

Jan. 26, 1965

J. A. BUTLER
POPLITEAL SUPPORT

3,167,351

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2 Sheets-Sheet 1

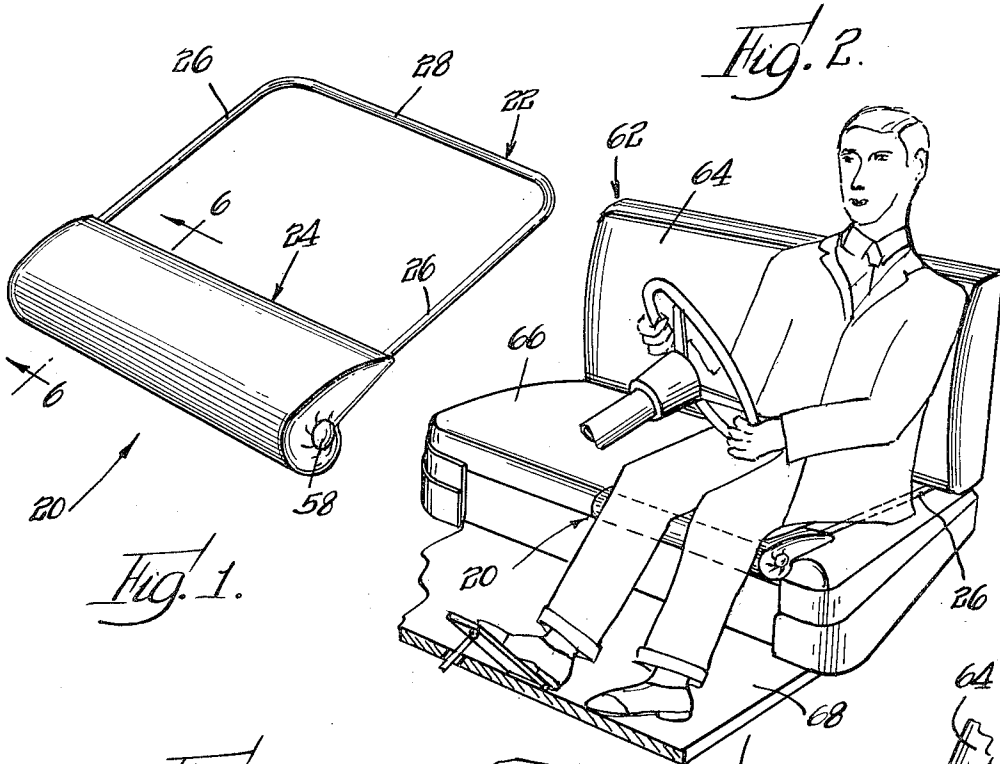


Fig. 1.

Fig. 2.

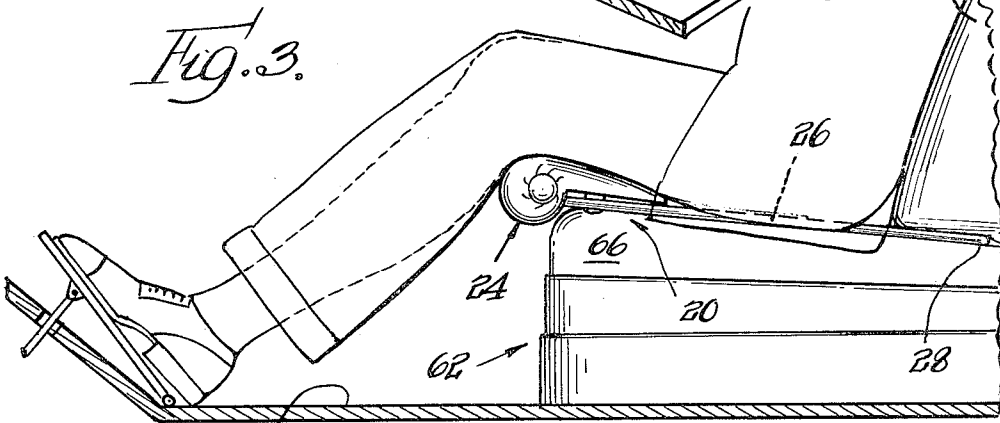


Fig. 3.

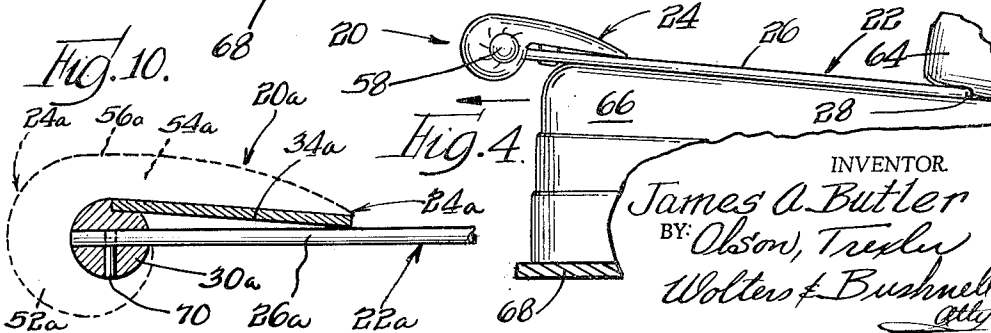


Fig. 10.

Fig. 4.

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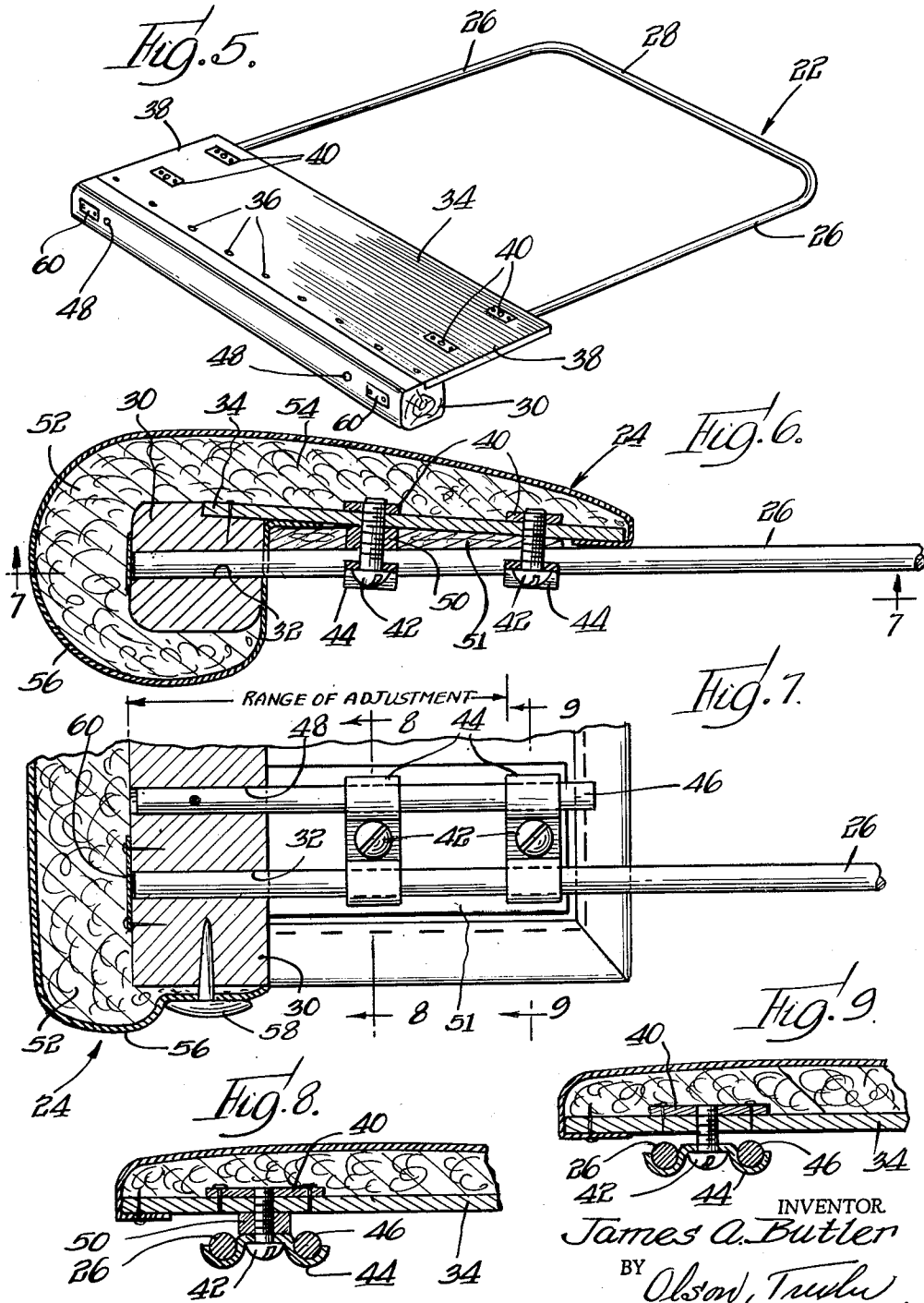
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2 Sheets-Sheet 2



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POPLITEAL SUPPORT

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This invention relates generally to surgical braces and supports and relates more particularly to supports for the popliteal region.

Many authorities suggest that the seated position is unnatural for the human body, and the discomfort which is commonly experienced by persons who remains seated for any extended period certainly lends credence to the proposition. Contoured chairs and special sacral supports have been developed to alleviate the strains placed on the torso of a seated human body; but heretofore, little attention has been given to elimination of the fatigue and cramps which develop in the legs upon assumption of the seated position.

The problem of leg discomfort has been intensified with the introduction of modern low seats, especially with regard to seating in trains, buses, automobiles and the like wherein an occupant may be confined for prolonged periods of time. In such low seats, only the feet and buttocks are solidly supported while the knees are drawn up by tensioning the muscles of the thigh and the lower leg. Continuance of this muscle tension eventually produces fatigue and may result in cramps of greater or lesser severity.

I have discovered that this stress in the muscles of the leg can be eliminated without supporting the entire leg; and therefore, a general object of the present invention is to provide a new and improved appliance for use in relieving stress in the leg muscles of a person who must remain seated for a prolonged period of time.

A more specific object of the invention is to provide a support appliance for the popliteal region.

Another object of the invention is to provide a positively positionable popliteal support.

Still another object of the invention is to provide a popliteal support for use by a seated person, which support clears the floor area adjacent the seat.

Yet another object of the invention is to provide a popliteal support which is arranged for personal use.

A further object of the invention is to provide a popliteal support which is both adjustable and portable.

A yet further object of the invention is to provide a popliteal support of simple construction.

These and other objects and features of the invention will become more apparent from a consideration of the following disclosure.

A popliteal support in accord with the invention includes a U-shaped metal frame adapted to be positioned on a substantially horizontal seating surface, the frame having spaced arms defining an open central region exposing a portion of the seating surface to the posterior of a person's body for seating purposes, the popliteal support of the invention further including an elongated support member mounted on the U-shaped frame at the front portion thereof in underlying alignment with the popliteal regions of the legs of a person seated on the seating surface, the elongated support member including a rigid strut traversing the front portion of the frame and resilient padding upholstering the strut.

The invention, both to its structure and mode of usage, will be better understood by reference to the following disclosure and drawings forming a part thereof, wherein:

FIG. 1 is a perspective view of a popliteal support constructed in compliance with the principles of the present invention;

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FIG. 2 is a perspective view of the popliteal support of FIG. 1 being used in conjunction with a bench-type automobile seat;

FIG. 3 is an enlarged side elevational view of the showing of FIG. 2 illustrating the support of the invention acting against the popliteal region of one of the legs of a person seated on the auto seat;

FIG. 4 is a side elevational view showing the popliteal support of the invention arranged with the auto seat and adjusted to its extended position;

FIG. 5 is an enlarged perspective view of the skeletal elements of the support of FIG. 1 with the upholstering removed;

FIG. 6 is an enlarged side elevational view taken through the section 6-6 of FIG. 1;

FIG. 7 is a view taken substantially through the section 7-7 of FIG. 6;

FIG. 8 shows a section taken substantially along the line 8-8 of FIG. 7;

FIG. 9 shows a section taken substantially along the line 9-9 of FIG. 7; and

FIG. 10 is a cross-sectional view of a modified form of the invention.

Referring now in detail to the drawings, specifically to FIG. 1, a popliteal support indicated generally by the numeral 20 will be seen to comprise a U-shaped frame 22 and an elongated support member 24 which extends across the front portion of the frame 22. The frame 22 is provided for the purpose of positioning the support member 24 in proper underlying alignment with the popliteal regions of the legs of a person using the device 20 and, accordingly, is fashioned to be rigid as by being fabricated, for example, from steel rod or tubing of suitable diameter. Specifically, the frame 22 includes spaced arms 26 that are interconnected by a rear portion 28. The spacing of arms 26 permits them to define an open central region in the frame that exposes a portion of the seating surface to which the popliteal support is assembled. This open central region admits the posterior of a person's body to the seating surface for support thereby.

The construction of the support member 24 and its mode of attachment to the U-shaped frame 22 will be better understood by reference to FIGS. 5-9. With initial reference to FIG. 5, the skeletal portions of the elongated support member are seen to include a rigid strut 30 that traverses the front portion of the frame 22, strut 30 being advantageously fabricated from wood, foamed metal or a suitable resinous plastic material. As will be seen in FIG. 6, the strut 30 is provided with a transverse bore 32 which slidably receives the free end of one of the arms 26, the strut 30 being fabricated with two such bores at appropriately spaced locations for receipt of both of the arms 26.

In order that the strut 30 may be adjustably coupled to the frame 22, a plate member 34 is attached to the strut by being received in an elongated notch or groove formed in the strut and by being fastened thereto by means of nails 36. The plate member 34 defines spaced attachment formations 38 at opposite edges thereof, the attachment formations extending laterally from the strut along the arms 26 of the U-shaped frame 22. A pair of nuts 40 are pinned or otherwise suitably secured to each of the formations 38, and the formations 38 are appropriately perforated in alignment with the threaded apertures of the nuts 40 for receipt of screws 42 as is shown in FIG. 6.

Double channelled brackets 44 are also provided; and each of these brackets is perforated with an aperture between the respective channels thereof for slidable receipt of the shank of a screw 42. The nuts 40 are spaced on the respective formations 38 longitudinally of the respective arms 26, and the brackets 44 are disposed be-

neath the heads of the screws 42 with a channel thereof embracing a portion of the adjacent rod 26 as is well shown in FIGS. 7-9. Accordingly, the screws 42 can be tightened into the nuts 40 drawing the respective arms 26 into firm engagement with the floor of the respective bores 32 and into similar engagement with the distal end of the plate member 34.

Advantageously an auxiliary rod 46 of abbreviated length is passed into a bore 48 formed in the strut 30 to be disposed parallel to an arm 26 and spaced from the inward lateral side thereof, a rod 46 being provided with each of the arms 26. The rod 46 is fitted snugly into the bore 48, and may be pinned if desired. The brackets 44 grip the rod 46 with the remaining channel of each of the brackets whereby to enhance the fixed coupling which is achieved between the arms of the frame 22 and the support member 24. A spacer, preferably in the form of a locknut 50, is desirably interposed between the plate member 34 and the rod 26 at the nut 40 which is closest the strut 30. This is shown in FIGS. 6 and 8. Furthermore, a wooden wedge 51 may be situated between the plate member 34 and the rods 26 and 46 for spacing and positioning purposes.

In addition to the strut 30, the elongated support member 24 includes resilient padding which upholsters the strut. Specifically and with reference to FIG. 6, a relatively large pad portion 52 is seen situated forwardly of the strut 30, encompassing the same and extending into and merging with a pad portion 54 which overlies both the strut and the plate member 34. These pad portions are advantageously fabricated from rubberized hair, sponge rubber or resilient polyester foam. In addition, these pad portions are suitably covered with a protective layer 56 that is selected to be of leather, vinyl plastic or a suitable upholstery fabric. The layer 56 may be attached to the strut 30 and the plate member 34 in any convenient manner, button-headed upholstery tacks 58 being advantageously employed for example. Furthermore, nails, adhesive or stitching may be employed alone or in conjunction with the tacks 58. Under some circumstances, it is desirable to upholster the underside of the support member 24 for purposes of protecting the edge of the cooperating seat from the heads of the screws 42 and the adjacent elements.

As will be seen in FIG. 7, the ends of the bores 32 are closed off by means of stop plates 60 that are pinned to the strut 30 overlapping the respective open ends of the bores. These stop plates are also seen in FIG. 5. The stop plates 60 act to arrest movement of the arms 26 and prevent the arms from entering the pad portion 52. In addition, the stop plates 60 cooperate with the remote bracket 44 in defining a range of adjustment which is indicated in FIG. 7. The distance that the support member 24 can be extended from the frame 22 allows the popliteal support 20 to accommodate different sized seating structures.

Having thus described one construction of the popliteal support of the invention, it is advantageous now to describe an exemplary use of the invention. Turning to FIGS. 2-4, the popliteal support 20 will be seen assembled with an automotive bench-type front seat 62. The seat 62 includes a backrest 64 and a bench cushion 66 which defines a horizontal seating surface. As is well shown in FIG. 3, the rear portion 28 of the U-shaped frame 22 is wedgedly inserted between the seating surface defined by bench cushion 66 and the bottom edge of the backrest 64. Moreover, it is to be noted that the arms 26 of U-shaped frame 22 are spaced to expose a portion of the horizontal seating surface for access thereto by the posterior of a person's body. After the person has seated himself between the arms 26, the support member 24 is positioned in underlying alignment with the popliteal regions of his legs. The broken line indication of the driver's leg in FIG. 3 well illustrates the fitted engagement which the support member 24 achieves with

the popliteal region. As will be recognized, minor adjustments in the position of the support member 24 may be achieved by regulating the position of the rear portion 28 under the backrest 64; and if more substantial adjustments are required, the popliteal support 20 will be removed and the screws 42 loosened for achieving such adjustment by repositioning the arms 26 relative to the support member 24. FIG. 4 illustrates the extended position of the popliteal support 20.

In compliance with conventional practice, a floor panel 68 is situated adjacent the seat 62; and it is to be observed that the popliteal support 20 clears both the region surrounding the seat 62 and the floor panel 68. Thus, no obstructions to a desired positioning of a person's feet are involved; and in the case of automotive seats, no hazards are presented should an emergency arise.

By virtue of the adjustment that is available, the popliteal support 20 is capable of accommodating, not only seating surfaces of different length, but also human thighs of different length. Moreover, the lightweight character of the popliteal support 20 which is achieved, principally by the open arrangement of the frame 22, lends portability to the device, the described mode of assembly of the popliteal support with the seating structure furthering this character of portability by avoiding the necessity for permanent attachment. It will thus be recognized that the popliteal support 20 may be regulated for a particular person's use, and he may carry the device with him for use on the train, an airplane or in an auto as is desired.

The wedged engagement of the rear portion of the frame of the popliteal support of the invention achieves positive positioning of the forward support member whereby to preserve its supporting alignment with the popliteal region of the user's legs, thus eliminating fatigue and the possibility of developing cramps. It will also be noted, particularly with reference to FIG. 3, that the support member 24 engages only the popliteal region and hence frees the remainder of the leg, as for example to achieve a desired posture or to allow free manipulation of the leg so as to operate an accelerator pedal or other foot-operated control.

Turning to a consideration of FIG. 10, a modified embodiment of the invention will be seen indicated generally by the numeral 20a. Since the embodiment of FIG. 10 includes a number of elements which are similar to the embodiment of FIGS. 1-9, like numerals have been used to designate like parts, the suffix letter "a" being employed to distinguish those elements associated with the embodiment of FIG. 10. The popliteal support 20a which is shown in FIG. 10 is distinguished by a permanent attachment of the support member 24a to the frame 22a. For this purpose, the strut 30a is apertured transversely to pass a fastener 70 into lateral engagement with the rod 26a, fastener 70 acting to fix the rod relative to the strut 30a. The popliteal support 20a is also distinguished by the provision of a strut having a circular cross-section. In other essential respects, the popliteal support 20a functions similarly to the popliteal support 20.

While particular embodiments of the invention have been shown and described, it should be understood, of course, that the invention is not limited thereto since many modifications may be made; and it is, therefore, contemplated to cover by the present application any such modifications as fall within the true spirit and scope of the appended claims.

The invention is claimed as follows:

1. A popliteal support arrangement comprising: seat means including a substantially horizontal seating surface having a front edge and further including a backrest upstanding from the rear edge of said seating surface and defining a crevice at its juncture with said seating surface; popliteal support means including an elongated rigid member of sufficient width in a direction generally perpen-

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dicular to and in a plane generally parallel with said seating surface to define a projection extending beyond said front edge, said popliteal support means further including resilient padding encompassing at least the projected portion of said elongated member to contact and support comfortably the popliteal regions of the legs of a person seated on said surface; and means positioning said popliteal support means relative to said seat means in overlying relationship therewith, including rigid anchoring means connected to said popliteal support means and wedgedly disposed in said crevice for locating said popliteal support means.

2. A popliteal support arrangement according to claim

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1 wherein said positioning means further includes means acting between said anchoring means and said popliteal support means adjustably to couple said elongated rigid member and said anchoring means.

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