April 14, 1942. P. D. CROUT 2,279,303

ELECTRICAL APPARATUS

Original Filed Sept. 6, 1934

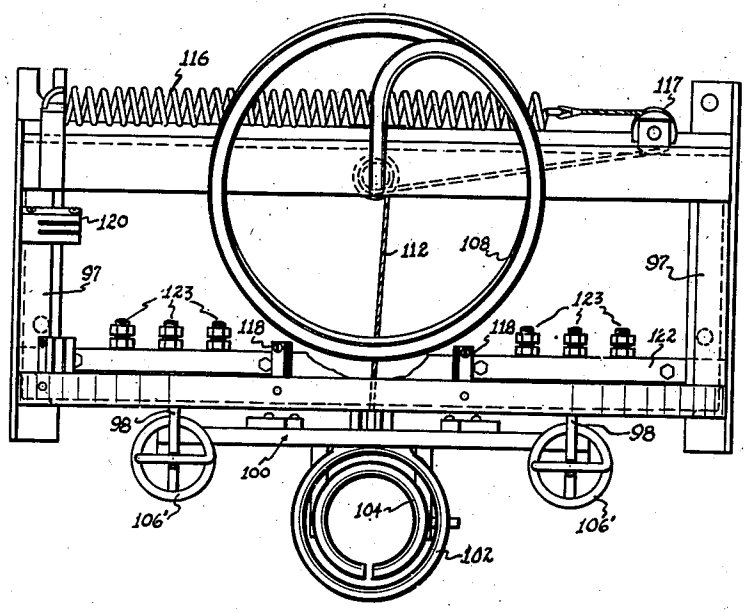


FIG. 1.

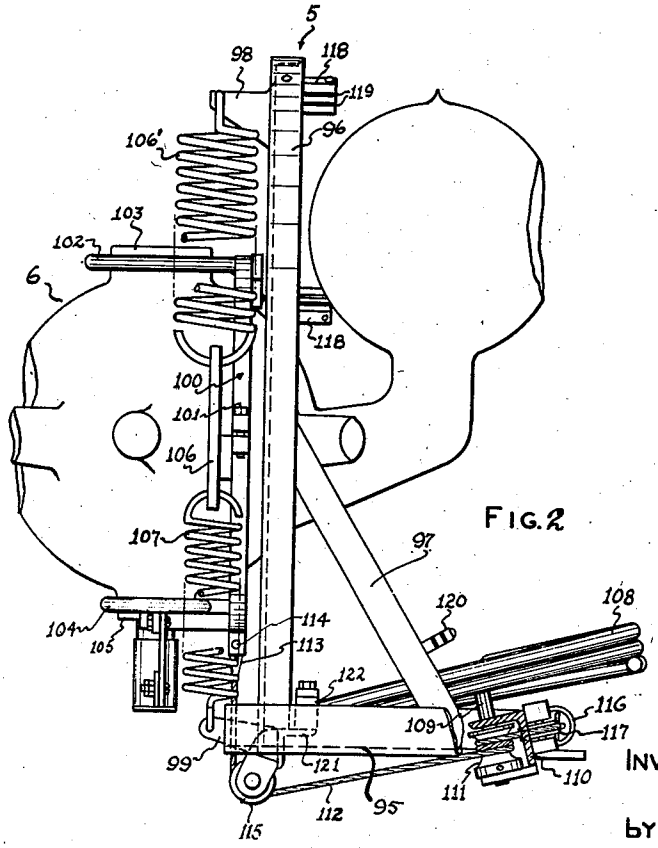


FIG. 2.

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ELECTRICAL APPARATUS

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Original application September 6, 1934, Serial No. 742,913, now Patent No. 2,171,512, dated August 29, 1939. Divided and this application July 19, 1939, Serial No. 285,465

5 Claims. (Cl. 248—358)

This invention relates to a support for an electrical space discharge tube. This is a division of my copending application for an improvement in Electrical apparatus, Serial No. 742,913, filed September 6, 1934, which has now matured into Patent No. 2,171,512, granted August 29, 1939.

An object of this invention is to produce a support of the above type which will protect the tube against shock and prevent damage to the tube structure.

The foregoing and other objects of my invention will be best understood from the following exemplification thereof, reference being had to the accompanying diagrammatic drawing, wherein:

Fig. 1 is a top view of the rectifier tube-supporting structure; and

Fig. 2 is a side view of the structure shown in Fig. 1.

I have devised a novel electric arc-welding machine comprising a gaseous discharge rectifier, and various other elements. This system is described and claimed in my Patent No. 1,928,848.

The welding machine is often subjected to severe handling, and since the rectifier tube is generally constructed of glass and usually contains a considerable quantity of mercury, it is necessary to protect the tube in order to prevent damage to it as a result of such handling. The chief danger of damage resides in the free body of mercury in the tube. If the tube were merely supported by a resilient structure, and were subjected to a sudden displacement, oscillations by the tube of considerable amplitude would be set up. There would also be a tendency for the mercury to be thrown from one part of the tube to another. The impact of the body of mercury would be likely to damage the construction within the tube. Such a tube 6 is mounted in a support 5 which avoids the above difficulty and effectively prevents any severe shocks from damaging the tube.

The support 5 consists of a base 95 and a frame 96. These parts are preferably constructed of standard angle iron. The frame 96 in the embodiment shown is U-shaped. Two braces 97 are provided to afford the proper rigidity to the support of the frame 96. The frame 96 at the upper end carries the two brackets 98 and the base 95 carries the two brackets 99 in vertical alignment with the brackets 98. In order to hold the tube 6, a split ring 100 is provided. The two halves of this ring are held together around the tube 6 by bolts 101. The upper half of the ring 100 carries a loop 102 which fits over the top neck 103 of the tube 6. The lower half of the ring 100 carries a loop 104 which fits over the lower neck 105 of the tube 6. To the two sides of the lower half of ring 100 are connected two bars 106 each having a hole at its upper and lower end. Two upper springs 106' have their upper ends hooked over the top brackets 98 and their lower ends hooked through the holes in the upper ends of bars 106. Two lower springs 107 have their upper ends hooked through the holes in the lower ends of bars 106 and their lower ends hooked onto the lower brackets 99. In this way tube 6 carried by the ring 100 is resiliently supported with respect to the frame 96.

In order to prevent excessive oscillation of the tube 6 and in order to prevent the body of mercury within the tube from damaging the internal construction thereof, the ring 100 has connected thereto a special snubbing device. This snubbing device consists mainly of an inertia wheel 108. The shaft 109 of the inertia wheel 108 is rotatably mounted on the rear cross-bar 110 of the base 95. The shaft 109 also carries a pulley 111 around which is wound the snubber cable 112. The snubber cable has one or more turns around the pulley 111. One end of the cable 112 is securely fastened to the lower side of ring 100 by some suitable means such as the eyelet 113 and pin 114. A pulley 115 is secured to the lower side of base 95. Cable 112 passes over pulley 115 before it passes around the pulley 111. In order to apply the proper tension to cable 112, a spring 116 has one end thereof connected to the other end of the cable 112. The other end of the spring 116 is securely fastened to the frame 95, as shown. A pulley 117 is mounted to the rear of the bar 110. The cable passes over the pulley 117 between the pulley 111 and the spring 116. By the use of the two pulleys 115 and 117, the inertia wheel 108 may be placed in any desired position, whereby the space available may be used to the best advantage.

The various elements of the above system are so chosen that when the tube 6 is suddenly displaced downwardly, the cable 112 will loosen on the pulley 111 and the spring 116 will take up the slack, causing the cable 112 to slip around the pulley 111. At the same time springs 106' will be tensioned. When the springs 106', due to their tension, start to move the tube 6 upwardly, the cable 112 will tighten on the pulley 111 and tend to cause pulley 111 to turn. This likewise tends

to cause rotation of the inertia wheel 108. The wheel 108, due to its high inertia, will prevent any rapid acceleration of the system connected to it, and thus the tube 6 will slowly return to its neutral position. The action which takes place between the inertia wheel 108 and the cable 112 is similar to that of a one-way clutch. Thus in certain instances it may be possible to substitute other one-way clutch structures in my device instead of the specific one shown in the drawing. This action thus prevents any sudden upward movement of the tube 6. Since it is sudden upward movements which tend to throw the body of mercury in the bottom of tube 6 against other parts of the tube, the snubbing action performed by the inertia wheel and its associated structure effectively removes this danger.

In order to provide a convenient means of holding the various electrical connections to the tube 6 in place, the frame 96 is provided with a number of insulating blocks 118, each provided with a plurality of slots 119 in which the electrical conductors for tube 6 are held. One or both of the braces 97 also have a similar block 120. On the front cross-bar 121 of the base 95 is mounted an insulating bar 122 carrying a number of binding posts 123 for the purpose of making the proper connections to the tube. Due to this arrangement, the tube 6 may be assembled in its frame 5 and be connected electrically in the proper manner before the frame and tube are placed in the machine. Upon being placed therein and bolted in place, most of the electrical connections of the tube 6 to the machine itself may be accomplished by connecting the proper conductors to the binding post 123.

Of course it is to be understood that this invention is not limited to the particular details of the arrangement as described above as many equivalents will suggest themselves to those skilled in the art. It is accordingly desired that the appended claims be given a broad interpretation commensurate with the scope of the invention within the art.

What is claimed is:

1. A support for an electrical space discharge tube comprising a rigid supporting frame, an auxiliary supporting means for supporting said tube, springs interposed between said auxiliary supporting means and said frame for resiliently supporting said auxiliary supporting means, an inertia wheel rotatably mounted with respect to said supporting frame, a pulley fixed to said inertia wheel, a cable attached at one end to said auxiliary supporting means and having at least one complete turn around said pulley, and a tension spring connected to the other end of said cable.

2. A support for an electrical space discharge tube comprising supporting means for supporting said tube, a supporting base, means for resiliently supporting said supporting means on said supporting base, an inertia wheel rotatably mounted with respect to said supporting base, a pulley fixed to said inertia wheel, a cable attached at one end to said supporting means and having at least one complete turn around said pulley, and a tension spring connected to the other end of said cable.

3. A support for an electrical space discharge tube comprising supporting means for supporting said tube, a supporting base, means for resiliently supporting said supporting means on said supporting base, an inertia wheel rotatably mounted with respect to said supporting base, and means for connecting said supporting means to said inertia wheel upon an upward movement of said supporting means and for disconnecting said supporting means from said inertia wheel upon a downward movement of said supporting means.

4. A support for an electrical space discharge tube comprising a rigid supporting frame, an auxiliary supporting means for supporting said tube, springs interposed between said auxiliary supporting means and said frame for resiliently supporting said auxiliary supporting means, an inertia wheel rotatably mounted with respect to said supporting frame, a pulley fixed to said inertia wheel, a cable attached at one end to said auxiliary supporting means and having a turn around said pulley, and a tension spring connected to the other end of said cable.

5. A support for an electrical space discharge tube comprising supporting means for supporting said tube, a supporting base, means for resiliently supporting said supporting means on said supporting base, an inertia wheel rotatably mounted with respect to said supporting base, a pulley fixed to said inertia wheel, a cable attached at one end to said supporting means and having a turn around said pulley, and a tension spring connected to the other end of said cable.

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