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2,927,575

SWIVELY MOUNTED PHYSIOTHERAPEUTIC INSTRUMENT

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FIG. 1

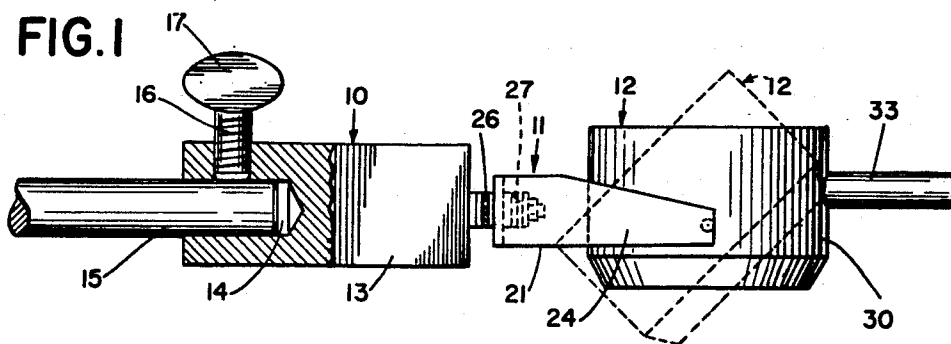


FIG. 2

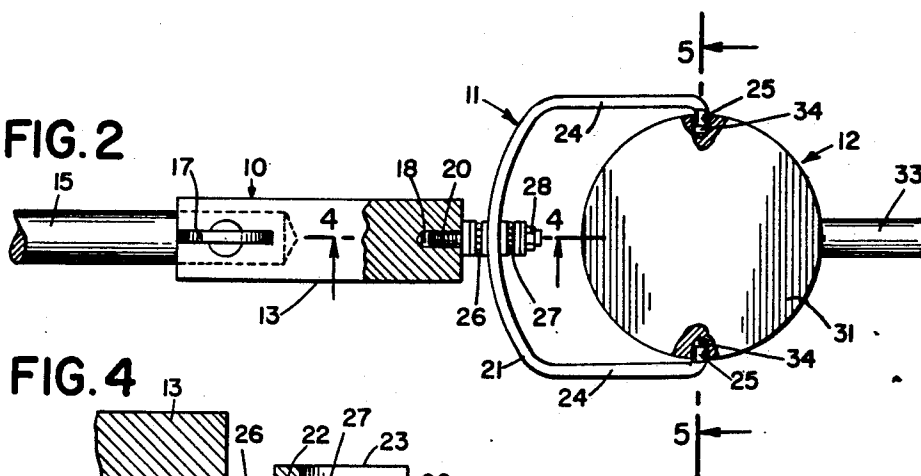


FIG. 4

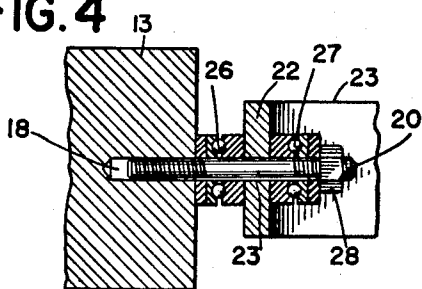


FIG. 5

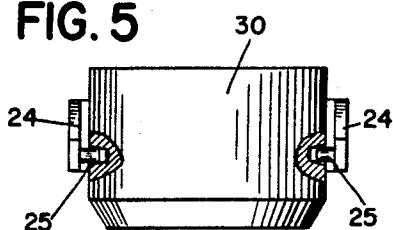
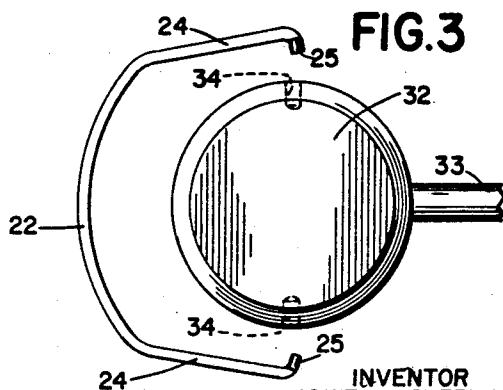


FIG. 3

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SWIVELLY MOUNTED PHYSIOTHERAPEUTIC INSTRUMENT

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4 Claims. (Cl. 128—24)

This invention pertains to the art of therapeutic instruments, and, in one of its more specific aspects, to swivelly mounting a physical therapy device to a support, such as a handle, whereby the device may be conveniently applied to and manually moved along selected human body areas of varying contour with minimum fatigue on the part of the operator.

The apparatus of this invention has wide application. It is especially useful for the purpose of handling and manipulating devices employed in the treatment of various physical ailments with the aid of sound waves having frequencies substantially higher than those perceptible to the human ear. Such sound waves are commonly referred to in various branches of the medical profession as "ultrasound waves," or simply as "ultrasound," and will be so designated hereinafter.

Modern ultrasound equipment consists of two basic units, namely an ultrasound generator and an ultrasound transmitter. The transmitter is connected to the generator by a relatively long, flexible conductor cable to permit the transmitter to be energized, moved and manipulated, as required. Treatment may be by direct contact of the transmitter with the skin or by indirect contact, wherein the part of the body undergoing treatment is immersed in a vessel containing warm water and the transmitter is positioned within the water at a proper distance from the body area concerned. The time for treatment depends on the nature of the ailment and may vary from a fraction of a minute to fifteen minutes, or longer.

It has heretofore been the practice for the operator to grip the ultrasound transmitter directly or indirectly by means of a handle that is rigidly secured thereto, and move the transmitter over the body area under treatment, continuously subjecting the transmitter to rectilinear, arcuate, or both rectilinear and arcuate motions during such movements. Due to the varying contour of the body and the necessity of maintaining proper contact between the transmitter and the area undergoing treatment, manipulation of the transmitter has, in the past, required repeated flexing and turning of the operator's wrist. It will be appreciated that this causes undue and, at times, extreme muscular fatigue, particularly when the operator carries out a number of successive treatments of relatively long duration.

The apparatus of this invention reduces substantially the fatigue difficulties experienced in the past in effectively manipulating the transmitter over selected body areas. My apparatus permits movement of the transmitter relative to its handle about a pair of independent pivotal axes and in a manner that the operator may apply the transmitter and readily move it over various body areas without undue strain or premature fatigue. The parts of the apparatus are so constructed and arranged that the transmitter is capable of conforming in its movements to the contours of the body with minimum flexing and turning of the operator's wrist and arm.

It is a primary object of this invention to provide a physiotherapeutic instrument that is swivelly mounted

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on a support, such as a handle, in a manner that the instrument may be properly applied to and moved over selected body areas of varying contour without undue strain or premature muscular fatigue on the part of the operator.

Another object of the invention is to provide apparatus of the character indicated that is simple in design, sturdy in construction, reasonable in manufacturing cost and efficient in operation.

The invention has for a further object the provision of a physiotherapeutic instrument that is swivelly mounted on a support, the parts being so constructed and arranged that the instrument may be easily and quickly connected to or disconnected from the support without the use of tools.

The enumerated objects and other objects, together with the advantages obtainable by the use of the apparatus of this invention, will be readily understood by persons skilled in the art upon reference of the following detailed description and the annexed drawing, which respectively describe and illustrate a preferred and recommended apparatus embodying the invention.

In the drawing, wherein like reference numerals identify the same parts throughout the several views:

Fig. 1 is a view in side elevation of apparatus constructed in accordance with this invention;

Fig. 2 is a top plan view of the apparatus of Fig. 1, certain parts being shown in cross section for better illustration;

Fig. 3 is a view showing the ultrasound transmitter in front elevation but disconnected from the coupling yoke;

Fig. 4 is an enlarged view taken along line 4—4 of Fig. 2; and

Fig. 5 is a view taken along line 5—5 of Fig. 2.

The illustrated apparatus consists of three principal units, namely, a support 10, a coupling unit 11 and a physiotherapeutic instrument 12, each of which is described below.

Support 10 comprises a handle 13 that may be conveniently gripped in one hand by the operator. The handle is provided at one end with a blind bore 14 for reception of a connector rod 15 if it is desired to operate the apparatus automatically by means of equipment of the character disclosed in my copending application Ser. No. 557,292, filed January 4, 1956, and entitled "Apparatus for Operating a Physiotherapeutic Instrument or Other Device." The handle is adapted to be removably attached to the rod by a set screw 16 having a wing head 17. The handle is provided at its other end with a tap 18 for reception of a shaft 20 which is threaded at each end.

Coupling unit 11 comprises a generally U-shaped yoke 21 consisting of a web 22, having a central opening 23 through which shaft 20 extends (Fig. 4), and a pair of substantially parallel, resilient arms 24, each of which terminates in a pin 25 that projects inwardly of the opening defined by the yoke. These pins are substantially coaxial when the yoke is in operative engagement with instrument 12, as best shown in Fig. 2. The apparatus includes a pair of anti-friction ball bearings 26 and 27 that are mounted on shaft 20 with yoke web 22 interposed therebetween. The bearings and yoke are maintained in the illustrated position on the shaft by a nut 28. These parts are so constructed and arranged that the yoke is freely pivotal about the axis of the shaft.

Instrument 12 is preferably an ultrasound transmitting device which includes a cylindrical case 30 having a rear end wall 31 and a front end wall 32. This device is of conventional construction and is adapted to be connected by an electrical conductor cable 33 to an ultrasound generator (not shown).

The waves generated by the generator are transmitted through front end wall 32 of the device. The device is provided with a pair of diametrically opposed blind bores 34, each of which serves as an opening to receive a corresponding yoke pin 25. The connection formed by these pins and the device permits pivotal movement of the device about the common axis of the pins. The axis of the pins is, as will be apparent from an examination of Fig. 2, substantially normal to the axis of shaft 20. Thus, the coupling unit permits of pivotal movement of the instrument about the axis of the shaft and also about the axis of the pins when the parts are assembled.

Due to the resilience of the yoke arms, the instrument may be readily connected to or disconnected from the yoke, as desired, without the use of tools. To disconnect the instrument, the arms are merely flexed outwardly a sufficient extent to disengage the pins from openings 34 (Fig. 3).

From the foregoing, it is believed that the objects, advantages, construction, and operation of my present invention will be readily comprehended by persons skilled in the art, without further description. Although the invention has been herein shown and described in a simple and practicable form, it is recognized that certain parts or elements thereof are representative of other parts or elements which may be used in substantially the same manner to accomplish substantially the same results. Therefore, it is to be understood that the invention is not to be limited to the exact details described herein, but is to be accorded the full scope and protection of the following claims.

I claim:

1. In apparatus of the character described, a support comprising a handle and a shaft carried by the handle, an ultrasound transmitting device, and a coupling unit comprising a generally U-shaped yoke including a web and a pair of resilient arms, said shaft being connected to the web, said yoke being pivotal about the axis of the shaft, and means connecting the yoke to the device and permitting relative movement therebetween about an axis that extends through the arms and that is substantially normal to the axis of the shaft.

2. In apparatus of the character described, a support comprising a handle and a shaft carried by the handle, an ultrasound transmitting device, a coupling unit comprising a generally U-shaped yoke including a web and

a pair of resilient arms, a pair of anti-friction bearings mounted on the shaft, said shaft extending through a portion of the web that is interposed between the bearings, said shaft, bearings and yoke being so constructed and arranged as to permit pivotal movement of the yoke about the axis of the shaft, and means connecting the yoke to the device and permitting relative movement therebetween about an axis that extends through the arms and that is substantially normal to the axis of the shaft.

3. In apparatus of the character described, a support comprising a handle and a shaft carried by the handle, an ultrasound transmitting device, and a coupling unit comprising a generally U-shaped yoke including a web and a pair of resilient arms, said shaft being connected to the web, said yoke being pivotal about the axis of the shaft, and means connecting the yoke to the device, said means comprising a pair of substantially coaxial pins, each pin being secured to a corresponding arm and registering with a corresponding opening formed in the device, said device being pivotal about the axis of the pins, the axis of the pins being substantially normal to the axis of the shaft.

4. In apparatus of the character described, a support comprising a handle and a shaft carried by the handle, an ultrasound transmitting device, a coupling unit comprising a generally U-shaped yoke including a web and a pair of resilient arms, a pair of anti-friction bearings mounted on the shaft, said shaft extending through a portion of the web that is interposed between the bearings, said shaft, bearings and yoke being so constructed and arranged as to permit pivotal movement of the yoke about the axis of the shaft, and means connecting the yoke to the device, said means comprising a pair of substantially coaxial pins, each pin being secured to a corresponding arm and registering with a corresponding opening formed in the device, said device being pivotal about the axis of the pins, the axis of the pins being substantially normal to the axis of the shaft.

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