Dec. 25, 1945. H. J. LAWRENCE 2,391,717

CRUTCH

Original Filed Nov. 5, 1941

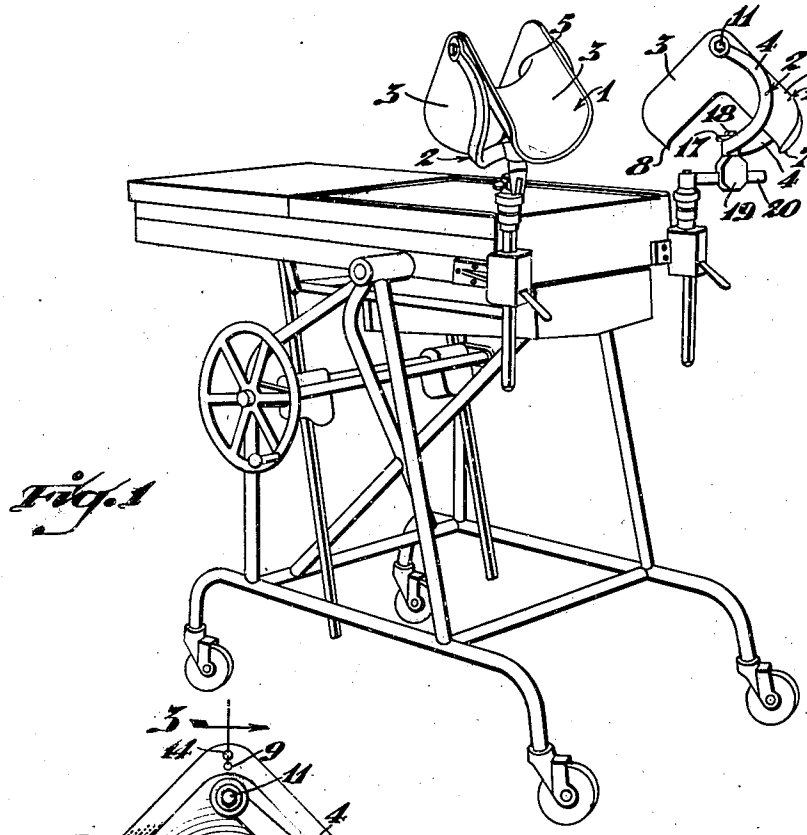

Fig. 1

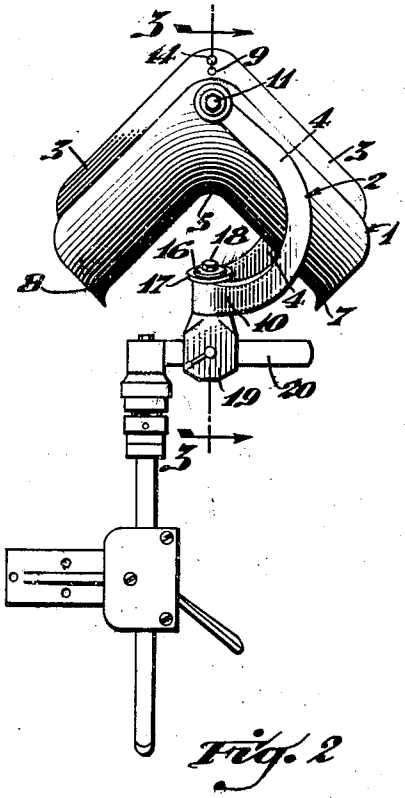

Fig. 2

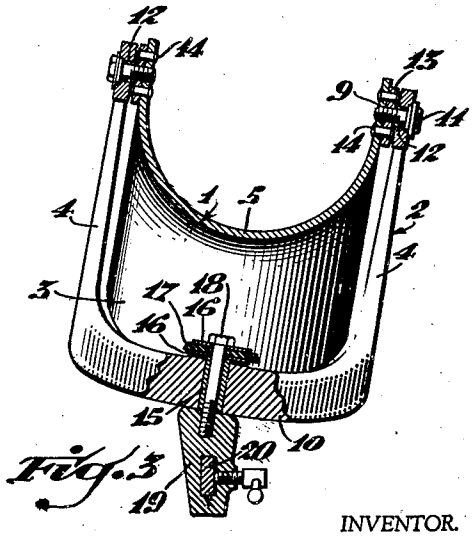

Fig. 3

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CRUTCH

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Original application November 5, 1941, Serial No. 417,931, now Patent No. 2,366,972, dated January 9, 1945. Divided and this application February 16, 1943, Serial No. 476,100

3 Claims. (Cl. 311—11)

This invention relates to surgical and diagnostic tables and is directed particularly to the crutch devices which are located at opposite sides of the table and usually at one end thereof for supporting a patient's lower limbs.

In the use of devices of this type, the patient is placed upon the table and with his legs arranged so that the crutches lie beneath the knees. The position, though necessary, is uncomfortable at best, and the primary objective of the present invention is to provide crutches capable of supporting the patient's legs in the desired position, yet with the least discomfort.

A further object of the invention has been to provide crutches constructed in the form of trough-shaped members which are pivotally suspended so that the patient's lower legs may swing to avoid cramped muscles.

This application is a division of my copending application, Serial No. 417,931, filed November 5, 1941, which has matured into Patent No. 2,366,972, granted January 9, 1945, and which discloses adjustable apparatus for supporting the crutches of the present invention such that the crutches may be moved about to accommodate persons of different sizes in different postures on the table and to provide the utmost convenience to the doctor or diagnostician who is using the apparatus.

While the present crutches are specifically suited to be used in conjunction with the adjustable apparatus shown in the aforesaid application, they may also be used in conjunction with supporting apparatus of other types.

Briefly, the present invention is based upon the concept of pivotally suspending the crutches in cradles or yokes, such that the center of gravity of the unit, particularly when a limb is rested in it, lies substantially below the pivotal suspension point or axis. I have determined that this construction provides the utmost degree of comfort for the patient and supports and holds the limbs securely in the desired position.

In the preferred embodiment, the actual crutch supports are trough-shaped elements arranged in the form of an inverted V, one trough-shaped face of the V declining toward the patient's body to support the thigh, and the other face declining away from the body to support the foreleg, while the knee is rested at the apex of the trough.

A U-shaped fork or bifurcated member has its arms extending upwardly at opposite sides of the crutch and the crutch is pivotally suspended in the arms on an axis which is located above the apex of the crutch trough to provide a true cradle effect. The fork member, in turn, is arranged to be rotatably mounted on a supporting arm or other member whereby the fork and crutch assembly may swing in a horizontal plane. I have further determined that additional comfort is provided by arranging the axis of rotation of the fork on an axis diverging outwardly from vertical so that it tends to line substantially in the plane passing through the thigh and foreleg of a patient who is lying on the table in the desired posture.

A preferred embodiment of the invention is shown in the accompanying drawing in which:

Figure 1 is a perspective view illustrating the crutches of the present invention mounted upon supports extending from a typical operating or diagnostic table.

Figure 2 is a side elevation showing the crutch and cradle unit of the present invention mounted on a supporting apparatus of the type shown in the aforesaid copending application.

Figure 3 is a cross-sectional elevation taken on line 3—3, Figure 2.

In the apparatus shown in the drawing, the trough-shaped element, or crutch per se, is designated 1 and the yoke in which the crutch is supported is designated 2. Each crutch 1 is a trough-shaped unit having opposite portions 3—3 diverging outwardly and downwardly from an apex 5 which is located substantially centrally intermediate the crutch ends. The outward faces of the crutch are flared slightly as at 7 and 8 so as to avoid having the terminal edges cut into the flesh.

As shown best in Figure 3, the trough of the crutch is substantially semi-circular such that the surface of it will conform substantially to the contour of the patient's limbs.

The walls of the crutch extend upwardly beyond the apex 5 of the trough and are bored as at 9, or, otherwise, provided with bosses, to constitute a pivotal axis for the crutch which is located well above the apex 5.

Yoke member 2 consists preferably of a pair of arms 4—4 which are spaced apart a distance somewhat greater than the trough width. These arms extend repsectively up along the side walls of the crutch 1 and are joined together at the bottom ends by a cross portion 10; with it they constitute a yoke or cradle. To pivotally carry the crutch, as shown in the drawing, the cradle arms 4—4 are bored to receive stud bolts 11. These bolts pass through appropriate sleeves 12 located in the cradle arms 4—4 which constitute bearings for the stud bolts. The inner edges of

the sleeves extend beyond the edges of the cradle arms so as to space the crutch therefrom, and reinforcement members 13 which surround the bores 9 in the crutch walls are riveted thereto by means of rivets 14. The stud bolts 11 are threaded through the reinforcing members and crutch walls so that the crutch is suitably suspended in the cradle and yet is free to swing.

At a point in the cross piece 10 intermediate the side arms 4—4, the cross portion 10 of the yoke is bored to receive a sleeve 15. This sleeve preferably is flush with the bottom surface of the cross portion 10 and extends above the upper surface thereof. A pair of washers 16, having a rubber washer member 17 placed beneath them, rests on the upper surface of the sleeve 15 beneath the head of a bolt 18 which extends down through the sleeve 15 into a saddle block 19. The bolt thus constitutes an axle about which the crutch and yoke assembly may swing or rotate to accommodate itself to the patient's leg positions.

In the preferred structure, as shown in the copending application, the saddle 19 may be slid along an arm 20 which is supported from the table, thereby enabling the crutch to be located at the best position for a person of given size or height.

It is to be noted that the axis of the bolt 18 is inclined outwardly and upwardly with respect to the table so that the central axis through the trough deviates outwardly from the table surface. This angulation enables the crutches to conform substantially to the crook of the patient's leg and foreleg. The crutches are free to swing in the yoke and the yoke, in turn, is free to move pivotally in a substantially horizontal axis about the saddle block. It is to be seen, therefore, that the crutch naturally assumes the position of the patient's limbs and does not tend to bind them in an arbitrary or predetermined position.

Having described my invention, I claim:

1. A limb supporting device for an operating and diagnostician's table comprising a saddle having an aperture presenting at least one flat face adapted to receive a supporting bar, and also presenting a supporting face above said flat face and inclined with respect to the flat face of said aperture, a fork rotatably journalled at the inclined face of said saddle and having a pair of arms extending therefrom in spaced relationship, and a trough-shaped member for supporting a patient's limb, said trough-shaped member being movably suspended in said fork.

2. A limb supporting device for an operating and diagnostician's table comprising a saddle having an aperture therethrough which has at least one flat face, a fork rotatably journalled on said saddle on an axis which is inclined with respect to said flat face, said fork having a pair of arms extending upwardly therefrom, and a trough-shaped member for supporting a patient's limb, said trough-shaped member being suspended between said pair of arms.

3. A limb supporting device for an operating and diagnostician's table comprising a saddle adapted to be mounted upon a supporting arm, a yoke rotatably journalled on said saddle and having arms extending therefrom in spaced relationship to one another, and a cradle suspended between said arms and arranged for supporting a patient's limb, the axis of suspension of said cradle being located on an axis substantially above the limb supporting surface thereof, such that the center of gravity of the cradle resides substantially below its axis of suspension.

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