

E. A. PIGEON.
 TESTING MACHINE FOR DIELECTRIC OBJECTS.
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1,407,887.

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Fig. 1.

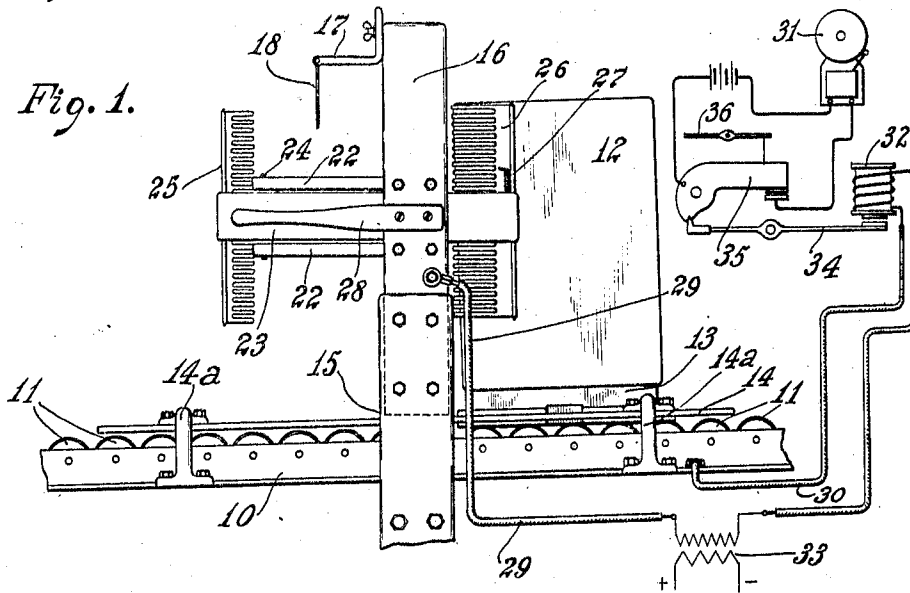


Fig. 2.

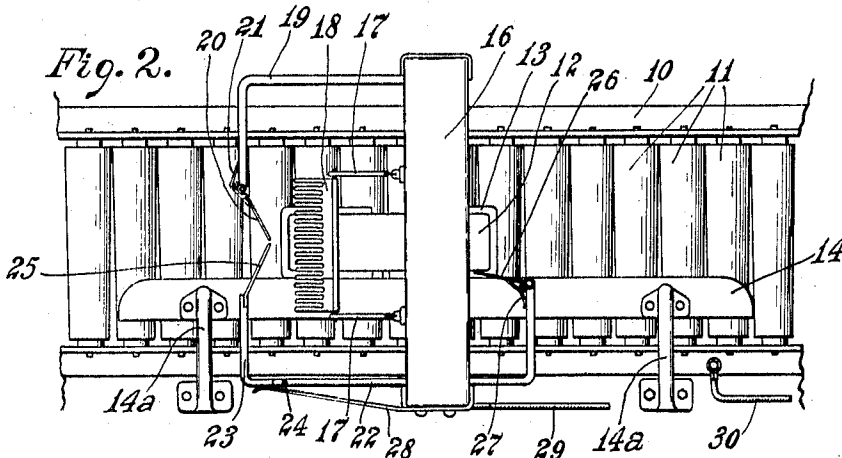


Fig. 3.

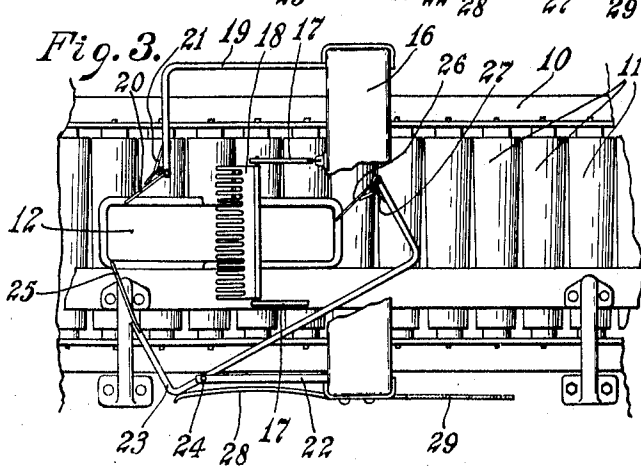
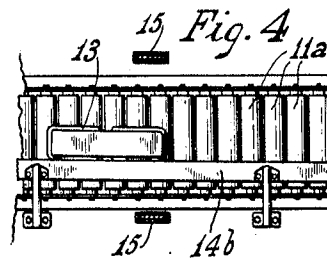


Fig. 4.



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UNITED STATES PATENT OFFICE.

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TESTING MACHINE FOR DIELECTRIC OBJECTS.

1,407,887.

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To all whom it may concern:

Be it known that I, ERNEST A. PIGEON, a citizen of the United States, residing at Akron, in the county of Summit and State of Ohio, have invented a certain new and useful Testing Machine for Dielectric Objects, of which the following is a specification.

This invention relates to the testing of the dielectric strength of objects, and especially of containers such as battery jars. In manufacture such jars are formed upon metal mandrels. When the jar is completed the mandrel extends from the open end of the jar and affords a convenient electrical contact for the testing of the jar. As the mandrel is heavy and the jar comparatively fragile, it is desirable that the testing be accomplished with as little handling as possible while all parts of the jar are subjected to the test.

The object of my invention is to provide automatic testing means of simple construction which will reduce the necessary handling of the jars and will insure a thorough test.

Of the accompanying drawings,

Fig. 1 is a side elevation of a device embodying one form of my invention, showing one stage of the testing operation.

Fig. 2 is a plan view of the same showing a later stage.

Fig. 3 is a plan view partly broken away showing a still later stage.

Fig. 4 is a plan view showing a modified means for guiding the work.

Referring to the drawings:

10 is a gravity carrier comprising an aligned series of rollers 11, all of said rollers being tapered in the same direction and loosely journaled on parallel, horizontal axes. 12 is a battery jar upon its mandrel 13. 14 is a side-rail disposed lengthwise of the carrier slightly above the smaller ends of the rollers and supported by brackets 14^a. At each side of the carrier is a post 15 formed of dielectric material, one of which posts is shown in Fig. 1. 16 is a metal brush-supporting arch secured to the dielectric posts 15 and spanning the carrier. 17, 17 are adjustable metal brackets secured to the top of said arch 16. 18 is a horizontally disposed electric brush or comb pivotally suspended from said brackets 17, 17. 19 is a metal bracket secured to the side of the arch

16 adjacent the larger ends of the rollers 11. 20 is a vertically-disposed electric brush or comb hinged on the end of said bracket 19. 21 is a hinge-spring associated with the hinge of said comb 20 and adapted yieldingly to hold it in a position with the point of the comb slanting toward the arch 16. 22, 22 is a pair of brackets, one above the other, secured to the side of the arch 16 adjacent the smaller ends of the rollers 11 and 23 is a U-shaped metal lever disposed in a horizontal plane and pivoted at 24 between the brackets 22. 25 is an electric brush or comb secured at one end of said lever and 26 is an electric brush or comb hinged to the other end of said lever. 27 is a hinge-spring associated with the hinge of the comb 26 and adapted yieldingly to hold it at an obtuse angle to the adjacent part of the arm 23 but to permit its turning inwardly to form an acute angle therewith. 28 is a leaf-spring secured to the arch 16 and bearing against one shoulder of the lever 23. 29 is an electric conductor connected to the arch 16 and 30 is an electric conductor connected to the frame in which the rollers 11 are journaled, said conductors being parts of a normally open electric circuit of which the brushes 18, 20, 25 and 26 constitute one terminal and the rollers 11 constitute the other. 33 is a transformer adapted to supply electric energy at high tension to said normally open circuit. 34 is a metal tripping lever associated with the solenoid 32 and adapted to release a self closing switch 35 in a battery circuit connected with a bell 31 whenever current passes between the rollers 11 and any of the brushes 18, 20, 25 or 26. 36 is a hand lever adapted to reopen said switch and cause it to be latchingly engaged by the lever 34.

In operation, electric energy of a voltage commensurate with the test desired is supplied by the transformer 33 to the rollers 11 constituting one terminal and to the brushes 18, 20, 25 and 26 constituting the other. A battery jar upon its mandrel is placed in an inverted position upon the higher end of the gravity-carrier 10, with one of its broad faces adjacent the side-rail 14. Due to the tapered form of the rollers, gravity causes the mandrel with the jar thereon to move down the carrier with the exposed base of the mandrel in contact with the side-rail 14 and consequently in

proper alignment with the brushes. As the jar passes the first end of the arm 23 the face of the jar adjacent thereto is swept by comb 26 under the action of the hinge-spring 27 as shown in Figs. 1 and 2. As the jar passes under the comb 18, the latter sweeps the bottom of the inverted jar, as shown in Fig. 2. As the jar proceeds, its forward face comes in contact with the comb 20, which under the action of hinge-spring 21 contacts with approximately half of said forward face and subsequently sweeps the adjacent side face of the jar. At the same time the forward face of the jar contacts with the comb 25 secured to the end of the pivoted lever 23, and the continued forward movement of the jar causes said lever to turn upon its pivot 24, against the action of spring 28, with the result that the comb 26, being relatively far from the pivot 24, is swung quickly across the rearward face of the jar and in continuous contact therewith under the action of the hinge-spring 27. Meanwhile, the comb 25 sweeps approximately half of the forward face and subsequently the adjacent side face of the jar. It will be noticed that in passing from one face of the jar to another, or in leaving the last face, the combs 20, 25 and 26, because of their positions and the action of the springs 21, 28 and 27 respectively, sweep the slightly-rounded vertical corners as well as the flat side faces of the jar.

In case the dielectric strength of the jar at any point is not sufficient to withstand the voltage applied to the open circuit 29, 30, the circuit will be closed by an arc through the defective spot, causing the bell 31 to ring as a signal. The brushes or combs and the lever 23 obviously may be varied in size and proportion and adjusted to adapt them to jars of different dimensions, and may extend as near the mouth of the jar as the voltage used in the test will permit without forming an arc around the open edge of the jar. The test is not limited to the parts of the jar actually contacted by the combs, but from the lowest part of the comb to the mouth of the jar the test is valid for gradually reduced voltage. At the delivery end of the carrier the mandrels, with the jars thereon, may be received and disposed of in any suitable manner. In the modified guiding means shown in Fig. 4 the rollers, 11^a, are cylindrical instead of tapered and the guide rail 14^b is set at a slight angle to the length of the carrier and thus adapted by a progressive crowding action to govern the course of the mandrel 13.

The details of construction may be varied without departing from the invention, and I do not desire to limit my claims to the specific construction shown. An obvious modification would be to connect the conduit 30 to the side rail 14 and thus use the latter

instead of the rollers 11 for an electrode; or to substitute a different form of conveyor, such as an endless belt carrier, for the gravity carrier.

I claim:

1. In testing apparatus for an object formed of dielectric material, the combination of a support for said object, a gravity carrier, means for supplying electric energy to said support while the latter moves on said carrier and an electrode adapted to be presented to the surface of said object upon said support as the latter moves on said carrier.

2. In testing apparatus for an object formed of dielectric material, the combination of a support for said object, a gravity carrier comprising a set of loosely journaled metal rollers, means for supplying electric energy to said support while the latter moves on said carrier and an electrode adapted to be presented to the surface of said object upon said support as the latter moves on said carrier.

3. In testing apparatus for a container formed of dielectric material, the combination of a support for said object, a conveyor, means for supplying electric energy to said support while the latter moves on said conveyor and a series of electrically connected electrodes adapted automatically to sweep substantially the entire external surface of said container upon said support while the latter moves without substantial turning upon said conveyor.

4. In testing apparatus for an object formed of dielectric material, the combination of a support for said object, a carrier, means for supplying electric energy to said support while the latter moves on said carrier and a pivoted lever provided with an electrode and adapted to be turned on its pivot by movement of said support on said carrier to cause said electrode to sweep the rear face of said object.

5. In testing apparatus for a container formed of dielectric material, the combination of a support for said container, a carrier, means for supplying electric energy to said support while the latter moves on said carrier, a U-shaped pivoted member adapted to be turned on its pivot by the movement of said container, an electrode on one end of said member adapted to be engaged by the foremost face of said container as it moves on said carrier, and an electrode on the other end of said member adapted to sweep the rear face of said container when said U-shaped member is turned on its pivot.

6. In a testing apparatus for a container formed of dielectric material, the combination of a support for said container, a carrier, means for supplying electric energy to said support while the latter moves on said carrier, a series of electrically-connected

electrodes adapted automatically to sweep the surface of said container upon said support as the latter moves upon said carrier, said series comprising an over-head electrode adapted to sweep the upper-most face of said container, an electrode adapted to sweep a side of the container, a pivoted member adapted to be turned on its pivot by the movement of the container and an electrode mounted upon the end of said pivoted member and adapted to sweep the rear face of the container when said pivoted member is turned on its pivot.

7. In a testing apparatus for a container formed of dielectric material, the combination of a support for said container, a carrier, means for supplying electric energy to said support while the latter moves on said carrier, a series of electrically-connected electrodes adapted automatically to sweep the surface of said container upon said support as the latter moves upon said carrier, said series comprising a pivotally-suspended electrode adapted to sweep the uppermost face of said container, a yieldingly-held electrode adapted to sweep a part of the leading face, one side and the adjacent corners of said container, a pivoted U-shaped member adapted to be turned on its pivot by the movement of said container, an electrode secured on one end of said U-shaped member and adapted to be engaged by said container in its movement on said carrier, a yieldingly-held electrode on the other end

of said member adapted to sweep the rear face of said container when said U-shaped member is turned on its pivot, and means for yieldingly holding said U-shaped member in position to be turned on its pivot by the movement of said container.

8. In a testing apparatus for an object formed of dielectric material, the combination of a support for said object, a carrier, means for supplying electric energy to said support while the latter moves on said carrier, a series of electrically connected electrodes adapted automatically to sweep substantially the entire surface of said object upon said support as the latter moves without substantial turning upon said carrier, and a common mounting for said series of electrodes comprising an arch spanning said carrier and insulated therefrom.

9. In a testing apparatus for an object formed of dielectric material, the combination of a support for said object, a carrier, means for supplying electric energy to said support while the latter moves on said carrier, a series of electrically connected electrodes adapted automatically to sweep the surface of said object upon said support as the latter moves upon said carrier, and a guide rail adapted to guide said support in its course on said carrier.

In witness whereof I have hereunto set my hand this 2nd day of December, 1920.

ERNEST A. PIGEON.