

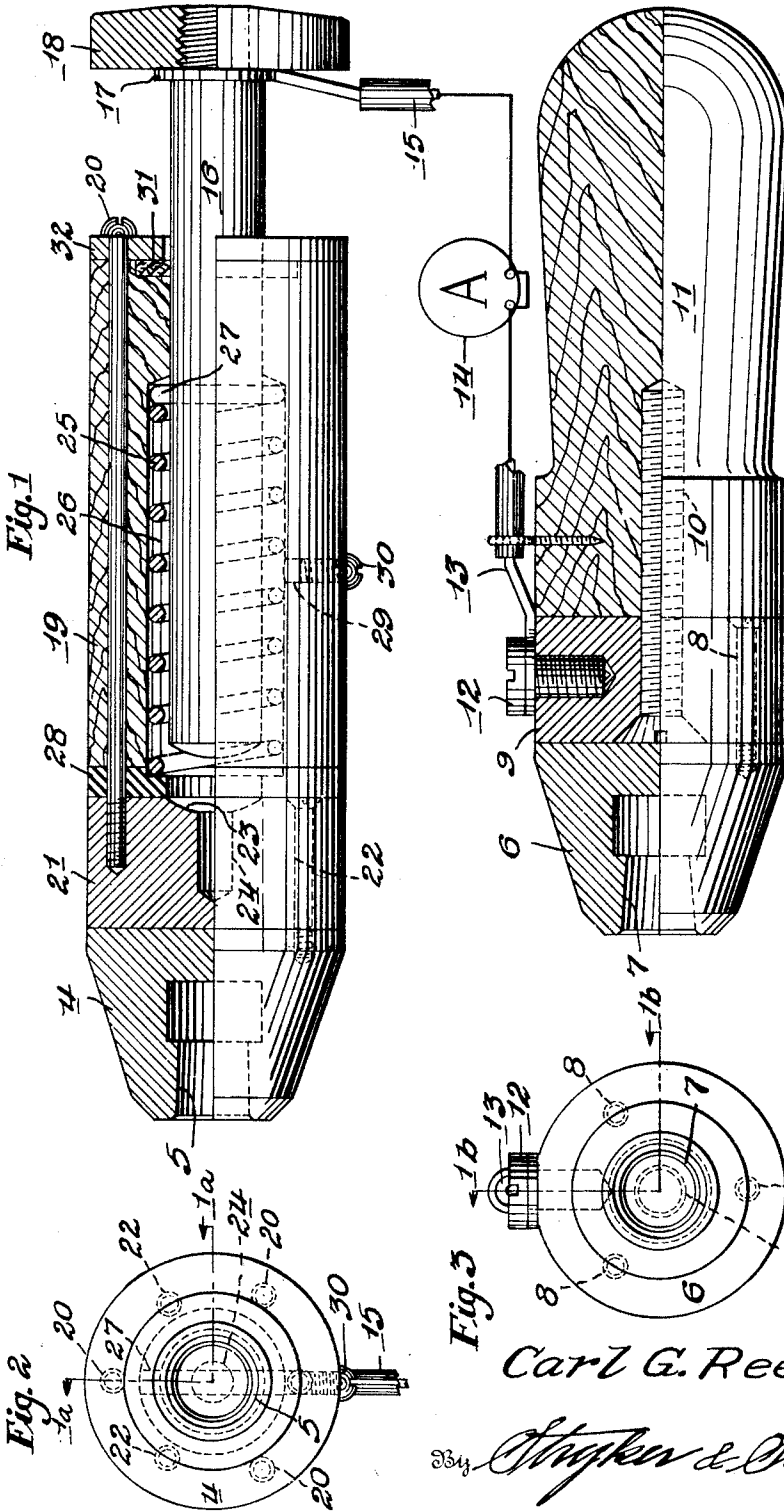
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STORAGE BATTERY TESTING DEVICE

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STORAGE BATTERY TESTING DEVICE

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5 Claims. (Cl. 200—52)

In the manufacture of storage batteries it is common to apply what is known as a breakdown test to ascertain whether the batteries are capable of delivering the maximum current required by specifications. In this test the terminal binding posts of a battery are connected in a circuit of low resistance, containing an ammeter, so that the battery is discharged at substantially its maximum rate for a brief interval of time, while the ammeter is observed to detect any breakdown in the insulation or other defect causing a reduction in the rate of discharge. When these tests are applied to the common types of automobile, radio and farm lighting batteries, currents of from 1000 to 1800 amperes are drawn from the batteries and unless contacts with the battery terminals are made properly, over large areas of the terminals, burning, discoloration and even partial destruction of the terminals results. In the interest of economy, the tests must be made quickly so that the clamping onto the terminals of leads of the ordinary type is impractical.

It is an object of this invention to facilitate the making of such breakdown tests rapidly and without damage to the battery terminals by circuit connectors of novel construction and arrangement.

Further objects are to provide a device of this class with a novel switch so constructed and arranged as to insure proper contact with the battery terminals when the switch is closed, to minimize arcing of the current between the contact surfaces in the switch itself and to promote durability to withstand the rough use to which such devices are subjected.

Other objects will appear and be more fully pointed out in the following specification and claims.

In the drawing:

Figure 1 is a part side elevation and part central, longitudinal section illustrating a pair of my improved circuit connectors, together with a diagrammatic illustration of a low resistance circuit extending between the connectors;

Fig. 2 is an end view of the connector having the switch, and

Fig. 3 is a similar view of the other connector of the pair.

One of my connectors has a tip 4 formed with a socket 5 of truncated conical shape adapted to receive and snugly fit upon the periphery of one of the battery terminal binding posts so that good contact is made over a large area of the periphery of such post. The other connector of the pair has a tip 6 formed with a socket 7 to fit in a similar

manner on the other battery terminal. The tips 4 and 6 are constructed from aluminum or other suitable electric conducting material. The connector having the tip 6 is illustrated in Fig. 1 in the quarter section taken on the line 1^b—1^b of Fig. 3. Secured to the tip 6 by three screws 8 is a cylindrical member 9 having a countersunk axial bore to receive a screw 10. This screw is threaded in a handle 11 of suitable insulating material, such as wood or fiber. The member 9 is made of brass or other conducting material and this member and the handle 11 are disposed in axial alignment with the socket 7 so that the tip 6 may be quickly and forcibly applied to make good electric contacts with the terminals of batteries. A binding screw 12 is provided on the member 9 for securing a circuit wire 13 thereto. As indicated diagrammatically in Fig. 1, the wire 13 extends to an ammeter 14 in series with a wire 15 extending to a switch plunger 16 of the other connector. The wire 15 preferably has a ring terminal 17 which is bound to the plunger proper by a screw threaded head 18 on the outer end thereof.

The plunger 16 extends in axial alignment with the socket 5 and is operable in a cylindrical housing 19. This housing is constructed from insulating material, as indicated in the quarter section taken on the line 1^a—1^a of Fig. 2, and is secured to a metal member 21 by three long screws 20. The tip 4 is secured to the member 21 by screws 22. Formed in the member 21 is an annular seat 23 adapted to fit the inner end of the plunger 16 and a central recess 24 extends from the seat 23 a substantial distance into the member 21 for the purpose hereinbefore described.

A stout helical spring 25 is confined in a chamber 26 formed in the housing 19 and the end of this spring remote from the tip 4 abuts against a steel pin 27 projecting from a transverse bore in the plunger 16. The other end of the spring 25 abuts against a ring 28 of insulating material which is confined between the housing 19 and the tip member 21. The chamber 26 communicates with the seat 23 and recess 24 through an opening in the ring 28 and is filled with an oil having insulating properties. This oil reduces or quenches the sparking between the plunger 16 and seat 23 in operation. The supply of oil is introduced into the chamber 26 through the laterally extending passage 29 having a closure screw 30. To seal the chamber 23 around the plunger 16, a compressible washer 31 is placed in a recess in the end of the housing 19 adjacent to the head 18 and this washer is held under compression by a ring 32 and the screws 20. The central opening in the ring 32

is large enough so that contact is not made with the plunger 16. It will be understood that the housing 19, ring 28 and washer 31 are all constructed from insulating material so that the circuit between the tip 4 and plunger 16 is closed only when the latter is moved to engage the seat 23.

In the use of the device, the tip 6 is connected in circuit with the ammeter 14 through the wires 13 and 15, the latter being connected to the plunger 16. To test a battery the tip 6 is forcibly applied to one of the terminals of the battery and the tip 4 is then forcibly applied to the other terminal while the operator grasps the head 18 and actuates the plunger 16 into contact with the seat 23 against the action of the spring. This closes the circuit through the ammeter 14 and the current is caused to flow through the meter for the period required for the test, when the operator raises the head of the plunger and the spring 25 quickly opens the circuit.

Sparking and excessive heating of the seat 23 and tip of the plunger is minimized by the oil contents of the chamber 26 and by the quick action of the spring 25. Continued efficient operation is insured by my arrangement of the seat 23 with the central recess 24 which allows the escape of such burned particles of metal and other products of combustion as would otherwise collect on the seat and plunger tip. The recess 24 in the annular seat 23 also permits extensive wear and burning away of the seat before the useful life of the device is exhausted. By my arrangement of the spring 25 and axial plunger 16 relative to the socket 5, the proper tight fitting of the tip 4 about the battery terminals during the tests is insured because the thrust on the plunger, required to close the circuit, is transmitted to the tip and battery terminal in such direction as to properly seat the tip on the terminal. As will now be understood, the application of the connectors to the batteries and the closing of the switch for the breakdown tests is accomplished quickly and such tests are made with a minimum of damage to the battery terminals.

Having described my invention, what I claim as new and desire to protect by Letters Patent is:

1. In a device for connecting a test circuit to a binding post of a storage battery, the combination with a socket adapted to receive one of said binding posts and to fit snugly thereon, a switch housing mounted on said socket, switch contact members enclosed in said housing and a handle disposed in straight alignment with said socket for

thrusting the latter upon said post, said handle being operatively connected to one of said contacts to close said switch by a thrust directed toward a post in said socket.

2. A circuit closing device for attachment to a storage battery terminal comprising, a socket formed to fit said terminal, a switch housing rigidly secured to said socket, a plunger operable in said housing, a seat for the inner end of said plunger formed in said housing, said end and seat constituting switch contacts, a liquid insulating material contained in said housing to quench sparking between said end and seat and a spring arranged to normally retain said plunger out of contact with said seat.

3. A circuit closing device for attachment to a storage battery terminal comprising, a tip formed to make electric contact with said terminal, a switch housing rigidly secured to said tip, a plunger operable in said housing in alignment with said tip, a seat for said plunger formed in said housing and connected electrically with said tip, a spring arranged to normally retain said plunger out of contact with said seat and a common handle for said plunger and for actuating said tip against said seat.

4. A circuit closing device for attachment to a storage battery terminal comprising, a tip formed to fit said terminal, a cylindrical switch housing rigidly secured to said tip, a plunger operable axially in said housing in alignment with said tip, a seat for the inner end of said plunger formed in said housing, an axially elongated recess being formed in said housing at the center of said seat, a liquid insulating material contained in said housing to arrest sparking between said plunger and seat and a spring arranged in said housing to normally retain said plunger out of contact with said seat.

5. A circuit connector for a battery having a tapered binding post comprising, a tip formed with a tapered seat to fit said post, a substantially cylindrical housing rigidly secured to said tip in axial alignment with said seat, a switch plunger operable in said housing in alignment with said seat, means normally insulating said plunger from said tip, a second seat for said plunger formed in said tip, a spring arranged in said housing to normally retain said plunger out of contact with said second seat, a liquid insulating material confined in said housing to arrest sparking between said plunger and second seat and a circuit lead connected to said plunger.

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