June 23, 1942. C. A. HEBERT ET AL 2,287,243

ELECTRICAL SHIELDING APPARATUS

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FIG. 1

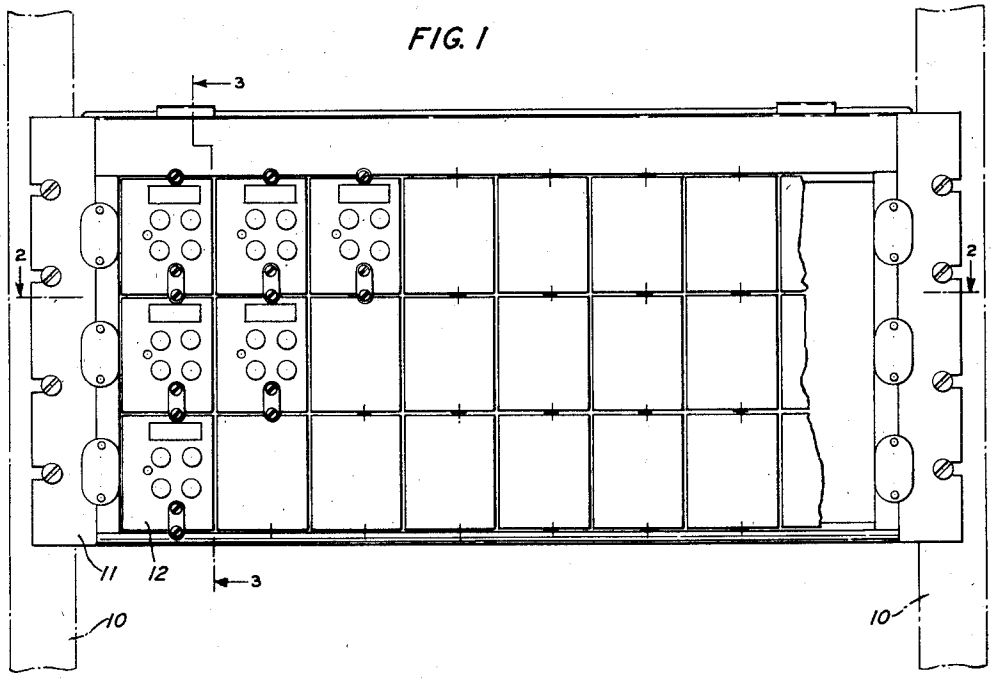

FIG. 2

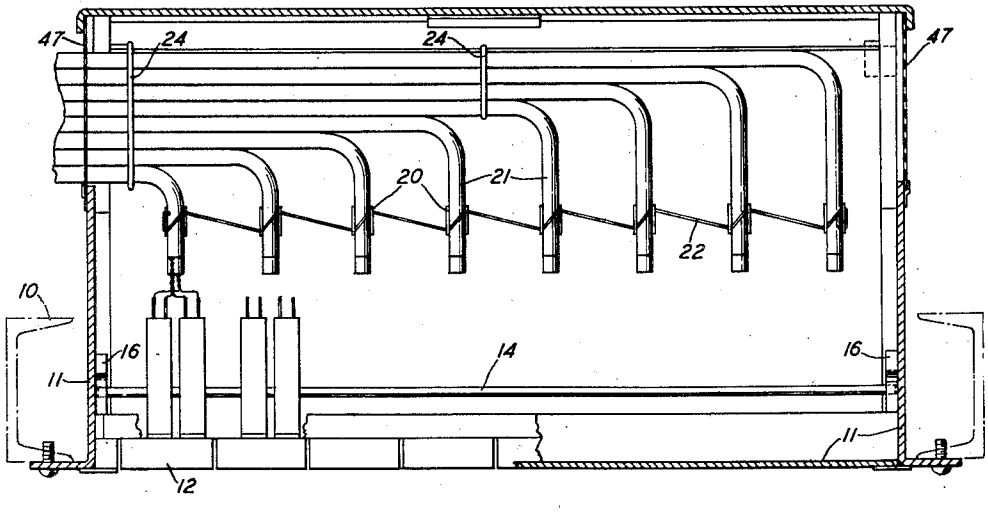

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FIG. 3

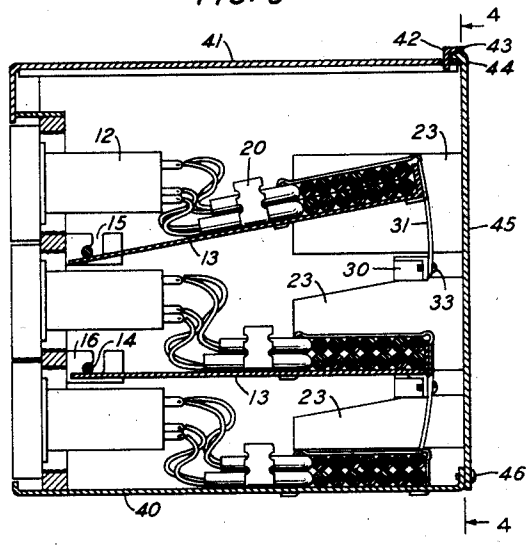
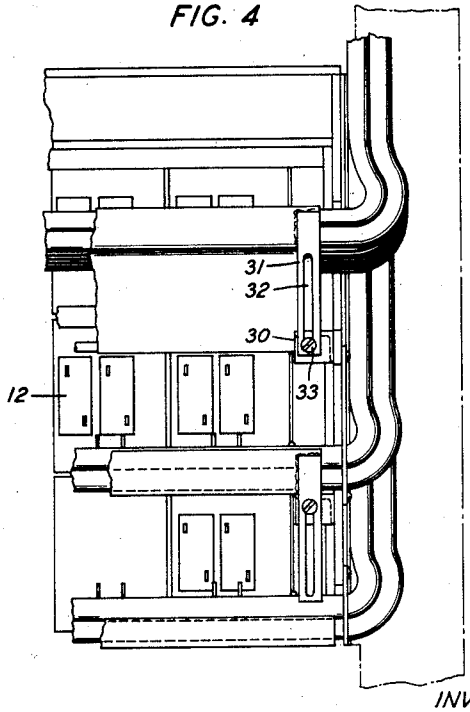


FIG. 4



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ELECTRICAL SHIELDING APPARATUS

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Application July 19, 1940, Serial No. 346,288

5 Claims. (Cl. 175—307)

This invention relates to electrical shielding apparatus for carrier transmission systems, and more particularly to a device for supporting electrical connections to carrier apparatus and in addition for shielding the carrier apparatus and the electrical connections thereto.

Carrier transmission systems may utilize at certain terminals electrical connections comprising concentric or paired and shielded conductors to minimize the introduction therein of cross-talk and noise from neighboring apparatus. Such conductors are bulky and stiff and consequently do not lend themselves expeditiously to cabling practices which comprise economy of space and minimum radii in the formation of bends, and which would therefore be expedient for electrical connections to carrier apparatus arranged, for example, in horizontal rows on relay racks.

The patent of F. M. Goddard, No. 1,560,778 granted November 10, 1925, discloses anti-induction apparatus in which a magnetic shield is slidably disposed between horizontal rows of electromagnetic relays to control cross-talk therebetween. This shield may be slidably withdrawn to provide facile access to the rear ends of the individual relays for the purpose of inspection and adjustment. Electrical connections comprising relatively small conductors served to the front ends of the relays occupy a minimum of space, involve no shielding and require no complicated supporting means. Therefore, such electrical connections can in nowise interfere with the slidable movements of the shield, as such movements are effected with respect to the rear ends of the relays.

Obviously, the bulky and stiff concentric or paired and shielded conductors mentioned hereinbefore for utility in carrier transmission systems would introduce certain difficulties, if considered for employment with anti-induction apparatus of the Goddard type. One such difficulty, for example, would involve for the concentric or paired shielded conductors a support which would be independent of the shield so as to allow for the latter the required slidable movement which was previously mentioned.

Accordingly, the present invention contemplates electrical shielding apparatus that is designed to support electrical connections to carrier apparatus and at the same time to provide electrical shielding between horizontal rows of carrier apparatus and the electrical connections thereto.

It is the main object of the invention to prevent magnetic and electrostatic disturbances between adjacent electrical apparatus.

It is another object to support electrical connections to such apparatus.

It is a further object to support electrical connections to such apparatus so that facile access to the latter may be provided.

It is a still further object to provide an enclosure for electrical apparatus so as to protect the latter from dust and damage.

In a preferred embodiment, the invention comprises a pair of spaced standards on which are fastened mounting plates carrying a plurality of rows of electrical apparatus. Interposed between adjacent horizontal rows of the latter is an electrical shield whose front end is pivotally supported between the mounting plates and which carries the electrical connections to the electrical apparatus. On the rear end of the shield is disposed a slotted member and a screw element cooperating therewith to control pivotal movement of the shield and to maintain the latter in various pivotal positions whereby the rear ends of the electrical apparatus may be exposed for inspection and adjustment of the connections thereto. Thus, the shield serves to support the electrical connections to the electrical apparatus and simultaneously therewith to prevent magnetic and electrostatic disturbances between contiguous rows of electrical apparatus and the electrical connections thereto.

A feature of the invention is that the unitary shielding and cable supporting means may be disposed on the same side of the electrical apparatus. Another feature is an enclosure to protect the electrical apparatus from the accumulation of dust particles and the occurrence of accidental damage. A further feature is that the shield is adapted to support in an orderly fashion the electrical connections to the electrical apparatus. An additional feature is the shielding and supporting means may be simultaneously actuated to expose for facile access the electrical apparatus and the connections thereto.

The invention will be readily understood from the following description taken together with the accompanying drawings, in which:

Fig. 1 is a front elevation showing the arrangement of electrical apparatus to which the invention is applicable;

Fig. 2 is a sectional view taken along the lines 2—2 of Fig. 1 and illustrating electrical connections to the rear ends of the electrical apparatus;

Fig. 3 is a sectional view taken along the lines 3—3 of Fig. 1; and

Fig. 4 is a fragmentary elevational view taken along the lines 4—4 of Fig. 3.

The same reference numerals are utilized to identify corresponding elements appearing in the several figures of the drawings.

Referring to Figs. 1 and 2, spaced standards 10, 10 comprising preferably channel beams and disposed vertically, support apparatus mounting plates 11, 11 to which are secured rows of patching jacks 12 suitable for connecting sections of

concentric conductors, and/or shielded paired wire, as the case may be. Positioned intermediate each horizontal row of patching jacks is an electrical shield 13, Fig. 3, one end of which has suitably fastened thereto a rod 14 whose opposite ends are disposed in bayonet slots 15 provided in supports 16, 16 attached suitably to the apparatus mounting plates, Figs. 2 and 3.

Arranged in horizontal alignment on the upper surface of each shield 13 is a plurality of U-shaped members 20, Figs. 2 and 3, in each of which is located the conductors 21 associated with the individual patching jacks. A cord 22 attached to the members 20 secures the conductors firmly in an orderly manner in the latter, particularly during pivotal movements of the shields 13, which movements will be hereinafter explained. These conductors may change direction from either the right hand or left hand and extend through a plurality of vertically aligned openings 23 provided in the rearward portions of the apparatus mounting plates, Fig. 3. Metallic spring-tempered straps 24, 24, Fig. 2, serve also to fasten the conductors in place on the shields 13.

Mounted on the rearward portion of each apparatus mounting plate is an angle member 30, Figs. 3 and 4, with each of which is associated a strap 31 whose one end is suitably secured to the rearward right-hand end of each shield 13, Fig. 4, and whose opposite end embodies a vertical slot 32. Each strap 31 serves to ground suitably the shield 13 with which it is associated. Positioned in the vertical slot 32 and secured to each angle member 30 is a screw 33 which serves to maintain the shield 13 in various pivotal positions as the latter is actuated on the pivot 14, and which together with the slot 32 serves to limit pivotal movement of the shield 13.

Pivotal movement of the shield 13 is necessary so as to provide sufficient space in the vicinity of the rear terminals of the patching jacks to inspect and adjust the connection of the conductors 21 thereto. Referring to Fig. 3, the upper shield 13 is disposed in its full pivoted position and held thereat by the screw 33 driven home in the associated angle member 30 so as to render accessible the rear terminals of the middle horizontal row of patching jacks. The middle shield 13 may be similarly disposed to render accessible the rear terminals of the lowermost horizontal row of patching jacks. Obviously, the uppermost horizontal row of patching jacks is accessible without movement of the upper shield 13. In other words, the aforedescribed pivotal movements of the shields 13 provide suitable space for inspection and adjustment of the connections of the individual conductors 21 to the rear terminals of the individual patching jacks. It is obvious that the number of shields 13 depends on the number of horizontal rows of patching jacks.

The lowermost group of conductors 21 is disposed on an electrical shield 40, Fig. 3, which is rigidly secured to the lowermost portions of the apparatus mounting plates whose uppermost portions suitably support an electrical shield 41. On the right-hand or rearward portion of the shield 41 is suitably positioned an inverted angle member 42 to provide a longitudinal slot 43 in which is positioned a right angle end portion 44 of a shield 45 whose lowermost portion is secured by one or more screws 46 to an upturned portion of the right-hand end of the shield 40. Associated with each opening 23 provided in the apparatus mounting plates, as previously mentioned, is an insulating element 47, Fig. 2. Thus, the connections to the patching jacks are enclosed to prevent further magnetic and electrostatic disturbances occasioned by neighboring signaling apparatus, and in addition to protect both the patching jacks and the electrical connections thereto from the accumulation of dust particles and an inadvertent damage.

What is claimed is:

1. An apparatus rack comprising standards, apparatus mounting plates secured to said standards, rows of apparatus affixed to said plates, shielding means disposed between rows of said apparatus, and means to support said shielding means in different pivotal positions relative to the rows of said apparatus between which said shielding means is disposed.

2. An apparatus rack comprising standards, apparatus mounting plates secured to said standards, rows of apparatus mounted on said plates, shielding means disposed between rows of said apparatus, means mounted on said shielding means to fan out electrical connections to said apparatus, and means affixed to said plates to support pivotally said shielding means such that varyingly increased amounts of space are provided in proximity of one of the two rows of said apparatus between which said shielding means is disposed.

3. An apparatus rack comprising standards, apparatus mounting plates secured to said standards, rows of apparatus mounted on said plates, shielding means positioned between rows of said apparatus, means disposed on said shielding means to fan out electrical connections to said apparatus, means fastened to said mounting plates to support pivotally one end of said shielding means, and means secured to the opposite end of said shielding means to control the pivotal movements thereof.

4. An apparatus rack comprising standards, apparatus mounting plates secured to said standards, rows of apparatus mounted on said plates, shielding means interposed between rows of said apparatus, means positioned on said shielding means to fan out electrical connections to said apparatus, means to mount pivotally said shielding means on said mounting plates, means to control pivotal movement of said shielding means, and additional shielding means enclosing said first-mentioned shielding means and the connections to said apparatus.

5. An apparatus rack comprising standards, apparatus mounting plates fastened to said standards, rows of apparatus mounted on said plates, shielding means interposed between adjacent horizontal rows of said apparatus to support electrical connections therefor, means fastened to said shielding means to fan out the electrical connections to said apparatus, means extending between said mounting plates to support pivotally one end of said shielding means, and means associated with another end of said shielding means to control pivotal movement thereof and to maintain said shielding means in desired pivotal positions.

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