Dec. 30. 1924. 1,521,144

T. D. ADAIR, JR

OVERLOAD INDICATING APPARATUS FOR TRANSFORMERS

Filed Oct. 11, 1921

Fig. 1

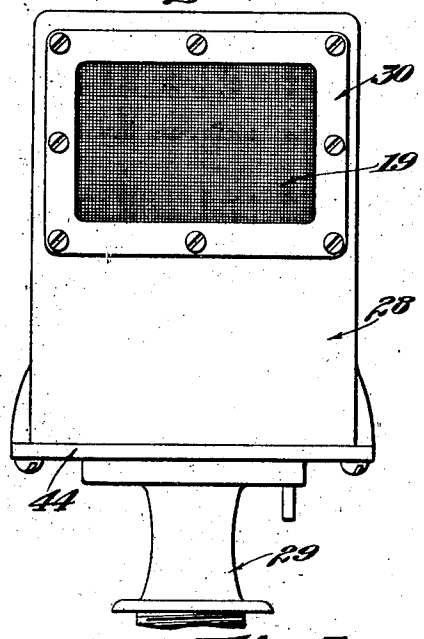


Fig. 2

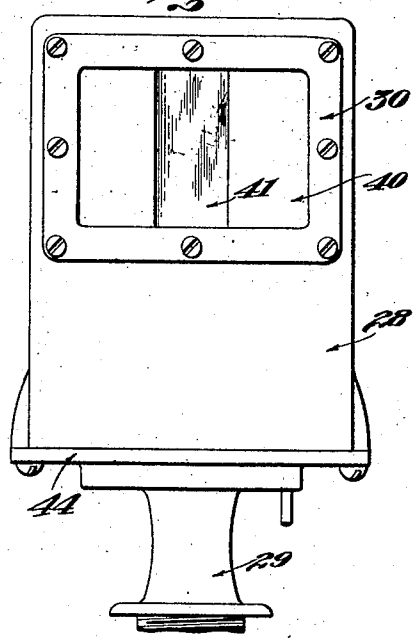


Fig. 3

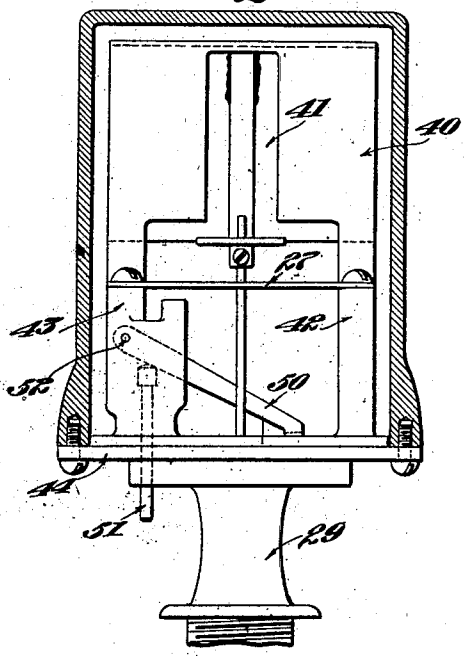
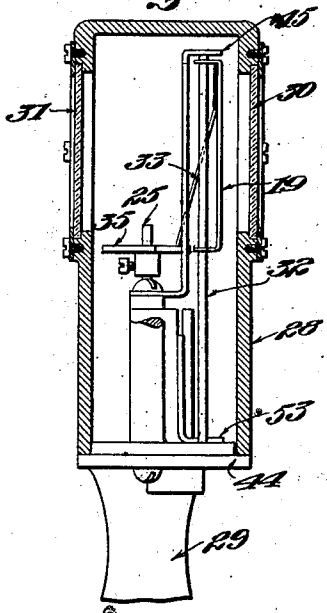


Fig. 4



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UNITED STATES PATENT OFFICE.

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OVERLOAD-INDICATING APPARATUS FOR TRANSFORMERS.

Application filed October 11, 1921. Serial No. 507,029.

To all whom it may concern:

Be it known that I, THOMAS DONALD ADAIR, Jr., a citizen of the United States, residing at Dorchester, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Overload-Indicating Apparatus for Transformers; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

The present invention relates to an improvement in overload indicating apparatus for transformers, and more particularly to semaphores for use in connection with such apparatus.

In the transformer disclosed in the application filed by the present inventor April 8, 1921, Serial No. 459,574, the semaphore is enclosed within a semaphore box having a window on one side. When the semaphore drops, it is exhibited at the window. In practice, in order to render the semaphore clearly visible and distinguishable, it is painted white. Upon the occurrence of transformer overload, the white was exposed to view by the dropping of the semaphore behind the window. When the transformer provided with this overload indicating apparatus was mounted in its usual position on a pole, it was discovered that when viewed against light clouds or blue sky, the white semaphore was indistinguishable from the black semaphore box or from the black appearance of the window before the semaphore fell. It was also observed that the reflection of the glass in certain positions of sun or cloud made it appear as if the white semaphore was in overload indicating position.

It was attempted to overcome this difficulty by providing the semaphore box with a large bonnet to cut off reflected light, but this was ineffective because the window was so shaded that with a strong light background it always appeared black.

It was next attempted to overcome the difficulty by striping the white semaphore with black, but this was ineffective because it was impossible for the eye to distinguish the black from the white against a brilliantly illuminated background such as a white cloud or blue sky.

It was next attempted to secure visible indication by providing the semaphore box with two aligned windows at the top of the box, and painting the semaphore black. This construction made it possible clearly to distinguish the dropping of the signal by reason of transmitted light, but against a dark background the opening appeared black, and in such case it was impossible to determine whether the semaphore was set or dropped.

Remembering that the signal of said application was visible against a black background, the present construction was produced in which a perforated screen was provided in the box between the two windows. When the semaphore fell, the perforation would permit the passage of light through the box, and render the signal visible against a white or highly illuminated background, the screen, being painted white, becoming visible against a dark background.

So the construction of the present invention was arrived at, in which a signal is visible both against a highly illuminated background or against a dark background. With this object in view, the present invention consists in the overload indicating apparatus hereinafter described and particularly defined in the claims.

In the accompanying drawings illustrating the preferred form of the invention, Fig. 1 is a front view of the signal box with the semaphore set; Fig. 2 is a front view of the box with the semaphore tripped; Fig. 3 is a sectional elevation of the box; and Fig. 4 is a transverse sectional elevation of the box.

The overload indicating apparatus for transformer as illustrated in the drawings, comprises a semaphore 19 operated by mechanism responsive to the overload conditions of

the transformer coils, comprising preferably a heat responsive element like that described in said application, which is connected to a rotatable spindle 25, journaled in a cross bar 27 within the semaphore box 28, mounted upon the upper end of a depending boss 29, having a threaded portion adapted to be extended through a hole in the cover of the transformer, upon which is a nut which is thereafter screwed to clamp the boss to the cover. Variations in temperature of the coil in the transformer operate through the expansion or contraction of the heat responsive coil or spiral to cause rotation of the rotatable spindle 25. The semaphore box 28 is provided with two windows 30, 31, at the top of the box on opposite sides. The window 30 may be called the front window, and the window 31 the back window. The windows are glazed. Close to the front window the semaphore 19 is supported to slide on vertical rods 32, and normally held in raised position and permitted to fall when the temperature of the oil bath reaches a point corresponding to an overload condition upon the transformer coils. The semaphore 19 is supported in its raised position by a resilient leaf spring 33, secured at its upper ends to the semaphore 19, having its lower end resting upon the upper surface of a horizontal segmental disk 35 secured to the upper end of the rotatable spindle 25. This disk 35 is provided with a notch through which the supporting spring 33 is permitted to pass when the disk is rotated to bring the notch under the spring 33, as in the construction of said application. The semaphore box 28 is provided with a screen 40, having a cut away portion 41. The screen is painted white, and the white screen is disclosed to view through the front window when the semaphore 19 drops. The screen 40 is integral with the cross-bar 27 by which it is mounted upon the posts 42 and 43, rising from the base or bottom 44 of the semaphore box. The upper end of the screen 40 is provided with a flange 45, in which are secured the upper ends of the semaphore guide rods 32. The front side of the semaphore 19, that is to say, the side toward the front window 30, is painted black like the outside of the semaphore box, and when it is in set position, that is, in its raised position, as shown in Fig. 4, it prevents the transmission of light through the box. After the semaphore is dropped, it is adapted to be lifted by the lifter lever 50, actuated by a push pin 51, the lever 50 being pivoted at 52 in the post 43. The top of the push pin engages the under side of the lifter lever 50, and is adapted to raise it when pressure is exerted upon the push pin. The lifter lever 50 has a transversely extended end or tip 53, which engages the under side of the semaphore.

The overload indicating apparatus mounted on its transformer on the pole may have any sort of background against which the inspector is required to view it. Thus, the inspector may find on one semaphore that it has to be observed looking at it almost directly at the sun, or with a blue sky or white cloud background, and in such case the light transmitted through the opening 41 in the screen will clearly indicate that the semaphore has dropped. Or, failure of light to be visible through the opening 41 will indicate that the semaphore has not dropped, and that the transformer has not been subjected to an overload. On the other hand, if the semaphore is observed against a dark background, the portions of the screen 40 visible through the window 30 will appear white against such dark background, as, for example, a building, or tree, and the indication in such case will be equally distinguishable and legible.

Having thus described the invention, what is claimed is:

1. Overload indicating apparatus for transformers having, in combination, a semaphore, a semphore box provided with windows on opposite sides of the semaphore, and a screen in the box covering a portion of the area of the window, permitting, upon the fall of the semaphore, the transmission of light from a light background, and being itself visible against a dark background.

2. Overload indicating apparatus for transformers having, in combination, a semaphore, a screen having a cut away portion, said screen being covered when the semaphore is in set position, and uncovered when the semaphore indicates overload condition, the screen being colored to contrast with a dark background, and to provide for the transmission of light through the cut away portion so as to be visible against a light background.

3. An indicating device having, in combination, a screen visible against a dark background and adapted to transmit light from a light background, and a semaphore adapted to be normally set to cover the screen.

4. An indicating device having, in combination, a screen having a portion visible against a dark background and a portion transmitting light from a light background, a semaphore, a member for normally maintaining the semaphore in position to cover the screen, and means for actuating the member to allow the semaphore to move and uncover the screen.

5. Overload indicating apparatus for transformers having, in combination, a semaphore box, a semaphore, the box being provided with aligned windows, the portion of the semaphore exposed at the window when the semaphore is in set position

being dark colored, and a portion of the apparatus exposed at the window when the semaphore is tripped being light colored so that when the semaphore is tripped, indicating overload condition, a passage for light through the box is provided by the aligned windows and a light colored area is exhibited, so that light may pass through the box to render the semaphore visible against a light background, and the light colored portion may be visible against a dark background.

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