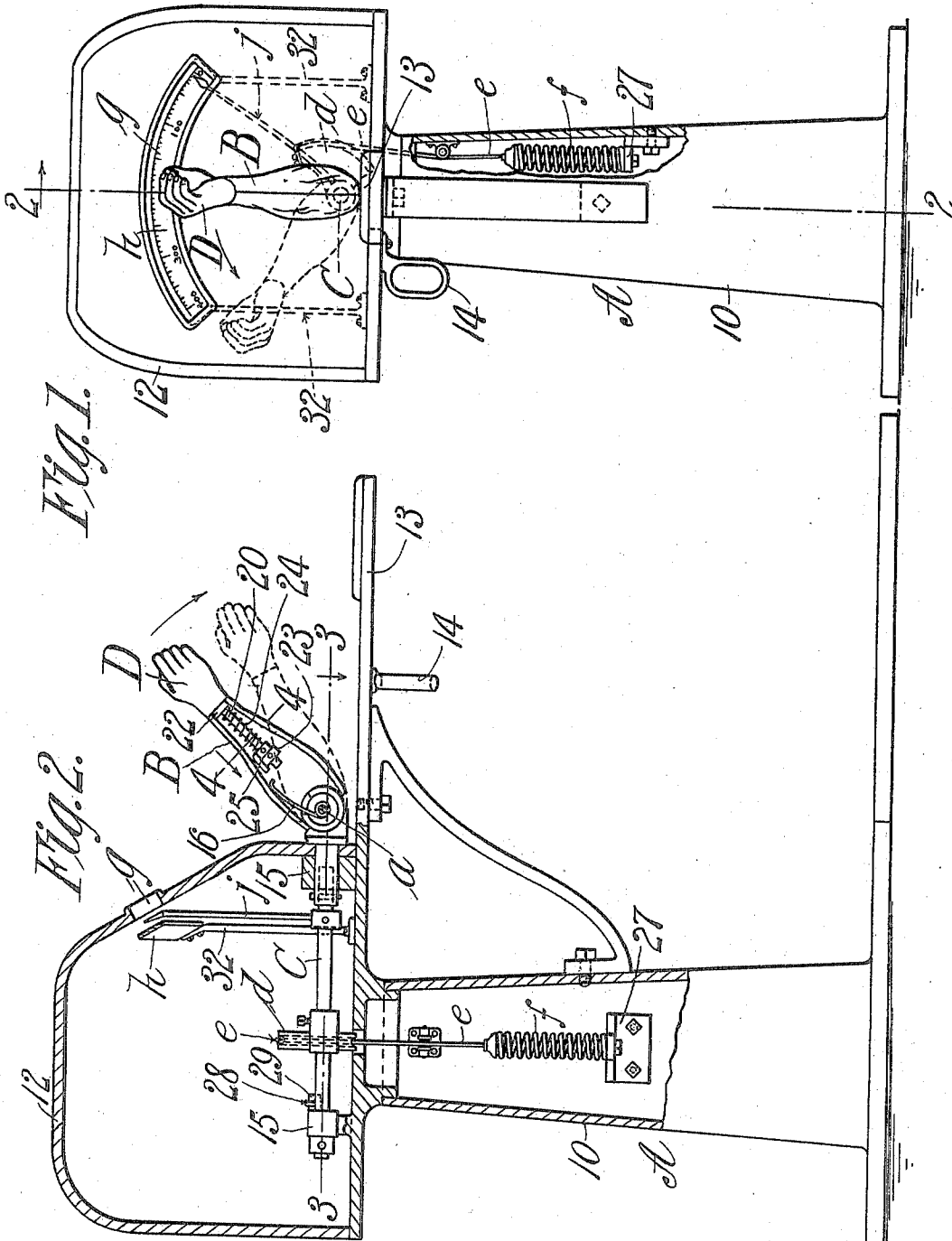


W. H. JOHNSON.
STRENGTH TESTING MACHINE.
APPLICATION FILED JULY 2, 1909.

948,140.

Patented Feb. 1, 1910.

2 SHEETS—SHEET 1.



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Fig. 3.

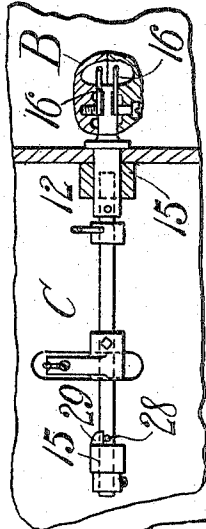


Fig. 4.

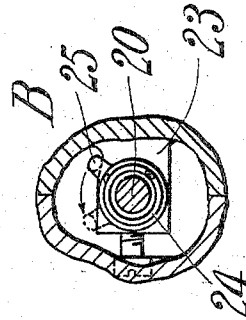
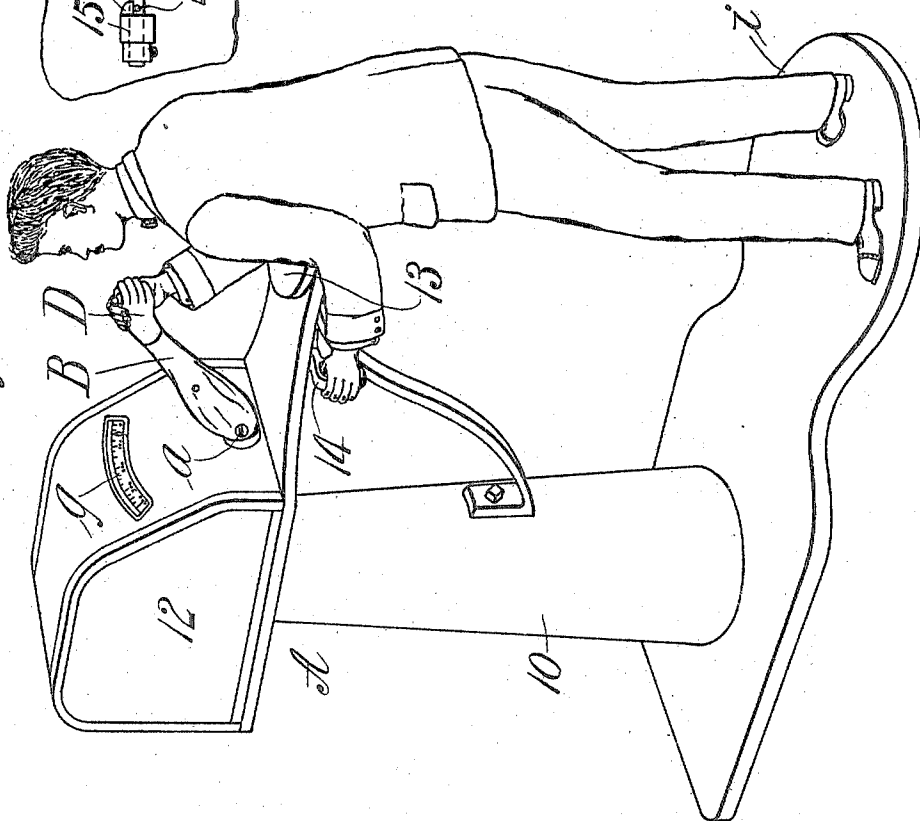


Fig. 5.



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UNITED STATES PATENT OFFICE.

WILLIAM H. JOHNSON, OF BRANDON, VERMONT.

STRENGTH-TESTING MACHINE.

948,140.

Specification of Letters Patent.

Patented Feb. 1, 1910.

Application filed July 2, 1909. Serial No. 505,599.

To all whom it may concern:

Be it known that I, WILLIAM H. JOHNSON, a citizen of the United States of America, and resident of Brandon, in the county of Rutland and State of Vermont, have invented certain new and useful Improvements in Strength-Testing Machines, of which the following is a full, clear, and exact description.

This invention relates to a machine or apparatus to enable a person to test the strength exerted by the wrist and forearm by the exertion of power in a lever-like action of the arm in which the elbow has a fulcrum support. In other words, the apparatus is one to enable a person to exercise an exertion of power very much the same as in the somewhat well known game of "twisting wrists" in which two persons, occupying positions opposite to each other, and resting their elbows on a table or like support, grasp hands and then the one who may be of superior strength, first twisting the wrist of the other around, then forces the arm of his opponent from an upright down to a horizontal position.

The present machine is one having a rocking support to which a yielding resistance is imposed, and provided with a mechanical arm extending angularly from such rocking support, such mechanical arm to take the place, with any person who is operating the apparatus, of the arm of a human opponent.

The machine, furthermore, comprises in combination with the aforementioned rocking support, means for registering greater or less extent of movement of the rocking support as swung by the arm and correspondingly indicating the amount of power exerted, which is proportionate to the extent of the movement.

The improved strength testing machine or apparatus is described in conjunction with the accompanying drawings and defined in the claims.

In the drawings:—Figure 1 is a front elevation of the strength testing machine; Fig. 2 is substantially a vertical sectional view as taken on line 2—2, Fig. 1; Fig. 3 is a partial horizontal sectional view as taken on line 3—3, Fig. 2; Fig. 4 is a cross-section, on a larger scale, through the arm as taken on line 4—4, Fig. 2; Fig. 5 is a perspective view of the apparatus with an indication of the manner of use of the same.

In the drawings,—A represents a support-

ing frame of hollow construction, comprising an upright 10 and an enlarged casing 12 at the upper portion thereof, said frame, furthermore, having a forwardly projecting shelf-like extension 13 to constitute an elbow rest; and said shelf extension is provided with a handle 14 to be manually grasped.

B represents a mechanical arm which is carried on a rocking support which in the present instance is constituted by a shaft C journaled for its rocking movements in bearings 15, 15, in the enlarged portion 12 of the casing, the extremity of said shaft extending forwardly at the exterior of the casing over the shelf extension, and it is to such externally protruding portion of the shelf that the arm B is connected. This arm at all times having the function of a crank member for the rockshaft is, however, so pivotally connected to the extremity of the rockshaft that it may be swung on a plane coincident with the axis of the shaft from a more or less upright position, as shown in full lines in Fig. 2, to a lower position as indicated by the dotted lines to accord with the lengths of arms of different persons who use the machine by resting the elbow on the elbow support 13. The arm B, as shown, is connected to the extremity of the rockshaft by the pivot *a* which extends through the arm and shaft extremity at right angles to the axis of the shaft. The arm is maintained normally in its elevated position by the duplicated springs 16 which are coiled around and anchored to the pivot *a* while their free extremities have reactions against the arm.

The mechanical hand D which is carried at the upper extremity of the arm B is swivel jointed to the latter by having an integrally formed stud 20 longitudinally extending from the hand within the hollow arm and having bearings in the lugs or webs 22 and 23 which are internal parts of the hollow arm. The spiral spring 24 is coiled around the stud extension of the hand, one end thereof being connected to the lug 24 while the other end is connected to the said stud so as to exert a torsional force on the hand to maintain it normally in a fixed relation on the arm, as insured by the engagement of the stop 25, carried as one with the stud, against the edge of the lug; and the extent of the swiveling movement of the hand on the arm, against the reaction of the

spring 24 will be also limited by the engagement of the said stop member 25 against another edgewise portion of the lug 23.

The rocking support for the mechanical crank-like arm B, constituted by the shaft C, is provided within the casing with a sector-like extension *d*, to which a strap, cord, wire or other suitable flexible connection *e* is secured, such flexible connection extending over the grooved edge of the part D and is secured to the upper end of the spiral spring *f*, here shown as located within the hollow upright 10, the lower end of said spring being secured to a bracket 27; and all so that the force exerted by a person against the crank-like arm B to swing it by its center of movement and to more or less rotatively move the shaft C would be against a stretching of the spring *f*, the character and strength of which are to be such as to constitute a suitable means of yielding resistance imposed against the rocking support.

A suitable stop is provided for limiting the retractile movement of the arm so that, normally, it will remain in its properly determined upright position, the same, for instance, consisting of a stud 28 on the rockshaft which has an abutment against a shoulder 29 on one of the journal bearing supports 15.

The upper portion 12 of the hollow frame is provided with an arc-shaped side opening *g* in its front (which may be covered with glass); and within the casing and slightly to the rear of said opening is a graduated curved scale *h*,—32, 32, representing the supports therefor; and *j* represents a pointer shown as constituted by a slender arm or rod radially extending from the rockshaft C and registering on the face of the graduated scale which is exposed at the aforesaid side opening. This pointer will normally rest at zero, and will move around to registration on the graduations having pound or power indicating numbers on the scale in extents according to the strength and force exerted by a person proportionate to which is the extent of rotative movement of the rocking support C for the mechanical arm.

The manner of using this apparatus is indicated in Fig. 5, wherein it is represented that a person standing in front of the machine (which will usually have an extension base *i*) resting the elbow of the right arm on the elbow support, grasps the hand of the mechanical arm B, and at the same time usually grasping the fixed handle with the left hand. He then usually imparts a twisting motion to the hand on the arm B and then forces such arm B more or less far toward a horizontal position according to the power which he is able to exert; and an indication in pounds of the resistance overcome by the operator is shown on the scale.

This machine will afford amusement and

satisfaction to various persons who may competitively operate it.

I claim:—

1. In a strength testing apparatus of the character described, in combination, a rocking support having an arm extending angularly therefrom and provided with a hand, to be grasped by the hand of a person, and swiveled on said arm, and means for imposing a yielding resistance to the movement of the rocking support.

2. In a strength testing apparatus of the character described, in combination, a rocking support having a mechanical arm connected thereto and extending therefrom, said arm having a mechanical hand rotatively jointed thereon, means for imposing a yielding resistance to the movement of said rocking support, and means for imposing a yielding resistance to the rotative movement of the hand relatively to the arm.

3. In a strength testing apparatus of the character described, in combination, a rocking support having a mechanical arm jointed thereto and extending, crank-like, substantially radially to the axis of the rocking support, and adapted to have a swinging movement on said support whereby the extremity of the arm may be variable as to the height of its position, means for imposing a yielding resistance to the movements of the rocking support, and a rest for a person's elbow adjacent said crank-like arm.

4. In a strength testing apparatus of the character described, in combination, a supporting frame, a rockshaft journaled in said supporting frame and having its extremity extended to the exterior of the frame, and having a mechanical, crank-like arm pivotally jointed to the shaft extremity, and adapted downwardly and relatively to the shaft axis, a spring operative on and for elevating the arm relatively to the shaft, and a spring against the stress of which the shaft has its rocking movement in one direction.

5. In a strength testing apparatus of the character described, in combination, a frame comprising an inclosing casing having an aperture in the front thereof and a graduated scale adjacent, visible at, said aperture, a rocking support mounted for its movements in said casing and having a portion thereof extended to the exterior of the latter and provided with a mechanical arm angularly extending therefrom, means within the casing for imposing a yielding resistance to the movement of said rocking support, and a pointer carried by and movable with the rocking support and registering on said scale.

6. In a strength testing apparatus of the character described, in combination, a frame comprising an inclosing casing and having a

forwardly extending shelf to constitute an elbow rest and provided with a handle to be manually grasped, a rocking support mounted in said casing and having a portion thereof extended to the exterior of the latter above said shelf extension and provided with an angularly extended mechanical arm, and means for imposing a yielding resistance to the rocking movement of said shaft.

7. In a strength testing apparatus of the character described, in combination, a supporting frame having a shaft journal supported for rocking movements therein, said shaft having at a portion thereof within the frame a sector shaped extension, a spiral spring having one end immovably secured in the frame and having a connection with said sector shaped extension, and a mechanical crank-like arm located externally of the frame and connected to the extremity of the said rock-shaft.

8. In a strength testing apparatus of the character described, in combination, a frame having the form of a hollow casing provided with an arc shaped sight opening in its front and having a graduated curved scale plate supported within the casing behind said side opening, a rockshaft journaled in the casing and having its extremity extending to the exterior of the latter and provided with a crank-like arm, a spring connected with and

for yieldingly resisting the rocking movement of the shaft, and a pointer arm connected to, and radially extending from the rockshaft and having a registering coaction with said graduated scale.

9. In a strength testing apparatus of the character described, in combination, a hollow casing frame having at the front thereof a shelf extension constituting an elbow rest and provided with a handle to be manually grasped, a rockshaft journaled in said casing and having a pointer arm radially extending therefrom, a graduated scale with which the pointer registers, a mechanical arm carried at the extremity of the rockshaft over said shelf extension and pivotally jointed to the shaft whereby it may be swung more or less incliningly to the axis of the shaft, and having a hand member swiveled thereto and a spring against which the hand is rotatively movable, a spring for maintaining said arm in an upwardly swung position relatively to the rockshaft, and a spring against the stress of which said shaft has its rocking movements.

Signed by me at Brandon, Vt., in presence of two subscribing witnesses.

WILLIAM H. JOHNSON.

Witnesses:

ALICE L. AHN,
GEORGE BENOIT.