

Nov. 7, 1939.

R. FITZPATRICK

2,179,406

RACK

Filed March 25, 1938

3 Sheets-Sheet 1

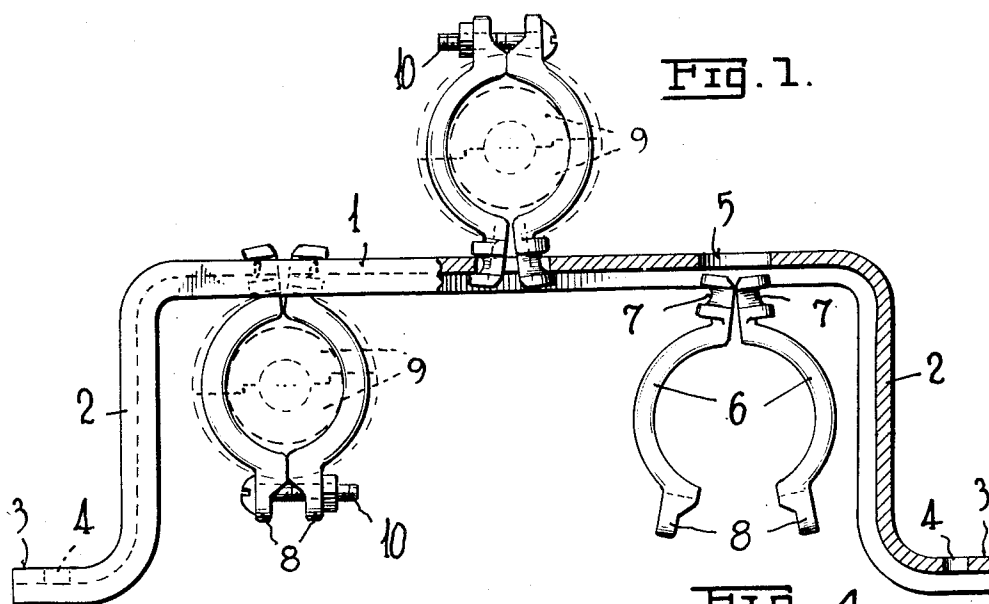


FIG. 1.

FIG. 2.

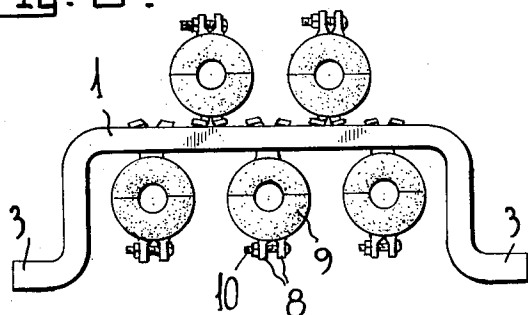


FIG. 4.

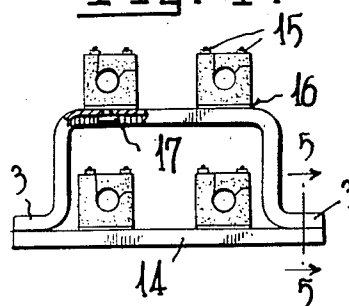


FIG. 5.

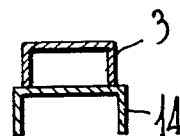
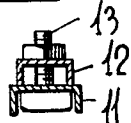
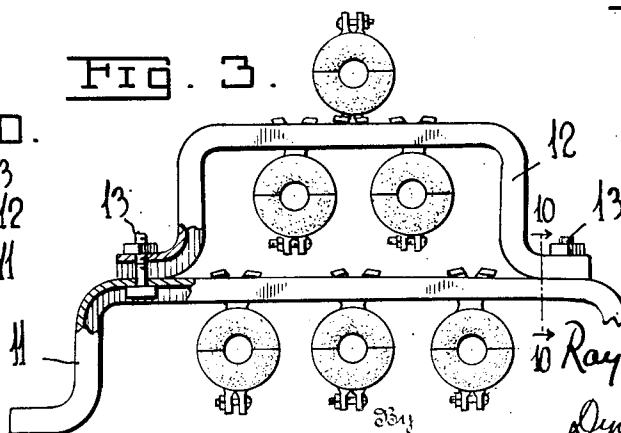


FIG. 3.

FIG. 10.



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FIG. 6.

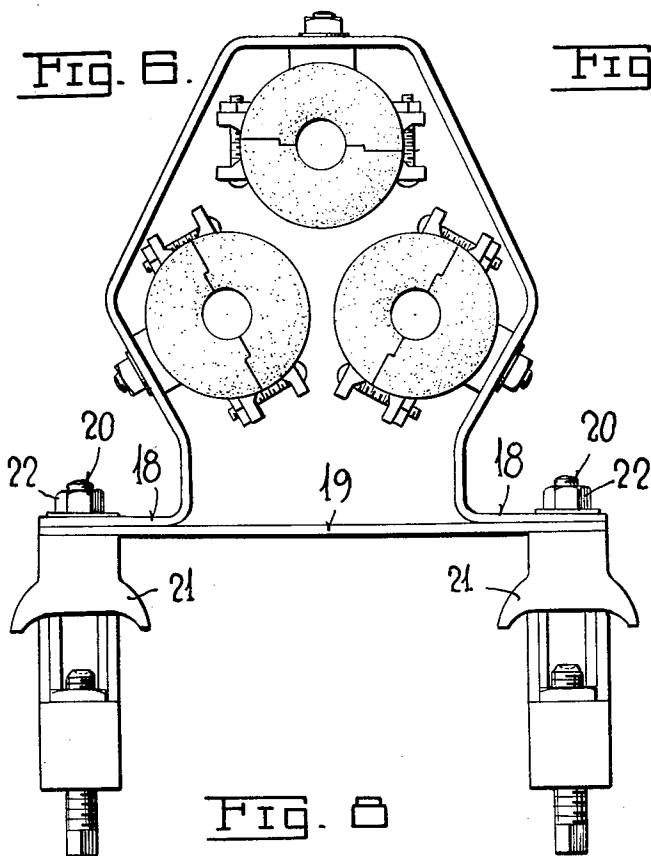


FIG. 7.

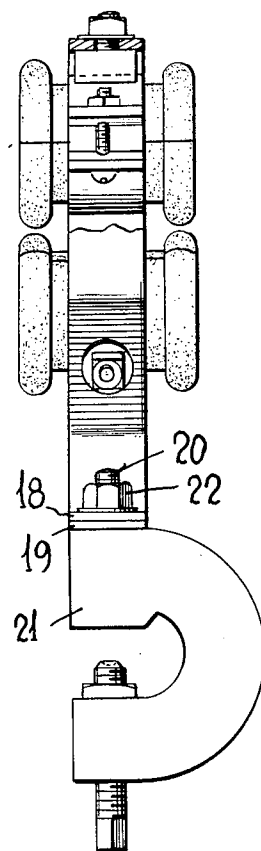


FIG. 8.

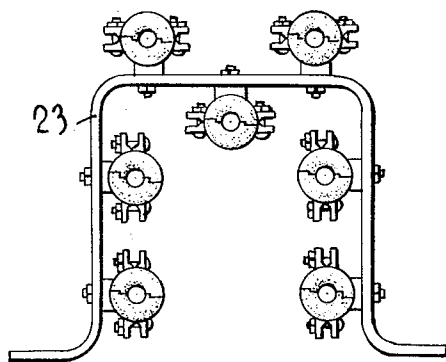
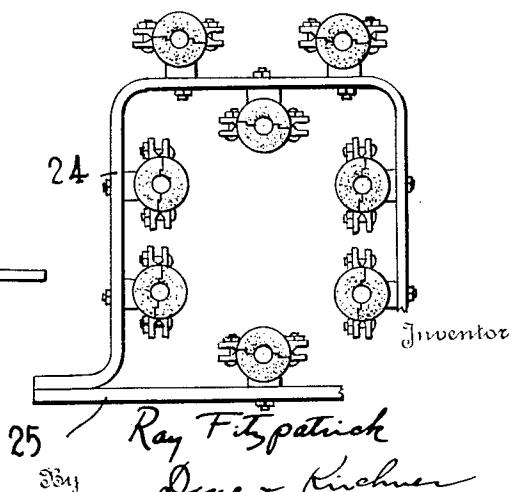


FIG. 9.



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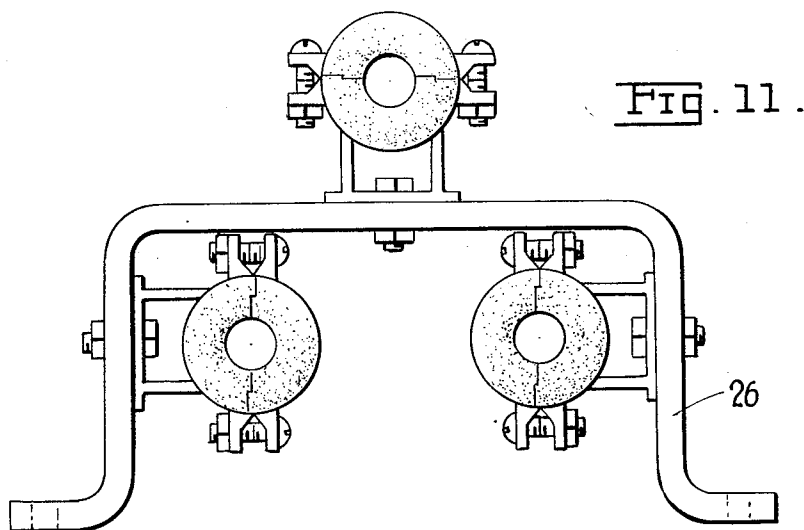
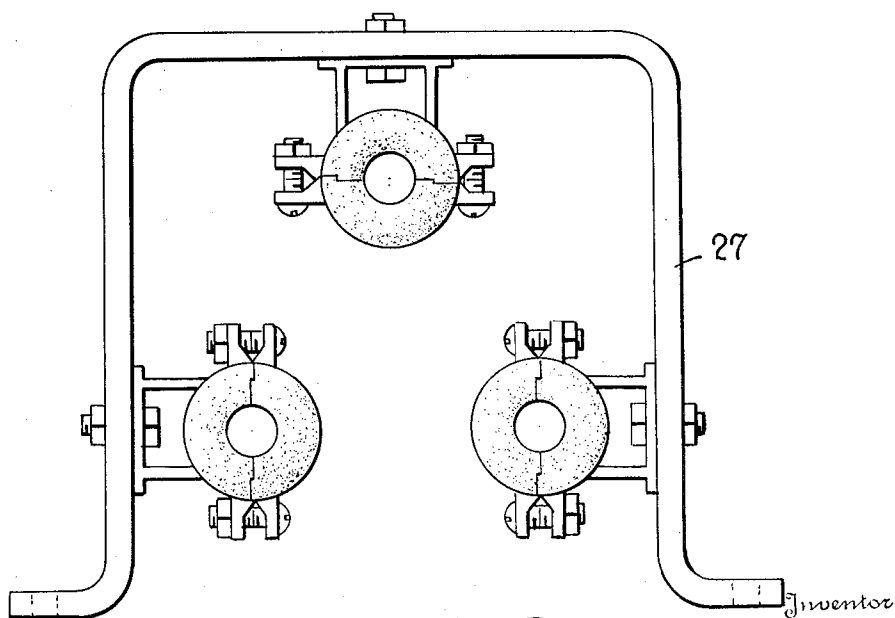


FIG. 12.



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UNITED STATES PATENT OFFICE

2,179,406

RACK

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Application March 25, 1938, Serial No. 198,139

4 Claims. (Cl. 248—68)

My invention relates to rack structures for supporting in spaced or nested relation a plurality of electric current conductors or the like.

For supporting a plurality of lines of this type on poles, pole cross arms, building walls and structural members such as beams and girders, the prior art has proposed numerous brackets, racks and the like. An object of the present invention is to provide a device of this character which will be superior to the best of the prior art structures in respect of economy of manufacture, simplicity of design, durability, efficiency in the performance of its functions, and general adaptability for use with any usual type of insulator.

More specifically, racks made in accordance with the principles of the present invention provide rigid support for any usual number of conductor lines, and permanently and securely space the lines apart. The new rack requires a minimum of material, and the material is used to the maximum of its capacity in providing mounting surfaces for insulators or the like. Common and inexpensive blank stock is subjected to a few simple bending and drilling or punching operations to make the racks, so that the cost of casting, forging and special shaping work is eliminated. Connection of the rack to the supporting surface is made at only two points in the preferred embodiments of the invention, and these points are spaced a maximum distance apart to give the rack a high degree of stability and minimize the strain on the member which provides the supporting surface. Installation of the racks is exceedingly simple, requiring no special tools, and can be performed by unskilled labor. While structurally very rigid, the racks possess a high degree of flexibility of performance, i. e., they are adaptable to meet a wide range of conditions of use. For example, any of the preferred embodiments of the invention may be mounted wherever an appropriate supporting surface can be had; the mounting can be made upright or inverted, and in any plane; and the rack can be arranged to carry symmetrically with respect to each other and with respect to the rack structure any number of lines from one to the capacity of the rack.

A feature of considerable practical value, particularly in the case of mountings in building interiors, is the disposition of the conductors in safely spaced yet compactly nested relation.

In a particular embodiment, the invention provides a rack structure in two or more parts which can be used alone or together. In this way a single part may be installed initially, to accom-

modate a relatively small number of lines, and as the needs of the service increase and outgrow the capacity of the rack, a second rack part may be added to the first. The cooperation of the two parts is such that the change or addition can generally be made without disturbing any of the original lines.

Other features and advantages of the generic concept and of the several specific embodiments will sufficiently appear in the following specification as the description proceeds.

In the drawings, which illustrate preferred embodiments chosen to exemplify the invention,

Figure 1 is an elevational view, with a portion in section, of a rack constituting one embodiment of the invention and showing the manner in which insulator mounts are connected to the rack;

Fig. 2 is an elevational view of the rack with the mounts differently arranged;

Fig. 3 is an elevational view, partly in section, of a two-part rack structure;

Fig. 4 is an elevational view, partly in section, of a modified form of rack, with alternative type of support;

Fig. 5 is a detail cross section taken on the line 5—5 of Fig. 4;

Fig. 6 is an elevational view of a further modified form of rack;

Fig. 7 is an end view of the rack shown in Fig. 6;

Figs. 8 and 9 are elevational views of still further modified forms of rack;

Fig. 10 is a detail cross section taken on the line 10—10 of Fig. 3; and

Figs. 11 and 12 are elevational views of further modifications.

In the drawings the several figures are drawn to different scales, for economy of space on the sheet.

Referring to the drawings, and first to Fig. 1, the rack structure includes a member, conveniently made of channel iron stock bent or otherwise formed into substantial U-shape, so as to include a base portion 1, leg portions 2 and terminal feet portions 3. The feet 3 preferably extend outwardly from the legs 2, as shown, but may, if desired, be formed to project inwardly. The construction is preferably such that the web of the channel is disposed along the outside of the U-shape and the flanges of the channel project interiorly of the U-shape, as shown, and in the constructions illustrated on Sheet 1 of the drawings the leg portions 2 are substantially parallel.

Each foot is provided with a perforation 4

through the web of the channel, adapted to receive a bolt or analogous fastening for securing the rack to a supporting surface (not shown). The web of the channel, in the base of the rack, is provided with a perforation 5, or a plurality of such perforations, each adapted to receive a suitable support or mount for an insulator such as the bushings and cleats shown in the drawings. In certain of the figures I show bushing mounts of the type disclosed in my United States Patent No. 1,837,259 of December 22, 1931, consisting of a pair of clamping elements 6 with attached foot portions 7 at one end and perforated ears 8 at the other end. As is clearly shown in Fig. 1 the foot portions 7, which are provided with spaced flanges, may be inserted together through the opening 5, after which the clamping elements 6 may receive the two bushing halves 9, 9, embracing the conductor, whereupon a nut and bolt fastening 10 is passed through the perforated ears 8 and drawn up to hold the bushing halves between the clamping elements and expand the foot portions 7 to make secure engagement with the margins of the opening 5. Other types of bushing and cleat supports may be substituted, as will be evident from illustrations of some other types in certain of the other figures.

A support is mounted in one or more of the openings 5 to carry as many conductor lines as may be required, up to the capacity of the rack structure. In the rack shown in Fig. 1 three supports may be mounted, and a convenient and symmetrical or equidistant disposition involves mounting two of these supports to extend from the under side of rack base and one from the other side, or one from the under side and two from the top.

In Fig. 2 the rack base is shown provided with five openings 5, each of which may be used to mount a support.

In Fig. 3 I show a rack structure including two parts, designated respectively 11 and 12. One of these parts, that which is connected directly to the support (not shown) and which may be considered to be the lower part, has a base portion somewhat longer than that of the other part, designated 12, which may be considered the upper part of the composite rack. The proportions are preferably such that the distance between the extreme ends of the feet of upper rack 12 is equal to the length of the base portion of lower rack 11. The base of each rack is provided with conductor supporting element receiving openings 5, and the base of lower rack 11 is provided also with holes registering with the holes in the feet of upper rack 12. Lower rack 11 is first mounted on the supporting surface and at the same time, or after the capacity of lower rack 11 has been exceeded, upper rack 12 is mounted on the lower rack through the instrumentality of bolt and nut assemblies 13. The polygonal heads of bolts 13 are conveniently such as to fit between the flanges of the channel iron forming the base of rack 11 and be held against turning by those flanges. By employing nut and bolt assemblies 13 in this manner, rather than tapping the rack base or foot to receive a screw, stripping of the threads which occasionally occurs eliminates only a nut or bolt, and not a rack or rack part. By this expedient the rack structure may be made of comparatively soft iron, and tapping expense is eliminated.

Where one rack is mounted on top of the other, the lower rack or section is preferably made wider from flange to flange, as shown in

Fig. 10, so that the lower rack provides a better bearing for the upper rack.

In each of the openings 5 in the composite rack structure 11, 12 an insulator support may be mounted, as is shown in Fig. 3, and the bushings, cleats or the like may be arranged in any of several patterns, preferably symmetrically as shown in the figure and closely and equally spaced center to center to relieve induction and impedance.

In the modification illustrated in Fig. 4 a bar 14 is shown welded or held by bolts in connecting relation with the two feet 3 of the rack structure. These bolts may be the same ones which mount the rack structure on the supporting surface, and the bar 14 may be provided with openings mounting the insulator supports. In Fig. 4 the cleats are shown as consisting of companion porcelain blocks connected by nuts and bolts 15 to a base plate 16 which is mounted in the opening 5 by a threaded stud receiving a nut 17. This type of cleat is well known and forms no part of the present invention, but it will be evident that the rack is admirably adapted to receive and mount it. These cleats may be arranged in any positions on the U-shaped frame and connecting bar permitted by the openings provided therein.

In Fig. 6 the frame is substantially U-shaped, but the legs are conveniently bent, outwardly in their upper portions and inwardly in their lower portions, and the legs and base are provided with openings to receive insulator supports. The bent shape of the legs dispose the bushings, cleats or the like in symmetry and equidistantly and renders the whole structure somewhat more compact than would be the case if the legs were straight and parallel as in the other figures.

The frame in the Fig. 6 device is made of strap or bar stock, but channel stock could be substituted. The feet 18 in Fig. 6 are connected by a brace bar 19 to stiffen the assembly and registering openings in the parts 18 and 19 receive threaded studs 20 carried by any suitable sort of clamp 21. Cap nuts 22 hold the assembly down on the clamps, and the clamps are mounted on any convenient support, as for example the flange of a beam.

In Figs. 8, 11 and 12 the construction is essentially like that shown in Figs. 1 and 2, except that the leg portions 23, 26 and 27 are relatively elongated, and are perforated to receive one or more supports. The base is similarly perforated and supports are appropriately arranged thereon.

The rack of Fig. 9 is essentially like that of Fig. 4 except that the leg portions 24 are relatively lengthened and perforated to receive supports. The foot connecting bar 25 and the base of the U are also perforated and similarly mount supports.

In the preferred embodiments the lower mountings are elevated above the plane of the supporting surface on which the rack is mounted. This is a feature of considerable advantage in certain installations, as in steel mills, where the dust which collects on beams and other metal surfaces on which these racks are mounted is commonly sufficiently loaded with iron or other metallic particles to short circuit the conductors when the dust pile rises to a break or weak spot in the insulation. By arranging the lower conductors well above the rack supporting surface the likelihood of dust bridging the resulting wide gap is minimized.

I claim:

1. A rack structure for supporting in spaced relation a plurality of electric current conductors comprising a length of channel stock disposed in substantial U-shape, having leg portions adapted to engage a support and having a base, the flanges of each leg portion extending toward the flanges of the other and the web of the channel forming the outer surface of the base, said base web being provided with a plurality of spaced openings, and a conductor supporting element mounted in each of at least some of said openings, disposed between the base and the support, and spaced from the support by said legs.

2. A rack structure for supporting in spaced relation a plurality of electric current conductors comprising a pair of substantially U-shaped frames, each having a pair of legs and a base, the legs of one of the frames being adapted to be connected to a supporting surface whereby said legs space the base of said frame from said supporting surface, the legs of the other frame being connected to the first named frame whereby said legs space the bases of said frames from each other, each base being provided with a plu-

rality of spaced openings, and a conductor supporting element mounted in each of at least some of the openings in each base and spaced by said legs from the other base and from the support.

3. A rack structure for supporting in spaced relation a plurality of electric current conductors comprising a substantially U-shaped frame having leg portions and a base connecting said leg portions, and a member connecting the free ends of the leg portions and spaced thereby from said base, said member and base being provided with spaced openings each adapted to receive and mount a conductor supporting element.

4. A rack structure for supporting in spaced relation a plurality of electric current conductors comprising a length of channel stock disposed in substantial U-shape, having leg portions adapted to engage a support and having a base formed by the web of the channel, said base web being provided with a plurality of spaced openings, and a conductor supporting element mounted in each of at least some of said openings, disposed between the base and the support, and spaced from the support by said legs.

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