

[54] FOLDING CRUTCH

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[58] Field of Search... 24/230 SC; 135/15 PQ, 25 R, 135/45 R, 46 A, 49, 50; 403/102, 322, 324, 325, 329, 327

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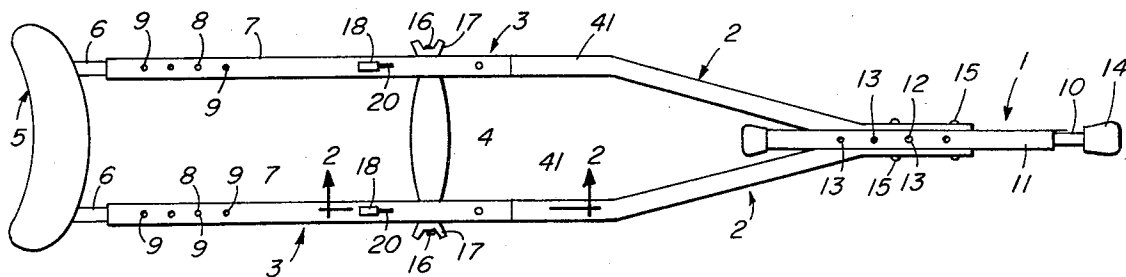
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[57]

### ABSTRACT

A folding crutch which can be folded or erected by the user, with two telescoping joints in each arm controlled by a pair of two-position latches each manually operable with one hand.

**3 Claims, 6 Drawing Figures**



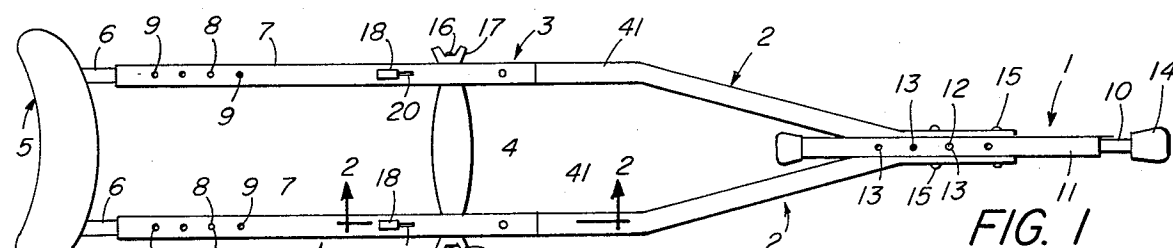
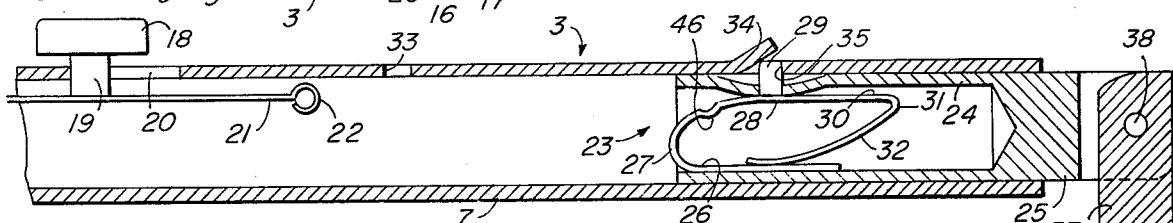


FIG. 3

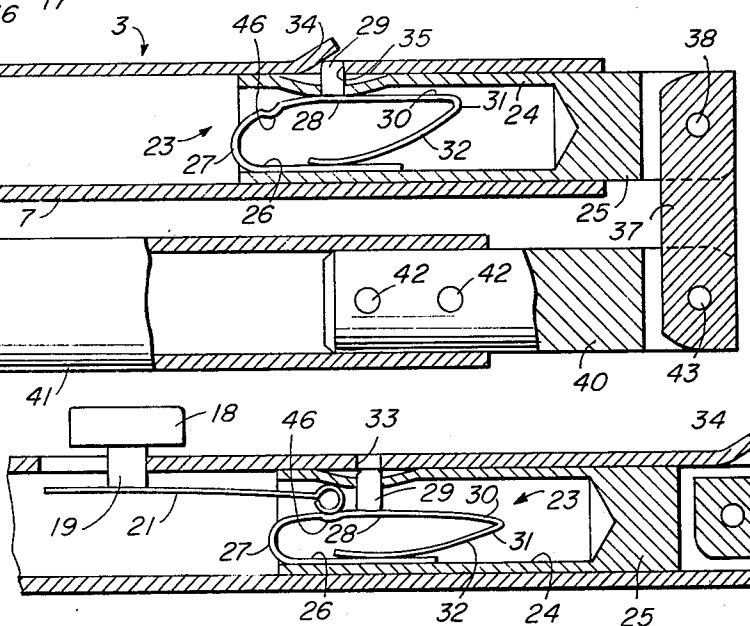


FIG. 4

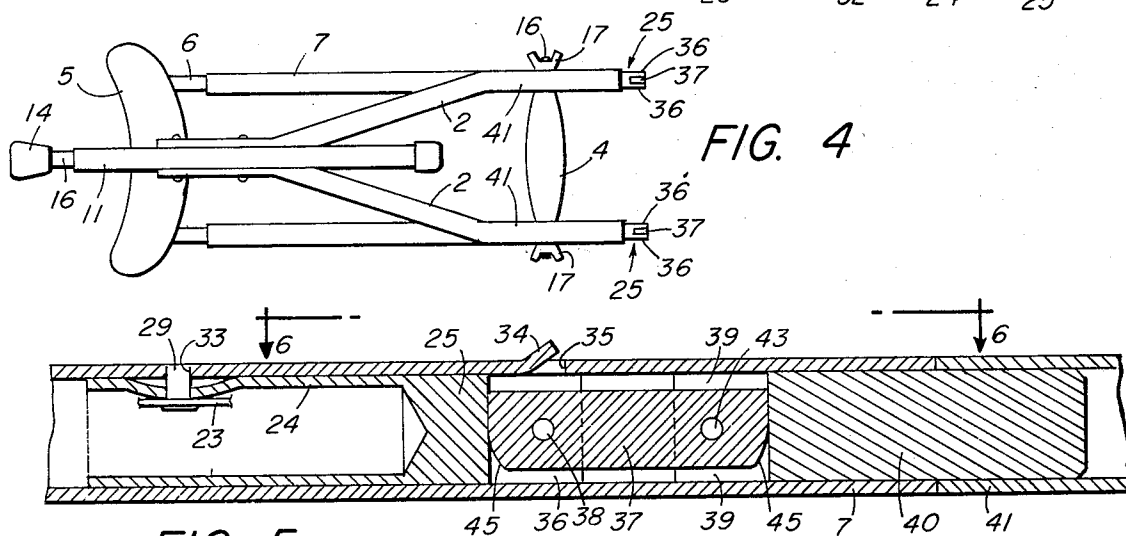
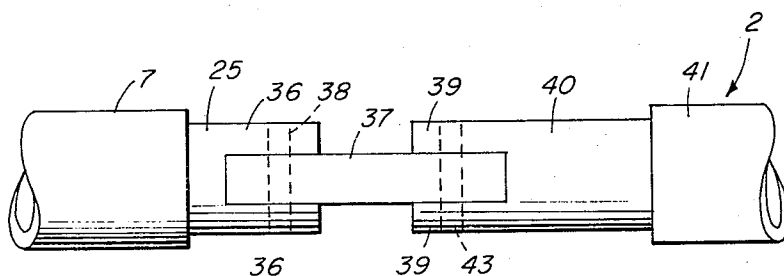


FIG. 6



## FOLDING CRUTCH

My invention relates to aids to the injured or handicapped, and particularly to a novel crutch.

Those who, temporarily or permanently, require the aid of a crutch, often find themselves inconvenienced or embarrassed by its awkward size and shape when not in use. It is not always a simple matter to carry one on a bus, or in a car, without interfering with other occupants. And if a pair is stood against a wall, one or both is apt to fall down and break something. Thus, a folding crutch would clearly be desirable, and many folding crutch constructions have been proposed.

However, so far as I am aware, prior to my invention, all such folding crutches have been lacking in important respects. For example, one commonly available folding crutch cannot be folded by one person with the hands alone, because both hands are needed to release detents on the arms of the crutch while the crutch is extended to enable it to be folded, by a third person. Other folding crutches that have been proposed are unsuitable, because the folding mechanism breaks the line of support that should extend from the shoulder to the tip through the position of the heel of the hand on the handgrip. The object of my invention is to provide a crutch which will serve its intended purpose as well as one of proper design of fixed dimensions, and yet can readily be folded by the user with only the use of his hands, and while in a seated position.

Briefly, the above and other objects of my invention are attained by a novel crutch construction in which telescoping folding joints are provided in each arm below the handgrip. Each of these joints is locked in the extended position of the crutch, by a two-position latch which can be moved from the locking position to the released position by one hand, and which will remain in either position when the hand is removed. By that arrangement, when the user is seated and desires to fold the crutch, he can simply place it across his lap, release the latch on one side with one hand, and then release the latch on the other side with the other hand, or with the first hand, if he only happens to have one to work with. A new grip is then taken, while the latches remain in their stable released position, with either both hands, or with one hand aided by gravity, and the crutch is extended. It will then drop into the folded position, forming an easily portable and stowable package. Two such crutches can be sequentially folded, or erected, without absolutely requiring more than one hand at any time, so that the user does not have to find an assistant each time he wants to stand up or sit down.

The manner in which the crutch of my invention is constructed, and its mode of operation, will best be understood in the light of the following detailed description, together with the accompanying drawings, of a preferred embodiment thereof.

In the drawings,

FIG. 1 is a schematic plan sketch of a folding crutch in accordance with my invention;

FIG. 2 is a schematic cross sectional elevational view, taken essentially along the lines 2—2 in FIG. 1, but with the crutch shown in its folded position and with parts shown in cross section and parts broken away, on an enlarged scale;

FIG. 3 is a fragmentary view, similar to FIG. 2, of a portion of the apparatus of FIG. 2, showing that portion of the crutch in its erected unlocked position;

FIG. 4 is a schematic plan view of the crutch of FIGS. 1 through 3, shown in its folded position;

FIG. 5 is a schematic cross sectional elevational diagram, showing an extension of the arms of the crutch of FIG. 3 in which the telescoping joint is contained within the crutch in its locked position; and

FIG. 6 is a schematic plan view, with parts broken away and parts shown in dotted lines, of the crutch of FIGS. 1 through 5, taken essentially along the lines 6—6 of FIG. 5.

Referring to FIG. 1, the crutch of my invention may basically comprise a tubular aluminum crutch of essentially conventional construction, except that the arms are modified to incorporate a pair of telescoping folding joints each independently controlled by its own two-position latch. The crutch can be folded by opening one latch, then opening the other latch, then extending the crutch to expose the joints, and finally by folding to the position shown in FIG. 4.

Generally speaking, the crutch comprises a lower tubular leg 1 having a pair of telescoping portions, to be described, one of which is secured to two diverging lower tubular arms 2. Two parallel upper arms 3 support the grip 4 and shoulder pad 5. Each of the upper arms 3 comprises an inner solid or tubular post 6 which is received within a cooperating outer tubular arm 7 in slidable adjustable relationship.

The posts 6 are each fixed to the shoulder pad 5 by any conventional means, and are adjustable secured to the post 7 by means here shown as conventional detents 8 resiliently secured to the posts 6 and engageable in any of a series of cooperating apertures 9 formed in the posts 7. By this arrangement, the shoulder pad 5 can be adjusted relative to the hand grip 4 by simultaneously depressing both of the detents 8, while someone else grasps the grip 4 and the shoulder pad 5 and extends or contracts the distance between them until it suits the user's needs. There is no great objection to the inclusion of this feature in this portion of the crutch of my invention, because it is generally only once that this adjustment is required to suit the crutch to the needs of a particular user. However, this particular extending construction is included primarily to illustrate the advantages of the latches incorporated for folding the crutch, to be described.

A second adjustment, which need only be made once to suit the crutch to a particular individual's requirements, is for overall length between the shoulder pad and tip. This adjustment can be made in the manner described above for the shoulder pad-to-hand grip adjustment, by forming the leg post 1 as a telescoping assembly comprising a lower tubular leg 10 slidably received in an upper leg 11 and adjustably secured thereto by a conventional spring-loaded detent 12 mounted on the leg 10 and received in one of a series of apertures 13 formed in the upper leg 11.

A conventional resilient tip 14, of rubber or the like, is mounted on the end of the leg 10. The upper leg 11 is secured to the lower arms 2, as by through-bolts or rivets suggested at 15. These may be accommodated by suitable slots, not shown, formed in the lower leg 10.

The hand grip 4, of wood or the like, is secured between the upper arms 7 by conventional means here shown as a stud 16 stopped at the arms 7 by conventional means here shown as a stud 16 stopped at the ends by wing-nuts 17. So far, the crutch described is of conventional design.

The folding joints, next to be described, are controlled by a pair of independently manually operable latch buttons 18, each slidably mounted on one of the upper arms 7 for movement between two extreme positions. As shown in FIGS. 2 and 3, each of the latch buttons 18 is secured to a post 19 that extends through a slot 20 in each post 7.

Each of the posts 19 is fixed to an actuating arm 21, comprising a strip of metal or the like, formed at one end with a recurved head portion 22 that serves as a cam. Each of the cams 22 is adapted to cooperate with a latch spring generally designated 23 in a manner next to be described. For clarity, only one latch construction will be referred to, it being understood that the other may be identical.

Each spring 23 may be made of a rectangular strip of any suitable spring material, such as steel, bronze or the like, and is located in a bore 24 formed in a cylindrical shaft 25 that is slidably mounted in the arm 7 for purposes to be described.

A base leg 26 of the spring 23 rests against one side of the bore 24, and is bent into a bight 27 formed integrally with a convex section 28. A latch pin 29, of metal or the like, is secured in the section 28 by welding, brazing, riveting, soldering, or the like, and extends upwardly, as seen in the drawings.

The end of the section 28 remote from the bight 27 joins an upwardly convex section 30 which terminates in another downwardly curving bight 31. The bight 31 extends to a downwardly sloping extension 32 which engages the base leg 26 of the spring and thus urges the pin 29 upwardly, as seen in the drawings.

With the latch button 18 in the position shown in FIG. 1, at the left extremity of the slot 20, and with the shaft 25 in the position relative to the arm 7 that is shown in FIG. 3, the spring 23 would urge the latch pin 29 up through a locking aperture 33 in the arm 7 to lock the shaft 25 to the arm 7, as shown in FIG. 5. When the latch button 18 is moved to the position shown in FIG. 3, the cam 22 engages the upwardly curved section 27 of the spring 23 and forces the spring 23 down to retract the latch pin 29 from the recess 33. In this position, the latch button 18 is retained by the force of the spring 23 against accidental disengagement, so that if the button 18 is released, the pin 29 will remain in the retracted position shown in FIG. 3. Similar movement of the other latch button 18 then releases the other pin 29 so that both shafts 25 can be slid out of the position shown in FIG. 3 to the position shown in FIG. 2.

As shown in FIG. 2, movement of the shafts 25 out of the corresponding arms 7 is stopped by a unidirectional limiting recess, which may be formed by a portion 34 punched out of the wall of the arm 7 to form a stop ledge 35 against which the latch pin 29 is stopped as the shaft 25 is withdrawn from the arm 7. The lower part of the portion 34 serves as a cam to guide the latch pin 29 back into the confines of the arm 7 when a force is applied to the shaft 25 tending to move it back into the arm 7.

Each of the shafts 25 is slotted at the outer end to form a pair of ears 36. A link 37, of steel, aluminum or the like, is pivotally mounted between each such pair of ears 36 by a pin 38 fixed to the ears 36 and extending through a suitable recess in the link 37.

The second end of each link 37 is pivotally mounted between a pair of ears 39 formed on a cylindrical shaft

40, of aluminum or the like, that is fixed in each of a pair of parallel extensions 41 formed integral with the diverging arms 2. The extensions 41 are parallel and coaxial with the cooperating arms 7. Each of the shafts 40 is fixed in the associated arm 41 by means here shown as a pair of pins 42, and is pivoted to the link 37 by means shown as a conventional pivot pin 43.

Operation of the crutch of my invention will generally be apparent from the above description of its construction. Briefly, in the extended position of the crutch shown in FIG. 1, the shafts 25 and 40 extend up into the arm 7, as shown in FIG. 5, so that the folding joint comprising the link 37 is locked in the arm 7 and there held by engagement of the locking pin 29 in the recess 33 formed in the arm 7. Upon movement of the latch button 18 from the position shown in FIG. 2 to the position shown in FIG. 3, the cam 22 engages the upper surface 30 of the spring 23 and removes the latch pin 29 from the recess 33 to free the shafts 25 and 40 so that they can be extended outwardly, after the associated latch button 18 on the other side has been moved to the same position, allowing the lower portion of the crutch to be extended so that the assembly can be folded about the link 37 to the position illustrated in FIGS. 2 and 4.

It will be noted that the link 37 has rounded corners, as indicated at 45, to allow the crutch to be folded in the manner shown, while inhibiting folding of the crutch in the opposite direction where the arms 41 would interfere with the latch buttons 18. It should further be noted that there is preferably formed the concavity 46 in the upper portion of the spring 23, as seen in FIGS. 2 and 3, so that the cam 22 will be detented in the released position of the crutch, further insuring that the user need not do anything further about one latch button 18 in order to fold the crutch while he is attending to the other one.

While I have described my invention with respect to the details of a preferred embodiment thereof, many changes and variations will be apparent to those skilled in the art upon reading my description, and such can obviously be made without departing from the scope of my invention.

Having thus described my invention, what I claim is:

1. In a crutch, first and second arm portions, means connecting said arm portions in fixed parallel relationship, first and second leg portions, means connecting said leg portions in fixed parallel relationship, first telescoping joint means connecting said first arm portion to said first leg portion for movement between a first position and a second position, second telescoping joint means connecting said second arm portion to said second leg portion for movement between a first position and a second position, said joint means comprising means for fixing said leg portions in parallel coplanar relationship to said arm portions in said first position, and allowing said leg portions to be swung into overlapping and non-coplanar relationships to said arm portions in said second position, first latch means operably connected to said first telescoping joint means, second latch means operably connected to said second telescoping joint means, said latch means each being operable to a first stable position in which its associated joint means is locked in said first position, said latch means each being operable to a second stable position in which said telescoping joint means may be moved to their second positions when and only when both of said latch means is in said second position, each of said

latch means comprising manually operable means movable between first and second positions, locking means movable between locking and unlocking positions, and resilient means for urging said locking means toward said locking position, said resilient means comprising detent means engaged by said manually operable means in said second position of said manually operable means for moving said locking means to said unlocking position.

2. In a crutch, first and second arm portions, means connecting said arm portions in fixed parallel relationship, first and second leg portions, means connecting said leg portions in fixed parallel relationship, first telescoping joint means connecting said first arm portion to said first leg portion for movement between a first position and a second position, second telescoping joint means connecting said second arm portion to said second leg portion for movement between a first position and a second position, said joint means comprising means for fixing said leg portions in parallel coplanar relationship to said arm portions in said first position, and allowing said leg portions to be swung into overlapping and non-coplanar relationships to said arm portions in said second position, first latch means operably connected to said first telescoping joint means, second latch means operably connected to said second telescoping joint means, said latch means each being operable to a first stable position in which its associated joint means is locked in said first position, said latch

means each being operable to a second stable position in which said telescoping joint means may be moved to their second positions when and only when both of said latch means is in said second position, in which each of said telescoping joint means comprises a first shaft fixed in one of said leg portions and partly extendable into the connected one of said arm portions, a second shaft, means pivotally connecting said first shaft to said second shaft, said second shaft being slidably mounted in the connected one of said arm portions for movement between a first position in which said second shaft is entirely within said arm portion and said first shaft is partly extended into said arm portion and a second position in which said first shaft is out of said arm portion and said second shaft is partly extended out of said arm portion, and in which said latch means each comprise release means slidably mounted on said arm portion for movement between first and second positions, and detent means comprising a recess in said arm portion, an element resiliently mounted on said second shaft and adapted to enter said recess in the first position of said second shaft with said release means in its first position, and means engaged by said release means in its second position for dislodging said element from said recess.

3. The apparatus of claim 2, in which each of said elements comprises a pin mounted on a spring located in said second shaft, said spring urging said pin outwardly of said second shaft to engage said recess.

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