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CONTACTING APPARATUS
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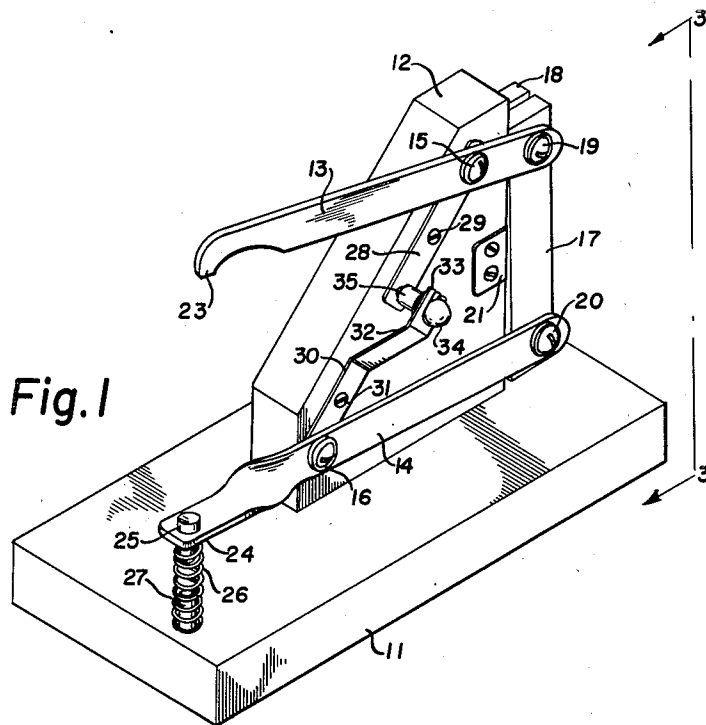


Fig. 1

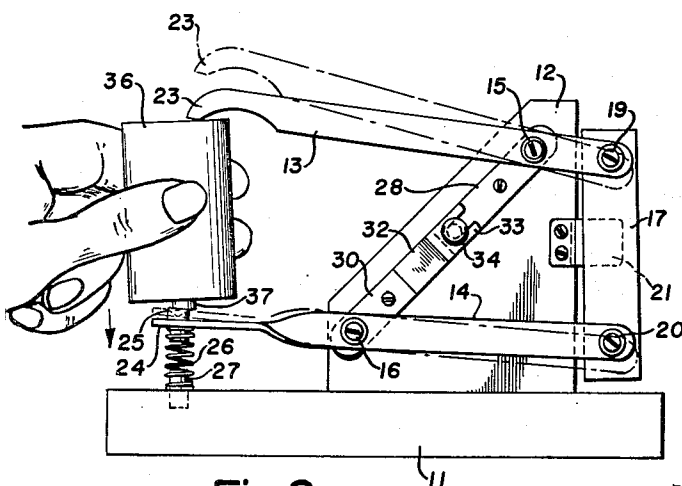


Fig. 2

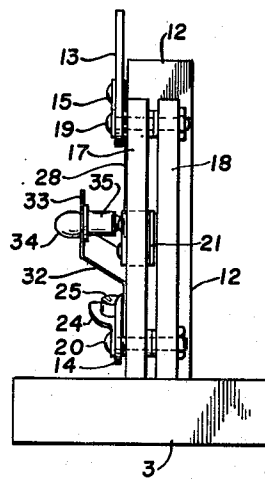


Fig. 3

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CONTACTING APPARATUS

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8 Claims. (Cl. 324—29.5)

My invention relates to contacting apparatus and particularly to apparatus having opposed members adapted to engage opposite ends of an article.

An object of my invention is the provision of improved means for simultaneously engaging the opposite ends of an article with a minimum of effort and a maximum of efficiency.

Another object is the provision of improved means for holding articles between pivoted arms having one arm movable through a greater arc than the other arm.

Another object is the provision of improved means for testing electric batteries.

Another object is the provision for apparatus arranged to engage the terminals of an electric dry battery with a minimum of manual effort and with efficiency and speed.

Another object is the provision of a device for testing dry batteries of various sizes and lengths.

Another object is the provision of a battery tester arranged to accommodate different sizes and lengths. Another object is the provision of an improved device of the class described, operating in a new manner to produce results not heretofore obtainable.

Other objects and a fuller understanding of my invention may be had by referring to the following description and claims, taken in conjunction with the accompanying drawing, in which:

Figure 1 is a perspective view of my device;

Figure 2 is a side view of my device showing its use in testing a battery; and

Figure 3 is a right-hand end view looking in the direction of the arrows 3—3 of Figure 1.

My device has a base 11 preferably made of wood or other non-electrical conducting material. Secured to the base is an upright supporting member 12 of generally triangular shape as shown in the drawing. The upright member 12 is also preferably made of wood or other non-electrical conducting material. Pivotally mounted to the upper portion of the upright support 12 is an upper arm 13 of electrical conducting material, such as aluminum. The arm 13 is pivotally carried to the support 12 by a bolt 15 providing a pivot support.

Pivotally carried by the support member 12 is a lower arm 14 also made of electrical conducting material, such as aluminum. A bolt 16 provides a pivot support for the lower arm 14. It is to be noted that the pivot support 16 is spaced from the pivot support 15 and that it is both lower on the support 12 than the pivot support 15 and is also disposed forwardly of the position of the pivot support 15.

The rearward ends of the arms 13 and 14, that is, the right-hand ends of the arms 13 and 14 in Figures 1 and 2, are interconnected by a pair of connecting members 17 and 18 preferably made of wood or other non-electrical conducting material. A bolt 19 pivotally connects the rear end of arm 13 to the connecting members

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17 and 18 and a bolt 20 pivotally connects the rear end of arm 14 to the connecting members 17 and 18.

To provide for guiding the up-and-down motion of the connecting members 17 and 18 and to limit any side-sway of movement thereof, a guiding member 21 is secured to the rear portion of the supporting member 12 and extends into the space or slot provided between the members 17 and 18 by the spacer washers on the bolts 19 and 20. The members 17 and 18 move vertically up and down as the arms 13 and 14 swing on the pivots 15 and 16.

The forward end of the arm 13 is cut away as shown in the drawing to provide the forward finger portion 23 pointed generally downwardly toward the other arm 14. The forward end portion of the lower arm 14 is twisted or bent to form the forward horizontally disposed portion 24. There is a recessed boss or stud 25 secured to the forward end portion 24. This stud or boss has a small depression or recess to accommodate the projecting terminal on a dry cell battery. The stud or boss 25 is also made of electrical conducting material, such as aluminum, so that a battery terminal contacting the box 25 conducts current from the battery through the boss 25 to the arm 14.

A coil spring 26 is interposed between the base 11 and the end portion 24 of the arm 14. An upwardly projecting post 27 in the base 11 retains the lower portion of the spring 26 in position and the stud or boss 25 has a pin extending downwardly from the portion 24 into the upper portion of the coil spring 26 so as to hold it in alignment. The bias of the spring 26 is such as to resiliently urge the portion 24 of the arm 14 upwardly. The spacing of the parts and the bias of the spring 26, however, is such that by pressing the boss 25 downwardly with a battery, as shown in Figure 2, the arm 14 swings downward on the pivot 16 to the position shown in full lines from the position shown in broken lines in Figure 2.

I provide electrical conduction between the two arms 13 and 14 by means of conductor bars secured to the upright member 12 and in electrical contact at the bolts 15 and 16 with the respective arms 13 and 14. A conductor bar 28 of suitable conducting material, such as brass or aluminum, is secured to the support 12 by a screw 29. The conductor bar 28 has a hole in it through which the bolt 15 extends so that there is electrical connection between the arm 13 and the conductor bar 28.

A lower conductor bar 30 is secured to the upright support 12 by a screw 31, this conductor bar 30 also being of electrical conducting material, such as brass or aluminum. The conductor bar 30 has a portion 32, which is bent out at an angle as shown in the drawing and is somewhat resilient so as to be biased toward the support 12. The upper end of the bent portion 32 is slotted to form the forked end 33.

I provide an electric light bulb 34 as a means for indicating the passage of flow of current. The light bulb 34 may be of the small miniature type as used in electric flashlights or torches. The light bulb 34 has a metal shank 35 and the forked end 33 resiliently presses inwardly against this metal shank 35 to urge the small tip or opposing terminal of the bulb firmly against the conductor bar 28. Thus, the one conductor bar is in electrical contact with the outer metal shank of the electric light bulb and the other conductor bar is in electrical contact with the end tip of the electric light bulb which, as in the usual small bulb, is insulated from the metal shank. The bulb may be readily removed and replaced by taking hold of the metal shank and slightly pressing the bulb away from the support 12 to overcome the resilience of the bent portion 32, thus facilitating the re-

moval of the bulb. A replacement bulb may be inserted in position so that the arms of the forked end 33 embrace the glass bulb and press against the metal shank 35 as shown in the drawing.

In operation a dry cell battery, such as battery 36 shown in Figure 2, is placed with one end down on the boss 25 and the battery 36 is pressed downwardly to overcome the bias of the spring 26. This moves the portion 24 of the arm 14 downwardly for a short distance. At the same time, the forward end 23 of the arm 13 moves downwardly but by reason of the linkage and the leverage arrangement, the forward end 23 moves downwardly a greater distance than the forward portion 24 of the arm 14. In moving downwardly a greater distance in the same time interval, the downward movement of the portion 23 of the arm 13 is at a greater speed than is the downward movement of the forward portion 25 of the arm 14. This provides for an accelerated action in contacting the opposite ends of the battery.

Preferably, I direct downwardly the head or protruding contact point 37 of the battery so as to contact the boss 25. However, if desired, the battery may be placed between the parts 23 and 25 with the head 37 directed upwardly so as to contact the forward end 23, while the base terminal of the battery contacts the boss 25. As is well known, in dry cell batteries of this type there is a terminal at the opposite ends of the battery. The head 37, forming one terminal of the battery, projects outwardly from the body of the battery, while the other terminal of the battery is the metallic disk or flat plate at the bottom of the battery. This flat plate or disk is sometimes recessed from the sides of the battery so that the forward portion 23 of one arm or the boss 25 on the other arm may extend inwardly to readily contact this end plate or disk forming the terminal on the end of the battery.

It will be noted that on arm 13 the greater portion of the arm is forwardly of the pivot support 15 and the minor portion of the arm is rearwardly of the pivot support 15. It is also to be noted that the major portion of the arm 14 is rearwardly of the pivot support 16 and the minor portion of the arm 14 is forwardly of the pivot support 16. The ratio of the distances along the arms between pivot points 15 and 19 and between pivot points 16 and 20 to the portions of the arms forwardly of the pivot points 15 and 16 is such as to provide the difference in the magnitude and speed of movement of the upper arm 13 relative to that of the lower arm 14.

Upon placing a battery to be tested between the arms 13 and 14 with the battery terminals or poles contacting the forward ends 23 and 25 of the arms, the electric light bulb 34 will light up, that is, will emit light, if the battery is "alive," that is, if it produces electric current. If the battery being tested is "dead" or inert then the bulb 34 will remain unlighted. Other means for indicating the passage or presence of electric current may be substituted for the light bulb 34, but I find the light bulb an economic and satisfactory indicator.

The present disclosure includes that contained in the appended claims, as well as that in the foregoing description.

Although this invention has been described in its preferred form with a certain degree of particularity, it is understood that the present disclosure of the preferred form has been made only by way of example and that numerous changes in the details of construction and the combination and arrangement of parts may be resorted to without departing from the spirit and scope of the invention as hereinafter claimed.

What is claimed is:

1. In battery testing apparatus comprising a supporting member, a first arm, a first pivot connection carried by the supporting member for pivotally carrying the first arm, a second pivot connection carried by the supporting member for pivotally carrying the second arm, a

connecting member operatively connecting said arms at distances rearwardly from the respective pivot connection of each to provide for movement of the respective rear ends of the arms both in one direction and for corresponding simultaneous movement of the respective free ends of the arms both in an opposite direction, said arms extending forwardly distances from the respective pivot connection of each to provide free ends movable simultaneously in the same direction upon the movement of said arms, the said distances forwardly and rearwardly of said pivot connections along the respective arms to said free ends and said connecting member being so proportioned as to cause the free end of one arm while moving in said same direction to move toward the free end of the other arm as said free ends move together in one direction, the arrangement of the supporting member, pivot connections and arms being such that pressing one end of a battery being tested against the free end of one of said arms in said one direction a certain distance causes the free end of the other arm to move a greater distance in said one direction to engage the opposite end of said battery.

2. A battery tester having opposed points adapted to engage opposed terminals on the ends of a battery, comprising a pair of arms having opposed engaging portions adapted to engage said terminals, said engaging portions being of electrically conducting material, first and second pivot means for pivotally supporting said arms, respectively, connecting means connecting said arms, respectively, at distances from, and rearwardly of, the said first and second pivot means, respectively, said arms each extending forwardly of said first and second pivot means, respectively, and having said engaging portions disposed adjacent the forward free ends thereof, the spacing of said engaging portions from said first and second pivot means, respectively, and said distances along said arms between said connecting means and said first and second pivot means, respectively, being such that movement of one of said engaging portions in one direction through a first distance causes the other of said engaging portions to simultaneously move in said one direction a second distance greater than said first distance, and electrical conducting means carried by said arms in electrical connection with said engaging portions and adapted to be electrically connected to an electrical indicating device for indicating current supplied thereto from a battery having its opposed terminals engaging said engaging portions.

3. A dry-cell battery tester comprising in combination a pair of engaging members adapted to electrically engage the terminals of said battery, a pair of lever arms carrying said engaging members, respectively, pivot means pivotally supporting said lever arms, connecting means connecting said lever arms to provide movement of one lever arm causes movement of the other lever arm in the same direction, said lever arms, pivot means and connecting means being arranged to provide that a first movement of the engaging member carried by one lever arm in one direction by a battery terminal pressed on the engaging member causes a second movement of the engaging member carried by the other lever arm in the same direction and toward said battery to engage the other terminal, said second movement being greater in distance and faster in speed than said first movement, and electrical connecting means electrically connecting said engaging members and adapted to be connected to an indicator for indicating flow of current supplied thereto from a battery having its terminals engaging said engaging members.

4. A battery tester comprising engaging means for electrically engaging opposed terminals of a battery, lever means for pivotally carrying said engaging means, and electrical conducting means for conducting current from said engaging means and adapted to be connected to a device for indicating flow of current from a said battery,

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said lever means including a pair of levers pivoted, connected and proportioned to provide that movement of one lever by a battery terminal being pressed in one direction upon the engaging means carried by said one lever moves the other lever to press the engaging means carried by the other lever upon the opposite battery terminal, and so proportioned that movement of said other lever relative to the movement of said one lever causes the engaging means carried by the said other lever to simultaneously move in said same direction a greater distance than the distance moved by the engaging means carried by the said one lever.

5. Apparatus for simultaneously engaging opposite ends of an article comprising a pair of spaced engaging members in opposed relationship, a lever arm carrying each of said engaging members, a pivot support for each lever arm, a non-extendible connecting member connecting the lever arms at distances from the respective pivot supports to provide that pivotal swinging of one lever arm causes simultaneous pivotal swinging of the other pivot arm on the same side of the respective pivot supports in the same direction, each lever arm having a forward portion between the engaging member carried thereby and the pivot support for the lever arm and a rearward portion between the pivot support for the lever arm and the said connecting member, the forward portion of one lever arm being longer than the rearward portion of the same lever arm and the forward portion of the second arm being shorter than the rearward portion of the same lever arm to provide for differential movement of said engaging members upon movement of the forward portion of the lever arms both in the same direction.

6. Apparatus for engaging opposite ends of an article comprising a pair of opposed engaging members carried by a pair of pivotally mounted lever arms, said lever arms being interconnected at distances from the pivotal mounting for each, respectively, to move simultaneously in the same direction, said lever arms each having a first portion and a second portion, said first portion being disposed between the engaging member carried by the lever arm and the pivot mounting for the lever arm, said second portion being disposed between the pivot mounting for the lever arm and the interconnection between said lever arms, the first portion of one lever arm being

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greater in length than that of the second portion of the one lever arm, the first portion of the other lever arm being lesser in length than the second portion of the said other lever arm, the said differences in length providing for a differential movement of said engaging members upon movement of the lever arms in the same direction.

7. A battery tester comprising, contact members to electrically engage the opposite terminals of the battery, electrical connecting means connecting the contact members and adapted to be connected to a light bulb, and lever means for carrying said contact members, said lever means including a first lever carrying one contact member, a second lever carrying the other contact member, a first pivot support for the first lever, a second pivot support for the second lever, and a connecting member connecting the levers at distances from the respective pivot supports to provide for movement of the levers in unison in the same direction, the lengths of the levers relative to the respective pivot supports, contact members, and connecting member being proportioned to move one contact member at a greater speed than the speed of the other contact member upon movement of said other contact member.

8. A battery tester comprising the combination of contact means having opposed contacting members adapted to engage opposite terminals of a battery, said contact members being adapted to be electrically connected to indicating means to indicate flow of current therethrough from a battery engaging the contact members, and lever means carrying said contact members, said lever means including first means movable a first distance by a battery terminal pressed against one of said contact members, second means movable in the same direction a second distance to press another of said contact members against an opposite terminal of said battery, and third means for compounding the movement of said second means relative to the movement of said first means to accelerate the movement of said another contact member relative to the movement of said one contact member.

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