April 21, 1931. E. J. COWAN 1,801,413

RACK FOR INSULATING CASING CONDENSERS

Filed Dec. 6, 1928

Fig. 1.

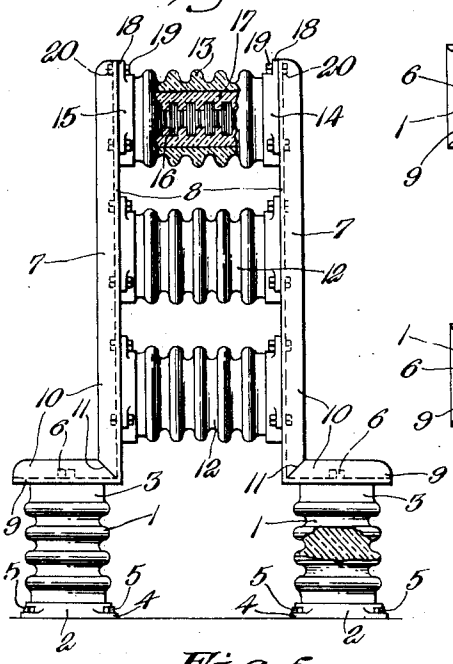


Fig. 2.

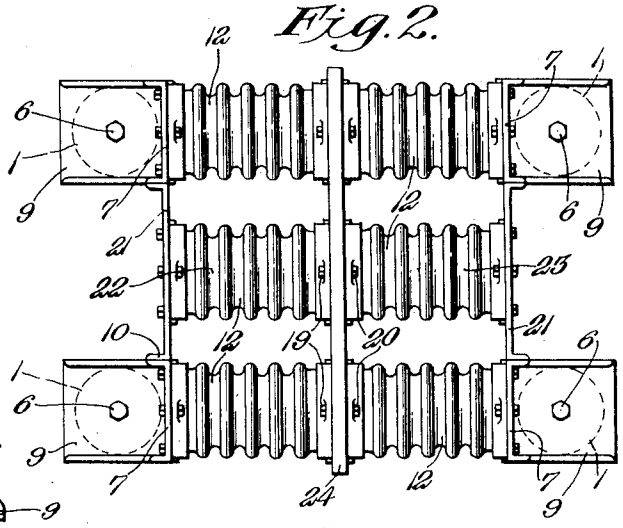


Fig. 3.

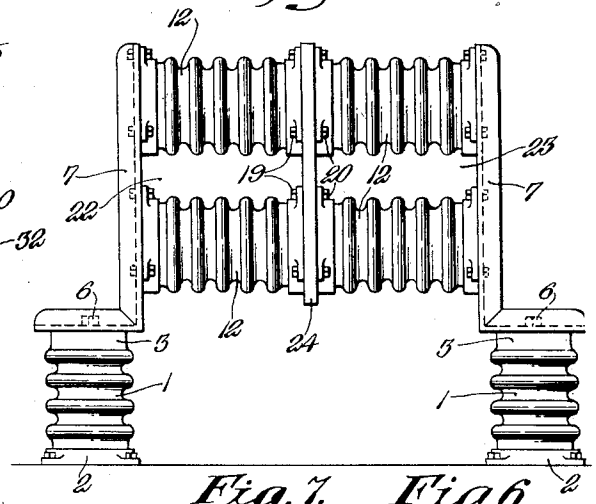


Fig. 5.

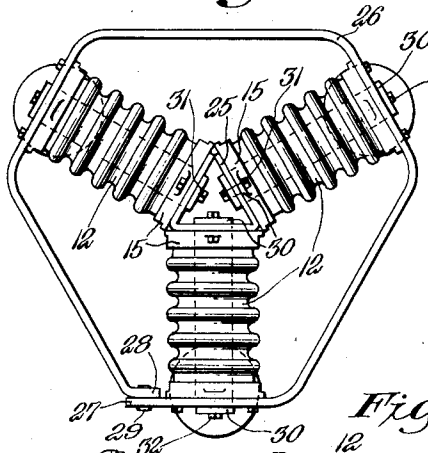


Fig. 7.

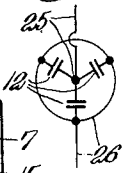


Fig. 6.

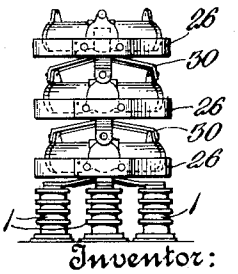
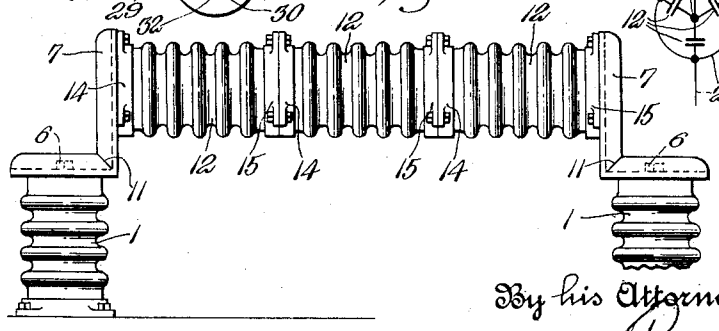


Fig. 4.



Inventor:
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By his Attorney

Patented Apr. 21, 1931

1,801,413

UNITED STATES PATENT OFFICE

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RACK FOR INSULATING CASING CONDENSERS

Application filed December 6, 1928. Serial No. 324,307.

This invention relates to an improved condenser assembly, and more particularly to a novel means adapted to serve as mounting structure for a plurality of condensers inserted in a carrier current circuit, either in parallel or series relationship, as may be desired.

Hitherto, the assembly of insulation-sided carrier-current condensers, has been practically restricted to series connections by means of metal and members screwed together or otherwise fastened, as by bolts and nuts. Such installations have imposed undue restrictions upon the number and position of the units to be used, vertical series connections, the so-called columnar arrangement, being substantially the only arrangement possible.

Where the capacitors used are of the insulation-sided, metal-end construction, the weight of the entire column is, of necessity, borne by the lowermost units of the column, which fact requires special reinforced bottom units or restricts the column height which can be used.

In addition to these serious mechanical disadvantages, there is an added disadvantage arising from the danger and inconvenience in installing such columnar installations and in servicing them under service conditions.

It is an object of this invention to provide an improved capacitor assembly of the type required for high potential uses.

It is a further object of this invention to provide such an improved assembly which can be readily made from standard parts without involving any changes in design or capacity of such parts.

Yet another object of this invention is the provision of such an improved capacitor assembly, which is essentially non-columnar, and which is adapted to be readily assembled and serviced.

These and other desirable objects and advantages of the present invention will be described in the accompanying specification and illustrated in the drawings, certain preferred embodiments being shown and described by way of illustration only, for since the underlying principles may be incorporated in other specific mechanical structures, it is not intended to be limited to the ones shown, except as such limitations are clearly imposed by the appended claims.

In the drawings, like numerals refer to similar parts throughout the several views, of which

Fig. 1 is a side elevation, partly in section, of a plurality of condenser units connected in parallel and mounted on two channel beams, which in turn are supported by suitable insulators;

Fig. 2 is a top plan view of six units connected in series parallel, and mounted on channel beams and insulators;

Fig. 3 is a side elevation of the assembly shown in Fig. 2;

Fig. 4 is a side elevation of a horizontally disposed, three-unit assembly connected in series;

Fig. 5 is a top plan view of an improved parallel arrangement of three condenser units mounted in a strap iron structure.

Fig. 6 is a side elevation of a plurality of the units shown in Fig. 5, mounted in a series arrangement and supported on an insulating base, and

Fig. 7 is a wiring diagram of the capacitor circuit of Fig. 5.

Referring now to Fig. 1, there is shown a capacitor structure comprising base insulators 1, one of which is shown partly in section, provided with metal end caps 2, 3. These end caps are secured to the insulators proper by any suitable means, such as ordinary neat cement, and the members 2 are provided with mounting lugs 4, which are suitably apertured to receive bolts 5 or other fastening means, as may be desired. Members 3, are centrally apertured to receive bolts 6, for a purpose to be described more in detail hereinafter.

Mounted on the insulating base members, and secured thereto in good mechanical and electrical relationship by the securing members 6, are a plurality of supporting members, designated generally by the numeral 7. These members comprise standard channel iron members of any suitable

dimensions, having side walls 8, and base portions 9, positioned substantially at right angles to, and integral with the side walls, and adapted to serve as supports. The channels are provided with the usual flanges 10, which serve as stiffening members for the assembly. These channel iron members are readily available and of low cost, and are particularly suited for the purposes of the present invention, as will appear more fully hereinafter. While ordinary channel iron members have been disclosed it will, of course, be readily appreciated that any desired metal in any suitable configuration, and having the requisite electrical conductivity and mechanical strength, may be used. The joints 11 of the channel members may be welded or brazed, as desired, to insure the maximum of strength in the assembly.

As noted above, the securing members 6, are adapted to secure the supporting bases 9, in good electrical and mechanical relationship to the metal ends 3 of the insulating bases.

The simplicity of this structure is readily apparent and the mechanical stability of the installation is very great, due to the abutting of the plane surfaces of support members 9 and the tops of the members 3.

Interposed between the members 8 may be included a plurality of electrical devices, such as capacitors of the type set forth and claimed in the application of Proctor and Bailey, S. N. 4150, which are designated generally by the numeral 12. These capacitors comprise insulation-sided casings 13, having metal ends 14, 15 adapted to hold stacks 16 of alternate foils and dielectrics under mechanical compression and transmit the compression strains to the members 13. Any suitable insulating filling compound, indicated generally at 17, may be employed. The members 14 and 15, in the present instance, are adapted to serve not only as compression transmitting devices and supports, but also as terminals of opposite polarity for the devices illustrated. These terminal members are provided with mounting lugs, designated generally by the numeral 18, and are secured to the supports 8 by suitable bolts and nuts, 19, 20, the bolts being adapted to register with suitable apertures in the support members 8, previously described.

While a capacitor assembly has been shown, it is to be understood that this is merely illustrative of the variety of electrical devices which may be mounted in the manner herein set forth and hereinafter claimed.

It will be seen that in the structure shown in Fig. 1 a plurality of capacitors are supported in a single plane by the simple construction comprising right angle channel iron supporting members mounted on insulating bases, and the supporting members also being adapted to serve as terminals of opposite polarity in the construction shown.

Referring now to Figs. 2 and 3, there is shown an assembly of capacitors in series parallel relationship, the assembly comprising a plurality of capacitor units 12, mounted on the supports 7 and the intermediate channel supporting members. These members 21 may be secured to the side flanges 10 of member 7 in any suitable manner as by bolts or machine screws, not shown, or by welding or brazing, as desired. Such a set of capacitors arranged in parallel and designated generally by the numeral 22, is connected in series with a like installation 23 by means of a supporting member 24 which is adapted to maintain the two groups in mechanical and electrical relationship thru the intermediacy of the usual bolt and nut connections 19, 20, previously described.

It will thus be seen that the standard units described by Proctor and Bailey, as well as any other suitable electrical devices, may be appropriately supported in either parallel or series parallel relationship without any great degree of trouble, and are readily mounted in position, as well as being adapted to be readily removed therefrom, due to the simplicity of the mounting means and to the further fact that the electrical units, per se, are in no way required to be altered. It will also be appreciated that any given value of the electrical characteristic of a circuit may be suitably varied by the mere insertion or removal of the requisite number of units having the desired electrical characteristics, such units being adapted to be placed in tiers, as indicated in both Figs. 1 and 3.

Where, in the case of capacitor assemblies, it is desired to retain the novel features of accessibility and ease of repair and installation in a series connection, the invention comprehends the arrangement of series connected condensers, illustrated in Fig. 4, which, as shown, comprehends a plurality of condensers serially connected by means of their metal ends to the supports 7 and to each other. In this construction, the number of units to be connected in any given series relationship is limited only by the tensile strength of the units themselves and not by any other consideration.

A novel arrangement of capacitors, which is comprehended within the spirit and scope of this invention, is the assembly shown in Figs. 5 and 6, the electrical circuit being indicated generally in Fig. 7. In these figures, a plurality of units 12 are provided with common mountings 25 and 26 made of strap iron or other suitable material and the units are secured thereto at their respec-

tive ends by the usual bolts and nuts, above designated. The member 26 being on the outside of the units, acts as a common terminal of one polarity, and ends 27, 28 are secured together by any suitable means such as rivets 29, or the like. The member 25 comprises a substantially triangular piece of strap iron having the desired mechanical strength and electrical conductivity, and serves as a common terminal for the members whose polarity is designated generally by the numeral 15. The assembly may be suitably supported in the usual manner on insulating bases 1, previously described.

Referring now to Fig. 7, it will be seen that there is provided in a single plane a plurality of condensers in parallel relationship in which the capacitors are held in good mechanical and electrical support by means of simple straps 25 and 26, without involving, as in the case of the structures previously described, any alteration in the design or capacity of the capacitors or other electrical devices which may be used.

Where it is desired to provide such an assembly in which the capacitors are arranged in series parallel, it is merely necessary to secure suitable strap members 30 to the member 25 by interposing them between the bolts or other securing members 31, bringing the respective support members downwardly into mechanical and electrical connection with the outer strap member 26 by means of a plurality of securing members 32 adapted to secure the straps to the next succeeding group. These straps 30, when assembled in the manner described, are adapted to form tripod supports for the upper capacitor assemblies and provide a desired distribution of the stresses, due to the weights of the assembled capacitors, as well as provide a certain desired resilience in the mounting means, which resilience is adapted to minimize any stresses, due to the weights above noted. The assembly shown in Fig. 6 comprehends the usual insulating bases 1 and it will be noted that this construction provides a maximum of capacity in a minimum of space, which is, of course, highly desirable, where space is at a premium.

In the construction as herein shown, the use of suitable terminals is, of course, comprehended, it being understood that while they are not particularly shown, that they may be appropriately located at any parts of the assemblies as may be found suitable.

It will now be appreciated that there has been provided a novel assembly for electrical devices, in which the various devices are mounted either in series or parallel, or series-parallel relationship, as may be desired, by supporting them from a plurality of ordinary channel iron members or the like, which are adapted not only to serve as mechanical supports, but as electrical connections and terminals, and in addition, permit the ready installation and servicing of the assembled devices without requiring any alterations, either in form or electrical characteristic of the devices in question.

It will further be appreciated that, due to the simplicity of the construction, as well as the remarkable cheapness and advantages of the supporting and connecting members used, marked economies in construction and maintenance are assured, as well as the ability to enlarge or diminish the particular installation without involving any substantial increase in expense due to new designs, or excess of material required.

I claim:

1. A compacitor assembly, including a plurality of base members respectively spaced in two planes, metallic channel shaped members rigidly secured to the bases, a metallic member extending laterally between and connecting two of the members, and means to connect several substantially horizontally aligned capacitor units to the metallic members.

2. A series parallel capacitor assemblage, including a plurality of upwardly extending channel shaped metallic members regidly secured to insulating bases, metallic struts extending laterally between and connected to two of the members, a metallic member spaced from the said members and struts, a plurality of capacitor units electrically connected at one end to the strut and at the other end to the said interposed metallic member.

3. A series parallel capacitor assemblage, including a plurality of upwardly extending channel shaped metallic members rigidly secured to insulating bases, metallic struts extending laterally between and connected to two of the members, a metallic member spaced from the said members and struts, a plurality of capacitor units electrically connected at one end to the channel shaped members and at the other end to the said interposed metallic member.

4. A series parallel capacitor assemblage, including a plurality of upwardly extending channel shaped metallic members rigidly secured to insulating bases, metallic struts extending laterally between and connected to two of the members, a metallic member spaced from the said members and struts, a plurality of capacitor units electrically and mechanically connected at one end to the strut and at the other end to the said interposed metallic member.

5. A series parallel capacitor assemblage, including a plurality of upwardly extending channel shaped metallic members rigidly secured to insulating bases, metallic struts extending laterally between and connected to two of the members, a metallic member

spaced from the said members and struts, a plurality of capacitor units electrically and mechanically connected at one end to the channel shaped members, and at the other end to the said interposed metallic member.

6. A series parallel capacitor assemblage, including upwardly extending, substantially parallel metallic frames; an interposed metallic connector, a plurality of vertical series of capacitor units, each unit of each series being electrically connected at one end to the frame and at the other end to the interposed connector.

7. A series parallel capacitor assemblage, including upwardly extending, substantially parallel metallic frames; and interposed metallic connector, a plurality of vertical series of capacitor units, each unit of each series being mechanically and electrically connected at one end to the frame and at the other end to the interposed connector.

8. A series parallel capacitor assemblage, including upwardly extending, spaced, parallel metallic frame members, a plurality of series connected capacitor units secured at one end to the frames, a central metallic conductor, and means to connect the other end of each capacitor of the said units to the conductor.

9. A capacitor assemblage, including at least two insulating base members, a channel shaped metallic support rigidly secured to the base members, a plurality of series stack capacitors including insulation sided, metal ended casings rigidly connected end to end, the free ends of the series being electrically connected to the channel-shaped metallic member and being mechanically supported thereby.

10. A capacitor assemblage comprising a plurality of capacitor units each having an insulating casing enclosing dielectric and armature sheets and end members provided with means for securing said units rigidly together in series, and spaced supports between which the plurality of units is horizontally mounted as a beam and to which they are secured, each of said supports including a columnar insulator.

In testimony whereof I hereunto affix my signature.

EDWARD J. COWAN.