



March 29, 1966

W. D. KENDALL ET AL

3,243,497

UNIVERSAL SUPPORT FOR ELECTROTHERAPEUTIC TREATMENT HEAD

Filed Dec. 11, 1964

2 Sheets-Sheet 2

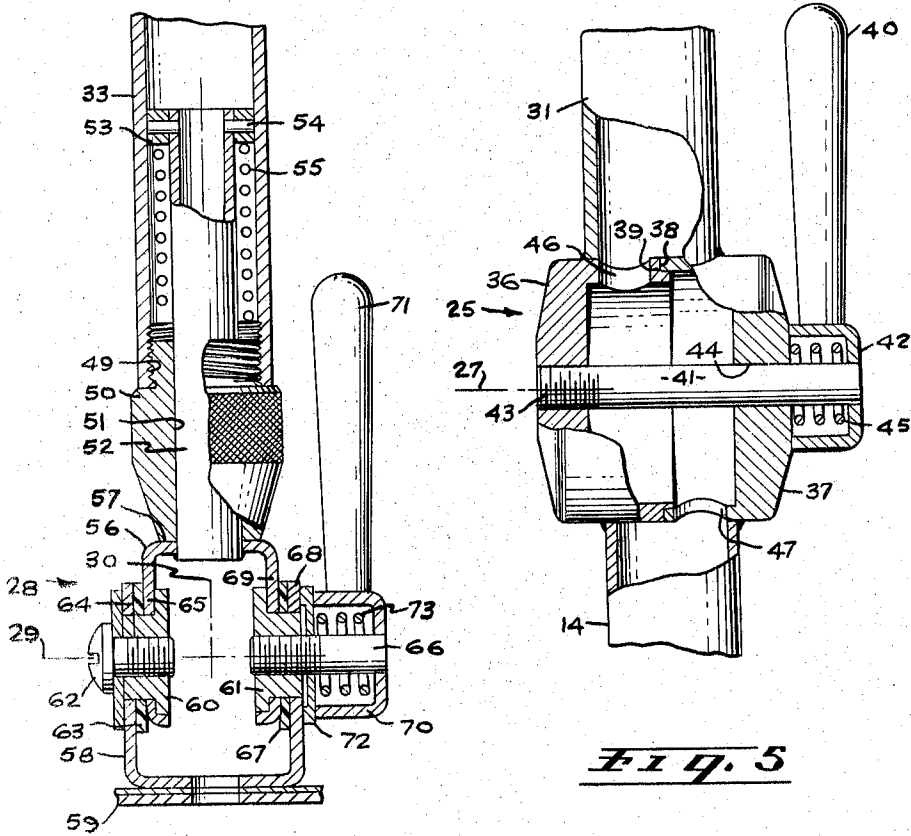


Fig. 5

Fig. 6

WILLIAM DENIS KENDALL  
KRISTOF SOMHEGYI

INVENTOR

*White and Haefliger*

BY

ATTORNEY

1

2

3,243,497

**UNIVERSAL SUPPORT FOR ELECTROTHERAPEUTIC TREATMENT HEAD**

William Denis Kendall and Kristof C. Somhegyi, Los Angeles, Calif., assignors to Dynapower Systems Corporation of California, Los Angeles, Calif., a corporation of California

Filed Dec. 11, 1964, Ser. No. 417,582

3 Claims. (Cl. 174-61)

This application is a continuation-in-part of my co-pending application entitled "Universal Support for Electrotherapeutic Treatment Head," Serial No. 188,109, filed April 17, 1962 and abandoned after December 11, 1964.

This invention relates generally to electrotherapeutic equipment, and more particularly concerns the supporting of a treatment head for bodily displacement and rotation throughout a wide range of adjustment positions, all with respect to a cabinet containing electrical apparatus from which electrical energy is fed to the head.

The invention has as a major object the provision of articulated arm assembly characterized as being adjustable in a novel manner to carry the treatment head from the front to either side of the electrical cabinet, and also up and down while permitting rotation of the head about several axes, thereby to impart a high degree of utility to the apparatus as respects application of the treatment head to patients. In accordance with this object, the arm assembly of the invention, while being itself new and advantageous, is combined with the cabinet and head in a novel manner productive of the desired adjustment capacity. Thus, the arm assembly includes a post subject to novel support and clamping at the cabinet top and pivotable about a vertical axis, primary joint means carried by the post above the cabinet top, arm means attached to the post through the primary joint and swingable about a generally horizontal axis at the joint, and terminal joint means carried by the arm and through which the treatment head has terminal attachment to the arm to swing about dual axes. The latter extend generally normal to one another.

Other important features of the invention include the provision of arms and joints which are hollow to protectively contain high voltage electrical cable running between the cabinet electrical apparatus and the treatment head, the joints typically including coaxial relatively rotatable cup-shaped members the rims of which are urged into mutual proximity to establish frictional interengagement of relatively rotatable joint shoulders for holding the articulated arm assembly and head in positions selected by forcible swinging thereof against such resistance. Also, the joints include shoulder tightening structure for positively locking the joint members against relative swinging about the mentioned horizontal axes. All these functions are accommodated by the novel arm assembly while protectively containing or enclosing the high tension cable, from which it is clear that the invention establishes highly unusual results as respect the utility, flexibility and safety features associated with the arm assembly and also its combination with the treatment head and the electrical cabinet.

These and other objects and advantages of the invention, as well as the details of an illustrative embodiment, will be more fully understood from the following detailed description of the drawings, in which:

FIG. 1 is a top perspective showing of the cabinet and treatment head with the arm assembly extending therebetween;

FIG. 2 is an enlarged side elevation, partially broken

away, showing the arm assembly interconnecting the cabinet top and treatment head;

FIG. 3 is a section taken on line 3-3 of FIG. 2;

FIG. 4 is a section taken on line 4-4 of FIG. 2;

5 FIG. 5 is an enlarged section taken on line 5-5 of FIG. 2; and

FIG. 6 is an enlarged section taken on line 6-6 of FIG. 2.

In FIG. 1 the arm assembly 10 is shown in combination with the cabinet top 11 and an electrotherapeutic treatment head 12, the latter being supported by the assembly 10. As is clear from FIG. 1, the controls 13 on the cabinet top may be manipulated for controlling the electrical signal supplied to the head 12, it being understood that a high voltage electrical cable runs between the electrical apparatus contained in the cabinet and to the head through the arm assembly.

Extending the description to FIG. 2, the arm assembly is shown to include a post 14, typically tubular, which is located at the cabinet top and is pivotable about a vertical axis 15. In particular, the post extends above and below the cabinet top plate 16, and is supported to swing between limiting positions carrying the head 12 from the front of the cabinet as shown in FIG. 1 to either side of the cabinet. Since the arm assembly facilitates upward and downward positioning and also swinging of the head 12 as will be more fully brought out, it is clear that the head has a wide range of adjustment positions all with respect to the cabinet from which electrical energy is fed to the head. Accordingly, the patient may be seated at either side of the cabinet or to the front thereof for treatment application of the head.

A typical stop means for limiting pivoting from the post is shown in FIG. 2 to include a lug 17 projecting forwardly from the post through an opening 18 in a journaling sleeve 19 which extends vertically above and below the cabinet plate 16. The opening 18 extends throughout approximately 180° as better shown in FIG. 3, stop shoulders 20 defining the annular limits of the opening 18, and being engageable by the lug 17 when the head 12 has been swung to either side of the cabinet. The sleeve 19 is shown as supporting the post 14 as a result of interengagement of a flange 21 integral with the post and the upper terminal of the sleeve, a cap 22 being threaded on the sleeve at 23 to retain the flange thereon as illustrated. The post may be locked in any pivoted position as by means of the set screw 23 threaded into the cap 22 and provided with a handle 24 for tightening the screw or cap against the post or flange, as by rotating the cap to clamp or retain the flange, as remains clear from the drawings and description. Suitable structure is shown at 25 mounting the sleeve 19 at the cabinet top plate 16.

What may be generally referred to as primary joint means is carried by the post above the top plate 16, one such joint means being indicated at 25. Attached to the post through the primary joint is what may be referred to as arm means 26, the latter being swingable about a generally horizontal axis 27 at the joint 25. Finally, terminal joint means such as that shown generally at 28 is carried by the arm means 26 to provide terminal attachment thereto of the head 12, such terminal attachment facilitating swinging of the head about axes one of which is indicated at 29, and the other of which, is typically shown at 30 and is generally normal to the axis 29.

Referring again to the arm means 26, it will be seen to include a first arm 31 attached to the post 14 through the primary joint 25, a secondary joint generally indicated at 32, and a second arm 33 terminally attached to the first arm 31 through the joint 32 and swingable about a

second axis 34 generally parallel to the first axis 27. As will further appear, the arm means 26 including the arms 31, 33 and joint 32, are hollow, as are also the post 14, a joint 25 as well as the terminal joint means 28 in order that the high tension carrying electrical cable 35 may be run therethrough to the head 12 from the electrical apparatus within the cabinet all without danger to the operator or the patient.

The two joints 25 and 32 are typically similar in construction, FIG. 5 showing the details thereof as respects joint 25. A pair of coaxial relatively rotatable cup-shaped joint members 36 and 37 are provided, the former being integral with the arm 31 and the latter being integral with the post 14. The arrangement is such that frictionally interengaged and relatively rotatable shoulders provide frictional resistance to joint member articular or pivoting about the axis 27. Typically, the interengaged shoulders are provided by the rims 38 and 39 of the cup-shaped members which are urged into mutual interfitting proximity as illustrated, by adjustable structure provided with a handle 40 or its equivalent. Typically, such adjustable structure includes a coaxial pin 41 attached to the handle 40 through a cup 42, and threaded at 43 into the member 36. Since the pin extends freely through an opening 44 in the member 37, it is clear that tightening of the handle 40 effects tightening of the shoulders 38 and 39 for positively locking the joint members against relative swinging about the axis 27. In addition, the joint includes an enclosed compression spring 45 acting to urge the shoulders 38 and 39 into frictional interengagement, particularly when the handle 40 is untightened, to provide a basic frictional resistance to joint member articulation characterized as holding the arm means and head in positions selected by forcible swinging of the arm means and head against such resistance. Accordingly, whether or not the handle 40 is tightened, the arm 31 will not collapse downwardly, but will remain in any position selected by forcible swinging thereof against the frictional resistance provided by the shoulders 38 and 39. The same construction and functioning thereof is found in the joint 32, excepting that in that case one joint member is integral with the arm 33, whereas the other joint member is integral with the arm 31. It will be particularly noted that the aforesaid desirable functions are present together with the additional advantage that the electrical cable 35 will extend through the joint 25 and without binding upon joint member relative rotation. This feature is made possible by providing side openings 46 and 47 through the respective cup-shaped joint members 36 and 37 to communicate between the tubular parts 14 and 31 and the interior of the joint member. Accordingly, since the openings 46 and 47 remain at the same distance from the axis 27, the cable extending from the post 14 through opening 47 and into the cup-shaped members and then through opening 46 and into tube 31 will not bind, catch or tighten during relative articulation of the arm 31 and the post 14.

Reference is now made to FIG. 6 showing one form of terminal joint means having the functions previously referred to. As illustrated, the end of the arm 33 is threaded at 49 to a tubular plug 50 having a bore 51 receiving a coaxial tubular insert 52. The latter projects into the end of the arm and has an annular stop 53 attached thereto as by a pin 54 to retain a compression spring 55 between the stop and the thread end of the plug 50. Accordingly, the spring urges the tubular insert 52 and the U-shaped bracket structure 56 attached thereto in a direction such that there is frictional interengagement between the bracket base and the end of the plug 50 at the location 57. As previously pointed out, the referred to frictional interengagement is characterized as holding the head in any selected position of rotation

about the axis 30, which position is determined by forcible swinging of the head about that axis.

The bracket 56 carries another U-shaped bracket 58 in such manner that the latter, to which the head is attached, swings about the axis 29. Merely for purposes of illustration, the head portion or plate attached to the bracket 58 is indicated at 59. Rotary attachment of the U-shaped brackets 56 and 58 is facilitated by the plugs 60 and 61 which are coaxial with respect to the axis 29 normal to axis 30. A fastener 62 is threaded into the plug 60 to create a frictional clamping effect between the nylon washer 63 and the legs 64 and 65 of the respective brackets 58 and 56.

Similarly a fastener 66 is threaded into the plug 61 to create when tightened a desired degrees of frictional interengagement between the nylon washer 67 and the legs 68 and 69 of the respective brackets 58 and 56. For this purpose, the fastener 66 is integral with a cap 70 mounting a handle 71 which, when turned, tightens the cup against a spacer 72 which presses against the bracket leg 68. When the handle 71 is loosened, a compression spring 73 contained within the cap 70 presses against the spacer 72 to create a basic degree of frictional interengagement as between the washer 67 and the bracket legs 68 and 69 characterized as holding the head in a selected position of rotation about the axis 29 at the same time such frictional interengagement permits forcible swinging of the head about the axis 29 to selected position.

Referring back to FIG. 1, for orientation purposes it will be understood that the cabinet has front and side panels 74 and 75 respectively. Also the head 12 has a front plate 76 through which therapeutic electromagnetic wave travel is directed. Post 14 is closer to the cabinet rear than to the cabinet front.

We claim:

1. In combination, a cabinet having a top with a vertical opening therethrough, a tubular post projecting vertically from the cabinet interior below said top to the cabinet exterior above said top, a lockable primary joint carried above the cabinet top and including first and second cup-shaped members relatively rotatable about a first horizontal axis, the first of said members being integral with said post and having a side opening in alignment with the post interior, a first tubular arm to one end of which the second member is connected, said second member having a side opening in alignment with the arm interior, a lockable secondary joint carried at the opposite end of said arm and including third and fourth cup-shaped members relatively rotatable about a second horizontal axis, the third member being integral with said arm and having a side opening in alignment with the arm interior, a second tubular arm to one end of which the fourth member is connected, said fourth member having a side opening in alignment with the second arm interior, means at each joint to positively lock said cup-shaped members against relative rotation and including a bolt having thread connection to one member and a head tightenable toward the other member, a sleeve carried by the cabinet and projecting vertically from the cabinet interior below said top to the cabinet exterior above said top to rotate relative thereto, the sleeve upper end terminating below said primary joint, a flange on the post above said top for transmitting loading imposed by all the structure carried by said post so that said loading is transmitted downwardly to the cabinet via the sleeve, and means to clamp the post against rotation within the sleeve and including a cap threaded on the sleeve above said top to engage the flange and a clamping handle carried by the cap to turn the cap for clamping the flange, the cabinet having a front and rear and said post being closer to the cabinet rear than to said front, a tubular swivel at the opposite end of the second arm, means to resist swiveling of the tubu-

5

lar swivel about the axis of the second arm, a lockable terminal joint carried by said swivel beyond said opposite end of said second arm and including a pair of parts relatively rotatable about an axis normal to said second arm axis, one of said parts being carried by the swivel, an electrotherapeutic treatment head including a shell carried by the other of said terminal joint parts, and electrical lead structure passing uninterruptedly endwise from within the cabinet interior upwardly through the post, the primary joint via said side openings in the cup members thereof, the first arm, the secondary joint via the side openings in the cup members thereof, then through the swivel to the interior of said head via said terminal joint.

2. In combination, a cabinet having a top with a vertical opening therethrough, a tubular post projecting vertically from the cabinet interior below said top to the cabinet exterior above said top, a lockable primary joint carried above the cabinet top by said post, a first arm carried at one end by the primary joint to pivot relative to the post, a lockable secondary joint carried by the first arm at the opposite end thereof, a second arm carried at one end by the secondary joint to pivot relative to the first arm, a swivel joint carried at the opposite end of the second arm, a lockable terminal joint carried by the swivel, an electrotherapeutic treatment head including a shell carried by said terminal joint, electrical lead structure passing uninterruptedly endwise from within the cabinet interior upwardly within the post and then to the interior of said head, a sleeve carried by the cabinet and projecting vertically from the cabinet interior below said top to the cabinet exterior above said top and closely receiving the post above and below said top to rotate relative thereto, the sleeve upper end terminating below said primary joint, a flange on the post above said top for transmitting loading imposed by all the structure carried by the post so that said loading is transmitted downwardly to the cabinet via the sleeve, and

6

means to clamp the post against rotation within the sleeve and including a cap threaded on the sleeve above said top to engage the flange and a clamping handle carried by the cap to turn the cap for clamping the flange, the cabinet having a front and rear and said post being closer to the cabinet rear than to said front.

3. In combination, a cabinet having a top with a vertical opening therethrough, a tubular post projecting vertically from the cabinet interior below said top to the cabinet exterior above said top, a lockable primary joint carried above the cabinet top by said post, a first arm carried at one end by the primary joint to pivot relative to the post, a lockable secondary joint carried by the first arm at the opposite end thereof, a second arm carried at one end by the secondary joint to pivot relative to the first arm, a swivel joint carried at the opposite end of the second arm, a lockable terminal joint carried by the swivel, an electrotherapeutic treatment head including a shell carried by said terminal joint, electrical lead structure passing uninterruptedly endwise from within the cabinet interior upwardly within the post and then to the interior of said head, a sleeve carried by the cabinet and projecting vertically from the cabinet interior below said top to the cabinet exterior above said top and closely receiving the post above and below said top to rotate relative thereto, the sleeve upper end terminating below said primary joint, a flange integral with the post above said top and supported on said sleeve, a cap threaded on the sleeve above said top to retain the flange supported on the sleeve, and a clamping handle carried by the cap.

No references cited.

35 ROBERT K. SCHAEFER, *Primary Examiner*.

JOHN F. BURNS, *Examiner*.

D. L. CLAY, *Assistant Examiner*.