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2,861,565

INTERMITTENT OR CONTINUOUS TRACTION DEVICE

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2 Sheets-Sheet 1

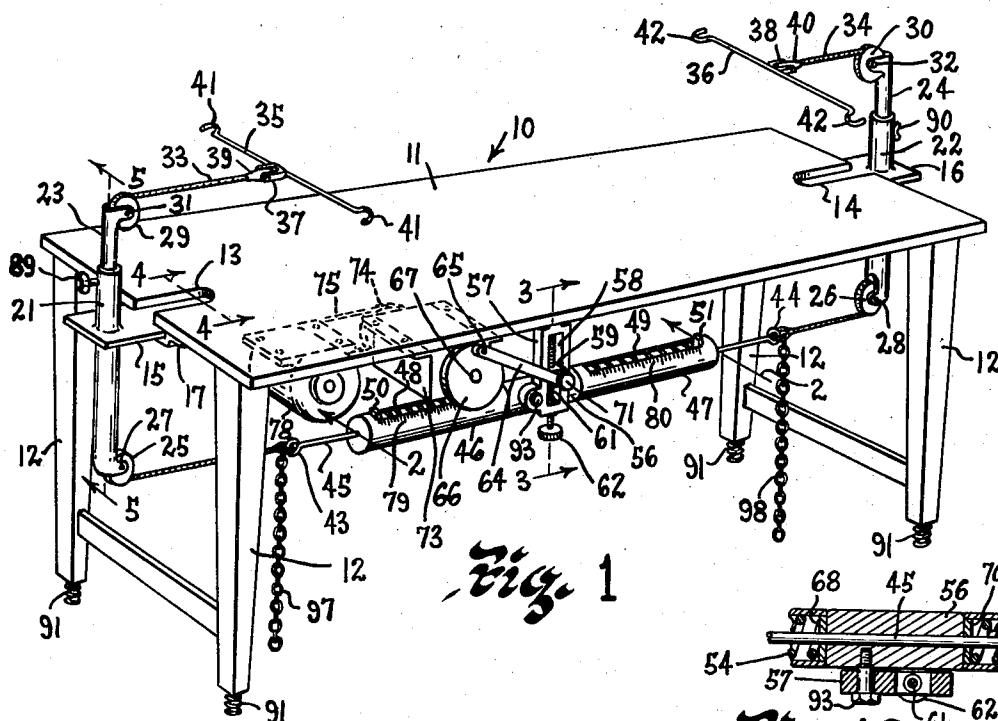


Fig. 1

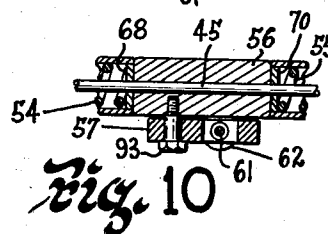


Fig. 10

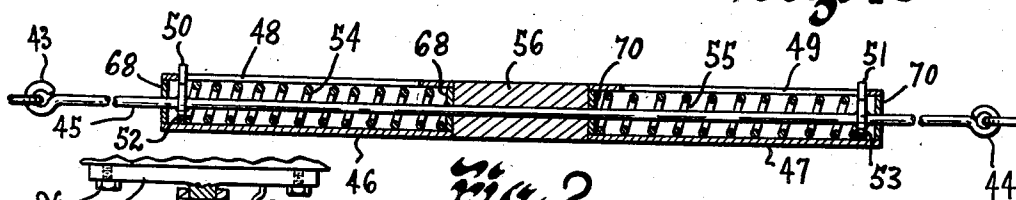


Fig. 2

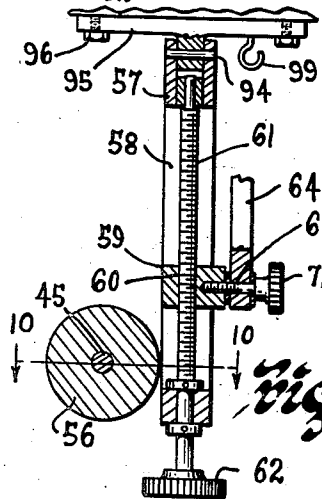


Fig. 3

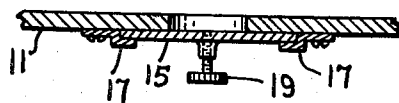


Fig. 4

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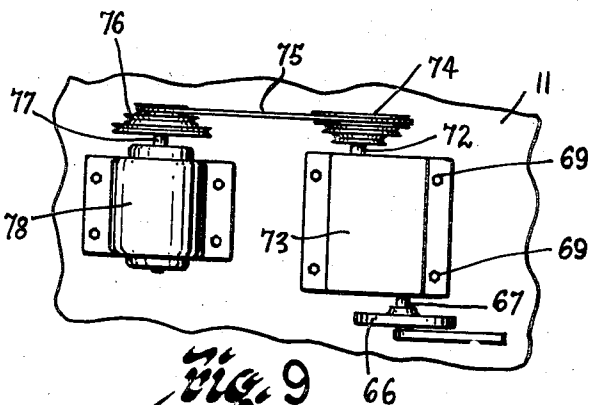
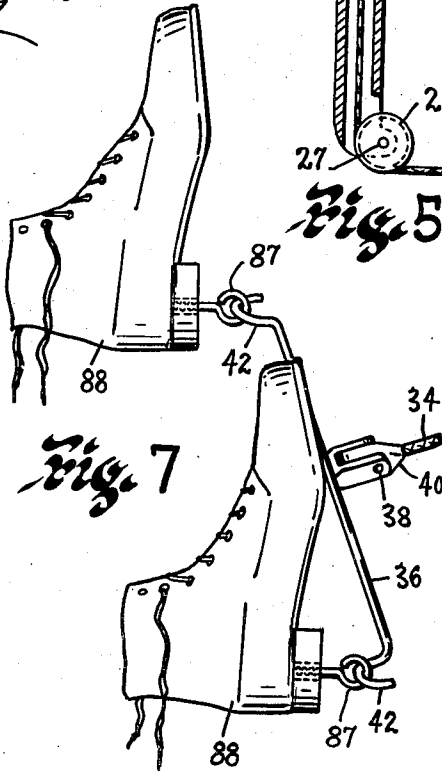
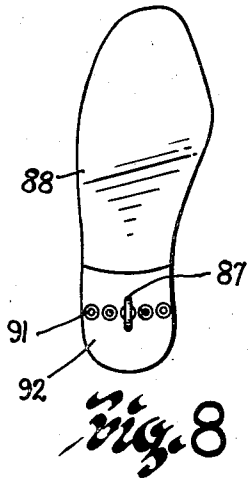
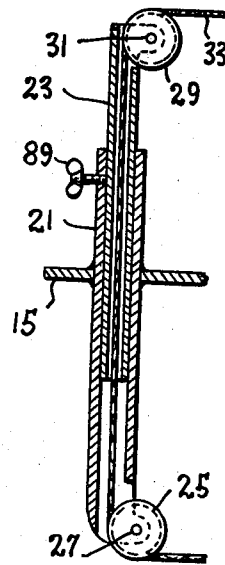
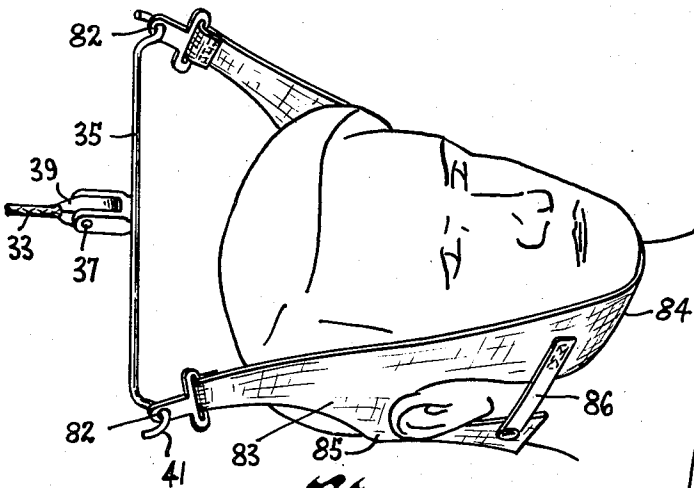
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2 Sheets-Sheet 2



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INTERMITTENT OR CONTINUOUS TRACTION DEVICE

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6 Claims. (Cl. 128—71)

This invention relates to improvements in traction devices and has particular reference to the provision of novel means for directing intermittent or constant tractions of controlled predetermined amounts to selected parts of the anatomy of patients.

One of the principal objects of the invention is to provide novel apparatus for directing intermittent or constant tractions of varying degrees to selected parts of the anatomy for the purpose of rectifying mechanical derangements, such as displacement of bones, and for alleviating pressures on nerves, blood vessels and similar interferences resulting from such displacements and which will further function to strengthen and enervate the muscles and nerves.

Another object is to provide a device of the above character which will function to alternately and intermittently exert a pulling and releasing action on the neck and feet of a patient.

Another object is to provide a device of the above character adapted particularly for use in stretching and relaxing the spinal column intermittently under varying degrees of tension.

Another object is to provide a device of the above character whereby intermittent or constant traction of from 0 to 40 pounds or more may be administered to the anatomy of a patient.

Other objects and advantages of the invention will become apparent from the following description taken in connection with the accompanying drawings, and it will be apparent that many changes may be made in the details of construction and arrangement of parts without departing from the spirit of the invention as expressed in the accompanying claims. I, therefore, do not wish to be limited to the exact details of construction and arrangement of parts shown and described as the preferred form only has been given by way of illustration.

Referring to the drawings:

Fig. 1 is a perspective view of a device embodying the invention;

Fig. 2 is an enlarged fragmentary sectional view taken as on line 2—2 of Fig. 1 and looking in the direction indicated by the arrows;

Fig. 3 is an enlarged fragmentary sectional view taken as on line 3—3 of Fig. 1 and looking in the direction indicated by the arrows;

Fig. 4 is an enlarged fragmentary sectional view taken as on line 4—4 of Fig. 1 and looking in the direction indicated by the arrows;

Fig. 5 is an enlarged fragmentary sectional view taken as on line 5—5 of Fig. 1 and looking in the direction indicated by the arrows;

Fig. 6 is a fragmentary perspective view illustrating a head gear for use with the device embodying the invention and illustrating its attachment to said device;

Fig. 7 is a fragmentary perspective view illustrating

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shoes for use with the device embodying the invention and showing their connection with said device;

Fig. 8 is a bottom plan view of a shoe showing the connection means associated with the heel of said shoe and the various positions at which said connection means may be located;

Fig. 9 is a fragmentary bottom plan view of a part of the operating mechanism of the device; and

Fig. 10 is a fragmentary sectional view taken as on line 10—10 of Fig. 3 and looking in the direction indicated by the arrows.

Referring to the drawings wherein like characters of reference designate like parts throughout the various views, the device embodying the invention comprises a table 10, having a top portion 11, and suitable supporting legs 12. The top portion 11, adjacent its opposed ends, is provided with slots 13 and 14 extending inwardly thereof in a direction longitudinally of the table. Directly beneath the slotted portions 13 and 14 there are provided slide plates 15 and 16 which may be adjusted inwardly or outwardly relative to the respective ends of the table. The slide plates 15 and 16 are mounted in slideways 17 beneath said table and may be locked in any desired adjusted position by set screws 19. Each of the slide plates 15 and 16 supports tubular uprights 21 and 22 in which are telescopically fitted tubular sections 23 and 24. Each of the tubular members 21 and 22 has circumferentially grooved pulleys 25 and 26 pivotally connected thereto, as illustrated at 27 and 28. The tubular sections 23 and 24 also have circumferentially grooved pulleys 29 and 30 pivotally connected thereto as illustrated at 31 and 32.

Flexible cords 33 and 34 have brackets 35 and 36 pivotally connected thereto at 37 and 38 by means of tie members 39 and 40 which are attached to the ends of said cords. Each of the brackets has hook-shaped end portions 41 and 42 formed thereon. The cords 33 and 34 are adapted to extend over the respective pulleys 29 and 30 down through the tubular sections 23 and 24 and the tubular members 21 and 22 respectively and over the pulleys 25 and 26 and are connected at their opposed ends 43 and 44 to a rigid rod 45. The rod 45 extends through tubular casings 46 and 47 which are provided with perforated end closure members 68 and 70 respectively slidable on said rod 45. Each of the casings is provided with longitudinal slots 48 and 49 through which pinlike protrusions 50 and 51 extend. The pinlike protrusions 50 and 51 are formed on disc members 52 and 53 which are rigidly attached to the rod 45 adjacent the respective outer ends of the longitudinal slots 48 and 49. Inwardly of the tubular casings 46 and 47, and in encircling relation with the rod 45, there are mounted coil springs 54 and 55. Each of the coil springs engage the respective disc members 52 and 53 adjacent one end thereof and a respective end closure member 68 and 70 secured in the adjacent inner ends of said casings. Intermediate the casings there is provided a slide block 56, slidably mounted on the rod 45, and which has a vertically disposed member 57 having a guideway 58 therein pivotally attached thereto as illustrated at 93. In the guideway 58 there is slidably mounted a member 59 having a threaded bore 60 therein. The vertically disposed member 57 is pivoted at 94 to a plate 95 attached to the underside of the top 11 by bolts or the like 96 and is provided with a threaded rod 61 which is threaded through the bore 60 in the member 59 and which may be manually rotated by a handgrip member 62. The member 59, having the threaded bore 60 therein, is pivotally connected at 63 to a link member 64 which is, in turn, eccentrically piv-

oted at 65 to a disc 66. The disc 66 is mounted on a stub shaft 67 rotatably driven by reduction gear mechanism in housing 73. The housing 73 is attached to the underside of the top 11 by bolts or the like 69. Supported in the opposed side of the gear reduction housing 73 and connected with said reduction gearing is a drive shaft 72 having a plurality of pulleys 74 of different diameters mounted thereon. The pulleys 74 are connected through a belt 75 to one of a nest of pulleys 76 of different diameters mounted on the shaft 77 of a motor 78. The nest of pulleys 76 is of different diameters comparable to those of the pulleys 74 whereby varying speeds of rotation of the drive shaft 72 may be obtained by shifting the belt 75 to different selected pulleys.

The longitudinal slots 48 and 49, adjacent one of the respective edges thereof, are provided with scales 79 and 80 graduated in terms of pounds whereby the pull on the respective cords 33 and 34 may be determined. The said pull may be varied from 0 to 40 or more pounds. The respective projection members 50 and 51 function as indicator means in cooperation with the respective scales 79 and 80. The hook-shaped members 41 are adapted to be connected with suitable eyes 82 formed in a head gear 83 which is adapted to be positioned on the head of the patient. The head gear comprises a portion 84 adapted to be fitted beneath the chin and to extend over the opposed sides of the head to the portions having the eyes 82 therein. A portion 85 is adapted to fit rearwardly of the head and is connected with the chin portion 84 by suitable straps or the like 86. The hook-shaped ends 42 are adapted to fit within suitable screw eyes 87 secured to the heels of shoes or the like 88 on the feet of the patient.

The patient is adapted to be disposed in a reclining position on top of the table during the use of the device with the said hook-shaped members 41 and 42 in connected relation with the respective eyes 82 and 87.

The throw of the crank disc 66 through the link 64 to the member 59 is varied by rotation of the hand-grip member 62. This rotation causes the threaded rod 61 to move the member 59 upwardly or downwardly in the guideway 58 and causes the crank disc to reciprocate the slide block 56 varying extents longitudinally of the rod 45. This causes the block 56 to compress the respective coil springs 54 and 55 varying amounts and provide means for varying the tension pull on the respective cords 33 and 34.

After proper adjustment the traction treatment is administered by energizing the motor 78 whereby said motor, through the gear reduction mechanism 73, will cause the crank disc 66 to rotate thereby causing the member 57 to swing on its pivot 94 and through its pivotal connection 93 with the slide block 56 cause said block to slide on the rod 45 to, in turn, cause the coil springs 54 and 55 to be compressed intermittently and successively as the crank disc 66 is rotated thereby causing one cord to pull while tension on the other cord is released and vice versa. This causes an intermittent traction and release of traction to be directed to the neck and to the feet of the patient in successive sequence. If desired the amount of pulling stress may be varied during the operation of the device by rotation of the threaded rod 61 to vary the length of sliding movement of the block 56 through the link 64.

The pivot 63 is threadedly attached to the member 59 and is provided with a hand-grip head 71 which may be gripped and turned to lock the link 64 against pivotal movement, if desired. This is when continuous tractions are desired. It is to be understood that the motor 78 is now not energized but the disc 66 and throw of the member 59 are so adjusted as to introduce the continuous traction pull desired. This may be varied during treatment by turning the hand-grip member 62 to in-

crease or decrease the pressure on the spring 54 or 55 depending upon whether the continuous traction pull is being directed to the neck or feet of the patient.

The height of the respective tubular sections 23 and 24 may be varied by suitable wing nuts 89 and 90 which may be loosened to permit telescopic adjustment of the sections relative to the tubular members 21 and 22, the wing nuts 89 and 90 are then tightened to retain said adjustments. This is an initial adjustment which is made before the use of the device.

Beneath the respective legs 12 there is provided coil springs 91 for cushioning the table against vibratory shock during the use of the device.

It is to be understood that a suitable mattress and coverings may be provided on the top of the table 11 for the comfort of the patient during treatment.

As shown in Fig. 8 a plurality of openings 91 are provided in the heels 92 of the shoes whereby the screw eyes 87 may be located centrally or to one side or the other of said heels. This is to cause the pulling action imparted by the device on the feet to be directed to different muscles of the feet, ankles, and legs of the patient. This is particularly useful in strengthening certain deficient muscles with a view to bringing about a more balanced functional relation thereof.

Although the apparatus has been shown and described as adapted particularly for alternately introducing intermittent tractions on the neck and feet of a patient and has been further described as being capable of exerting constant tractions on the neck or feet, it is possible to introduce intermittent or successive pulling and releasing actions on either the neck or feet separately and independently of each other. This is accomplished by providing the cords 33 and 34 with chainlike extensions 97 and 98 whereby one or the other of said cords may be detached from the adjacent end of the rod 45 and connected by said chain-like extension to a hook 99 carried by the plate 95. In this manner the cord attached to the hook 99 will be held stationary while the other cord will respond to the rotating disc 66 and associated mechanism and will be successively and intermittently pulled and released. The effective length of the cord attached to the hook 99 may be varied by connecting the proper link of the chain section 97 or 98, as the case may be with said hook 99. For example, if the feet are to be held stationary and the intermittent pulling and releasing action is to be applied to the cord 33 on the neck, the cord 34 will be detached from the rod 45 and its chain section 98 will be secured to the hook 99 at a location which will suit the requirements of the patient. On the other hand, if the intermittent pulling and releasing action is to be applied to the feet, the cord 33 will be detached from the rod 45 and its chain section 97 connected with the hook 99. This will hold the neck of the patient in a fixed position while the intermittent pulling and releasing actions are applied to the cord 34.

It is further pointed out that although the intermittent tractions have been described as being directed to the neck, spinal column, and feet of a patient, said tractions may be directed to other parts of the anatomy, such as the arms of a patient, either intermittently or constantly by providing suitable means for connecting the hook-shaped ends 42 with either one or both arms of a patient in a manner similar to the connecting thereof to the feet. Such connections means could be formed on wristbands, gloves or the like.

Instead of holding the head stationary as described above by securing the chain 97 to the hook 99, the hook-shaped members 41 may be secured to the shoulders through the provision of suitable connection means on shoulder straps or the like whereby the hooks 41 may be attached thereto for retaining the shoulders stationary in a manner similar to the holding of the head stationary.

If the traction is to be directed only to a finger, wrist,

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or forearm, suitable means may be attached only to the wrist or the lower or upper portion of the arm as required. It is further pointed out that traction treatments may be directed to other selected portions of the body in a similar manner.

Although the apparatus is shown as being directly applied to a special table on which the patient may be supported in a reclining position, it is to be understood that it may be applied to a standard hospital bed or the like in a manner similar to its application to the table.

From the foregoing description it will be seen that simple, efficient and economical means have been provided for accomplishing all of the objects and advantages of the invention.

Having described my invention, I claim:

1. A device of the character described comprising means for supporting an individual in a given reclining position, upright supports adjustably connected adjacent the opposed ends of said means and each having pulleys adjacent the opposed ends thereof, a cord extending over the respective pulleys, means adjacent one end of said cords for connecting the said ends to selected portions of the anatomy of the individual, a free-floating barlike member having its opposed ends connected to the other end of each of said cords and means for exerting a longitudinal movement alternately in opposite directions on said barlike member to, in turn, impart a pulling action on one of said cords and a simultaneous releasing action on the other of said cords alternately.

2. A device of the character described comprising means for supporting an individual in a reclining position, telescopically arranged tubular uprights connected one to each of the opposed ends of said supporting means, said uprights having pulleys pivotally connected adjacent the opposed upper and lower ends thereof and being adjustable telescopically to vary the height of the upper pulley with respect to the supporting means, means for locking said tubular uprights in adjusted position, a cord extending over the respective pulleys of each of said uprights with the portion thereof intermediate said pulleys lying inwardly of said uprights, means for attaching one of said cords to the head of the individual, means for attaching the other of said cords to the feet of the individual, and automatically functioning reciprocating means secured to the opposed ends of said cords for selectively exerting a pulling action on one or the other of said cords.

3. A device of the character described comprising means for supporting an individual in a reclining position, uprights connected to opposed ends of said means, said uprights having pulleys adjacent the upper and lower ends thereof, a cord extending over the pulleys of each of said uprights, connection means on one of said cords for attaching said cord to interconnection means carried by the head of the individual, connection means on the other of said cords for attaching said cord to interconnection means carried by the feet of the individual, a relatively rigid rod attached at its ends to the opposed ends of said respective cords, and a source of power connected with said rod for intermittently exerting a moving force thereon in one longitudinal direction and then in the other whereby a pulling and releasing action will be alternately exerted on said cords.

4. A device of the character described comprising means for supporting an individual in a given position, uprights connected to opposed ends of said means, said uprights having pulleys adjacent the upper and lower

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ends thereof, a cord extending over the pulleys of each of said uprights, connection means on one of said cords for attaching said cord to interconnection means carried by the head of the individual, connection means on the other of said cords for attaching said cord to interconnection means carried by the feet of the individual, a relatively rigid rod attached at its ends to the opposed ends of said respective cords, spaced abutment means on said rod, a slide block slidably supported on said rod intermediate said abutment means, coil springs between the opposed ends of said slide block and each of said abutment means, and means connected to said slide block for imparting an oscillatory movement thereto to cause it to alternately exert a pressure on the coil springs and thereby intermittently exert a yielding force on said rod in opposing directions and thereby cause an alternate pulling and releasing action to be exerted on said cords.

5. A device of the character described comprising means for supporting an individual in a given position, pulleys secured to said means adjacent opposed ends thereof, a cord extending over each of said pulleys, means for attaching one of said cords to the head of the individual, means for attaching the other of said cords to the feet of the individual, a source of power, and resilient motion transfer means secured to the opposed ends of said cords and connected with said source of power for selectively and alternately exerting a yielding pulling and releasing action on one and then the other of said cords.

6. A device of the character described comprising means for supporting an individual in a reclining position, telescopically arranged tubular members adjustably connected to the opposed ends of said means, said telescopically arranged tubular members having pulleys adjacent the outer ends thereof, a cord extending over each of said pulleys with a portion thereof lying inwardly of said tubular members, means carried by the upper end of one of the cords for attachment to interconnection means carried by the head of the individual, means carried by the other of said cords for attachment to interconnection means carried by the feet of the individual, a relatively rigid rod attached at its ends to the opposed ends of said respective cords, a slide block on said rod having an adjustable connection with an eccentric crank member, abutment members rigidly attached to the rod on the opposed sides of the block, resilient means intermediate said respective abutment members and the slide block, and an electric motor connected to the crank member for imparting a rotary movement to said crank member to cause said block to reciprocate on said rod and to intermittently compress and release said respective resilient means whereby an alternate yielding pulling and releasing action may be directed to said respective cords.

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