board 2 with an upwardly extending end plate.

12 represent bearing blocks, of which I employ two, these bearing blocks being adapted to be removably inserted into the ways 9. In the construction of each of the bearing blocks, I recess the upper side and outer portion thereof in the manner indicated at 12^a in Fig. 6. The upper surface of the recessed portion is inclined laterally to form a central comparatively sharp bearing edge and said recess is preferably of such length as to receive a bar of predetermined width, said bar being adapted to bear upon the central ridge of the recess.

In order to accommodate or properly support a bar of less width, I have provided the central portion of the recess 12^a with a second or sub-recess 12^b, the upper surface of which is inclined to form a central ridge, as shown, which is somewhat lower than the corresponding ridge of the main recess. The rear end of the block 12 has its upper side cut away as indicated at 12^c, thus forming a transverse block shoulder 12^d. Of the two blocks thus constructed, one is adapted to be inserted in one of the ways or recesses 9 on one side of the center of the length of the board 2 and the other is adapted to be inserted in a similar manner in a corresponding way or recess on the opposite side of the center of the length of said board. When thus inserted, it will be understood that the reduced rear end portions 12^c of the blocks 12 will extend beneath the stop bars 10, while the shoulders 12^d of said blocks will abut against the forward sides of said stop bars.

Depending vertically from the front or forward edge portion of the table top 1 is an indicator board or plate 13, the latter having indicated upon its face a dial or circle 14 from which radiate suitable dial or graduation marks 15 which may represent units or fractions of units of any desired value. Secured to the face of the plate 13 and to the central portion of the dial 14 is a plate 16 in which is pivoted the inner end of a short horizontal shaft 17 of a pulley or grooved wheel 18, the outer end of said

shaft 17 being journaled in the outwardly bent member of a semi-yoke bar 19, one end of which is secured to the plate 16. The pulley or grooved wheel 18 has projecting from the inner portion of its periphery an indicator hand 20.

21 represents a metal bar which is to be tested for the purposes hereinafter set forth. This bar has its outer end portions bearing upon and in the recessed portions of the blocks 12, the bodies of the latter having been inserted in corresponding ways or recesses 9 of the groups of said ways or recesses on opposite sides of the center of the board 2. As shown more clearly in Fig. 3 of the drawing, the central portion of the bar 21 passes through and supports a stirrup-like hanger 22. The hanger 22 is adapted to have hooked into a depending eye-piece thereof, the upper end of a flexible inelastic cord 23, this cord extending downward and being given one or more wraps or coils about the groove of the pulley or wheel 18 from which the cord depends to a suitable point below the dial.

In utilizing my invention, it will be understood that the indicator hand is normally at zero or in the vertical position indicated in Fig. 1 of the drawing, but it is obvious that by hooking into engagement with the lower end of the cord 23 a weight body such as is indicated at 24, of sufficient weight to produce a downward deflection of the bar 21, the partial rotation of the grooved wheel 18 imparted by the downward movement of the cord, will result in moving the indicator hand to the right and thereby indicating by reference to the dial graduations to which said indicator points, the degree of deflection of the bar 21 from a straight line. It will be understood that in order to measure definitely this deflection, the weight of the body 24 is predetermined and in completing the calculation the dimensions of the bar 21 are taken into consideration.

As indicated by dotted lines in Fig. 1 of the drawing, it is obvious that as desired, other weight bodies such as that shown at 24^a may be detachably connected with the weight body 24, thereby increasing the deflection of the bar 21 and moving the indicator hand a greater distance from its normal position.

By the means described, it will be seen that a method is provided for readily indicating the deflection of a metal body with a given stress applied thereto.

It is well known that in case a metal body such as the bar 21 is bent or deflected beyond a certain limit, said bar when relieved of stress by removal of the weights from the cord, will at once make but a partial return, but that in time said bar will move from its point of partial return to its normal position. It is evident that in this operation, the indicator hand will indicate the point of partial return, thereby showing in units or fractions thereof the elastic fatigue of the metallic body.

It is obvious that by withdrawing the bearing blocks 12 and inserting them in recesses 9 nearer the center of the length of the board 2, bearings will be provided for bars of less length than that shown. It will also be understood that the ways or recesses 9 on one side of the center of the board, are arranged at set or measured distances from the ways on the opposite side of said board 2, so that the predetermined distances between the bearing edges of blocks 12, when inserted into corresponding recesses 9, shall be at a unit distance or at predetermined fractional parts of a unit distance apart.

In order to secure a zero reading or reading of the indicator, or to insure the vertical position of the indicator hand, as illustrated in Fig. 1, I have provided the adjustable supporting screw 4 by turning which the board 2 may be raised or lowered, thereby raising or lowering the bar to be tested and effecting the desired movement of the indicator hand through the cord 23.

From the construction and operation described, it will be observed that simple, reliable and accurate means are provided for demonstrating the laws of elastic distortion of metal or other bodies.

What I claim, is:

1. In a device of the character set forth, the combination with a supporting frame comprising a base board and a series of pockets or ways on each side of the center of the length of said board, bearing blocks adapted to be removably supported in the desired ones of said pockets or ways, and a graduated dial supported below said supporting frame, of a grooved wheel pivoted centrally on said dial, an indicator hand carried by said wheel and a cord passing about said grooved wheel, the upper end of said cord being adapted to be detachably connected with a body supported upon said bearing blocks and the lower end of said cord being adapted to support one or more bodies of predetermined weight.

2. In a device of the character described, the combination with a supporting frame comprising a base board having a series of pockets or ways formed on each side of the center of its length, bearing blocks adapted to be inserted in said pockets or ways and to project therefrom, a vertically adjustable supporting screw under one end of said base board, and a graduated dial below said base board, of a grooved wheel journaled centrally on said dial plate, and a cord passing about said grooved wheel, the upper end of said cord adapted to be detachably connected with a body supported upon the projecting portions of said bearing blocks and the

lower end of said cord adapted to support bodies of predetermined weight.

3. In a device of the character described, the combination with a supporting frame comprising a base board and a series of pockets on each side of the center of the length of said board, bearing blocks the inner portions of which are adapted to be inserted in the desired ones of said pockets, each of said bearing blocks having the upper side of its outer portion recessed and said recessed surface being inclined laterally from the center of its width, and a graduated dial plate below said supporting frame, a grooved wheel journaled centrally on said dial plate, a cord running about said grooved wheel, and an indicator hand carried on said wheel.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES E. ALBRIGHT.

Witnesses:

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A. L. PHELPS.