Feb. 3, 1970 Z. R. BOYD 3,492,999

FOLDING CRUTCH

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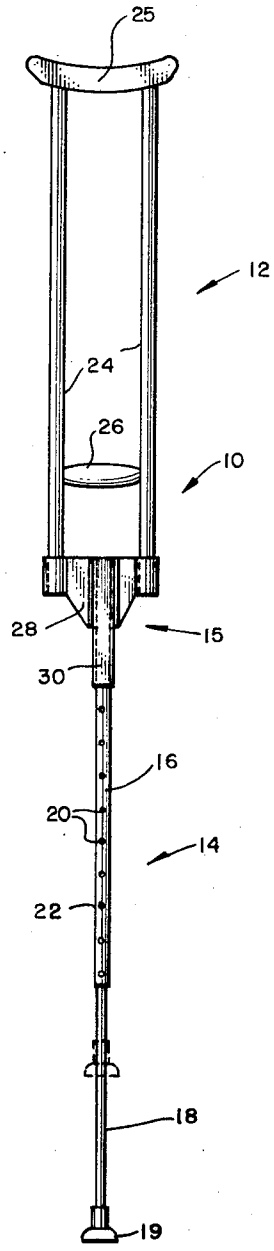


FIG. 1

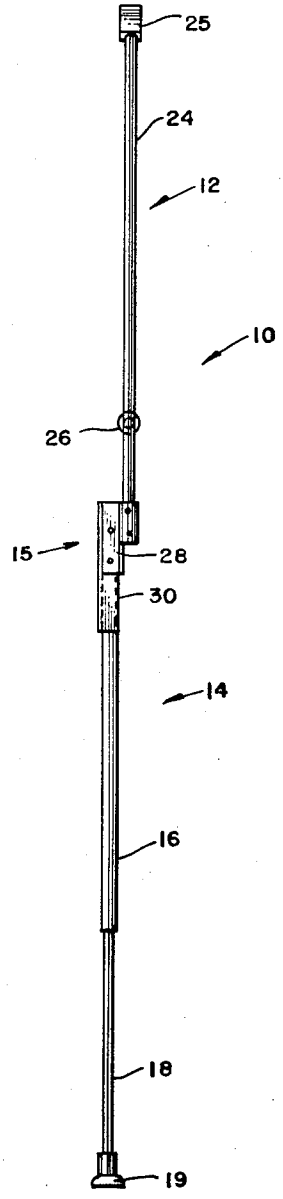


FIG. 2

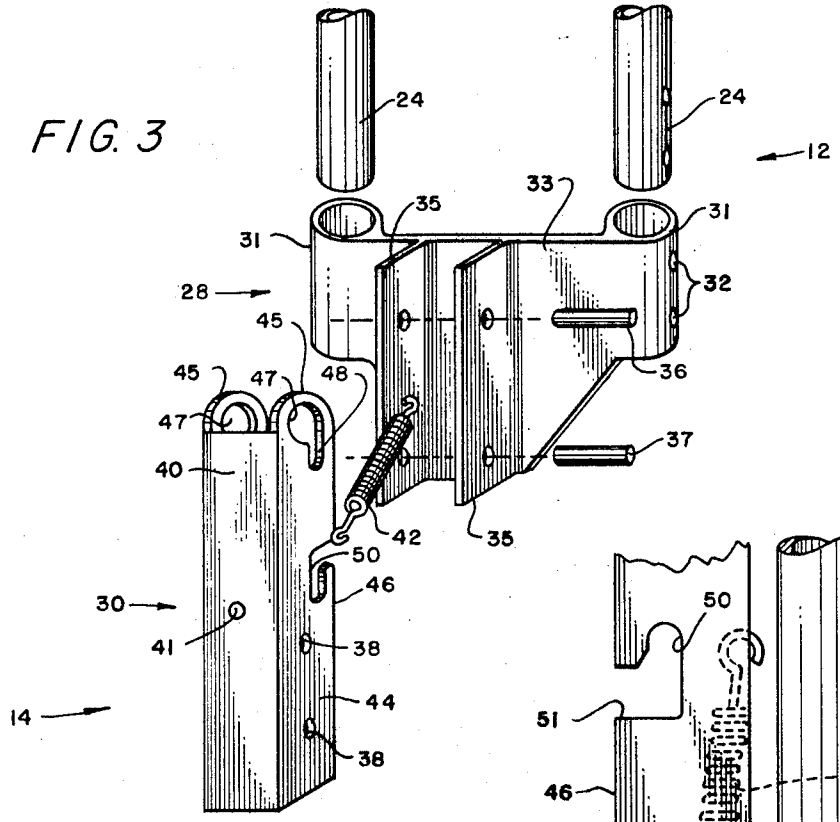
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FOLDING CRUTCH

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FIG. 3



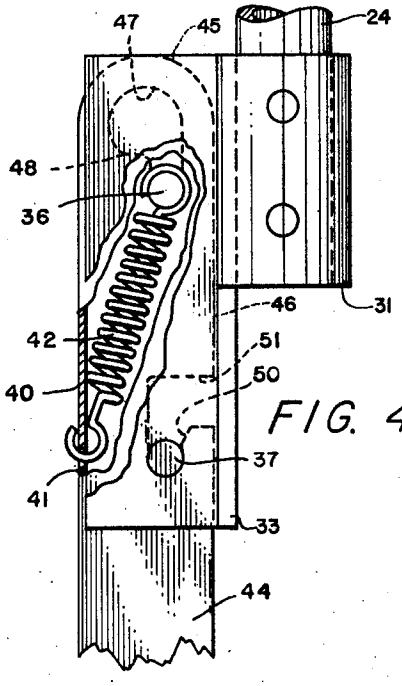


FIG. 4

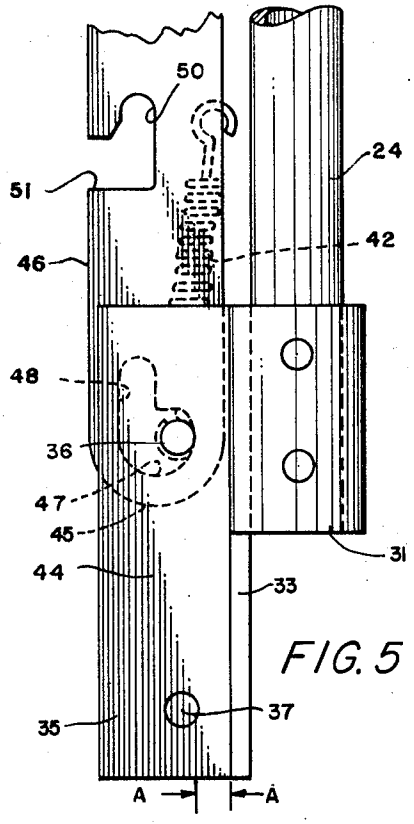


FIG. 5

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FIG. 6

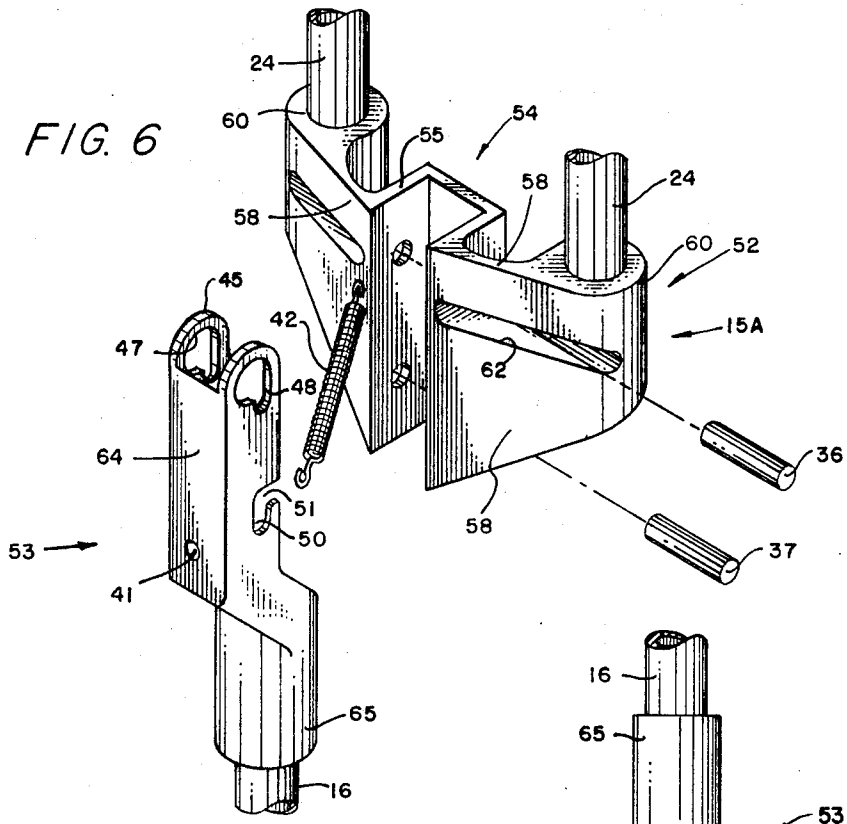


FIG. 7

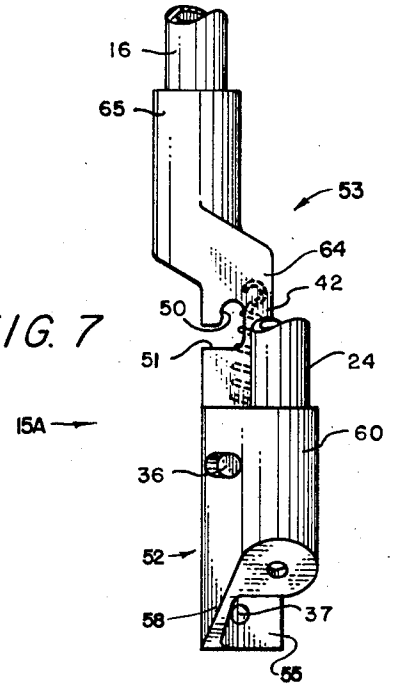
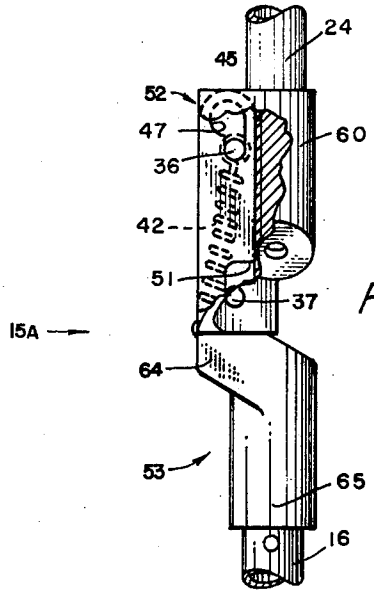


FIG. 8



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3,492,999

FOLDING CRUTCH

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Continuation-in-part of application Ser. No. 706,962, Feb. 20, 1968. This application Nov. 20, 1968, Ser. No. 777,447

Int. Cl. A61h 3/02

U.S. Cl. 135—49 10 Claims

ABSTRACT OF THE DISCLOSURE

The invention is a foldable traveling crutch which occupies a limited space in a collapsed position. The crutch comprises an upper and lower section pivotally connected by a joint which also allows the sections to slide longitudinally with respect to each other when fully extended to a position locking the joint from pivotal movement.

This invention is a continuation-in-part to co-pending application Ser. No. 706,962 of Zane R. Boyd, filed Feb. 20, 1968, now Patent No. 3,447,632.

BACKGROUND OF INVENTION

The conventional crutch used to assist the lame or infirm in walking, has gone substantially unchanged for many decades. While there have been some special use type crutches produced, the large majority on the market have been the conventional type which include a cross-piece at the end fitting under the armpit and a grip portion for the hand located approximately midway of its length. The length of these conventional crutches creates a space problem in all types of public and private transportation.

For example, when traveling in a car, they take up needed passenger space and in some of the smaller cars it is not possible to fit the crutches inside the car.

SUMMARY OF THE INVENTION

The present invention is a full length lightweight metal crutch which compactly folds into two sections when not in use. The sections are connected by a joint which only allows them to fold when the two sections are pulled apart in a telescoping manner against a tension spring. The sections are likewise locked against pivotal movement only when the sections are fully extended in axial alignment with each other. When in the locked position the sectioned crutch provides a rigid structure capable of supporting any compressive and bending load which might be encountered.

It is therefore the primary object of the present invention to provide a high strength, lightweight foldable crutch which can be stored in a limited space.

It is an additional objective to provide an improved locking joint for a folding section crutch.

Further objects and advantages of the invention will be in part apparent and in part pointed out specifically hereinafter in connection with the description of the drawings that follows and in which:

FIG. 1 is a front elevational view of the crutch in the extended position ready for use;

FIG. 2 is a side elevational view in the extended position;

FIG. 3 is an exploded perspective view of the locking joint between the two sections of the crutch;

FIG. 4 is a side elevational view of the joint in partial section with the sections locked in the extended position;

FIG. 5 is a side elevational view of the joint with the sections in the folded position;

FIG. 6 is an exploded perspective view of a modified form of the locking joint;

FIG. 7 is a side elevational view of the modified joint with the sections in the folded position; and

FIG. 8 is a side elevational view of the modified joint with the sections locked in the extended position.

Referring now to the drawings for a more detailed description of the invention, and more specifically to FIGS. 1 and 2, a foldable crutch is generally identified by the reference numeral **10**. The crutch is made up of an upper section **12** and a lower section **14** connected by a pivotal locking joint **15**. The lower section **14** includes a hollow tubular member **16** circumfusing a smaller member **18** in telescoping relation. Positioned on the lower end of member **18** is a common resilient non-slip foot **19**. The tubular member **16** has a series of longitudinally spaced holes **20** through which a spring detent or other type locking means **22** can be adjustably positioned to vary the length of the crutch to fit persons of varying height. A shorter person would adjust the member **18** to the dotted line position illustrated in FIG. 1. The upper section **12** of the crutch is made up of two parallel spaced tubular members **24** joined at their upper ends by an arcuate-shaped shoulder rest **25**. Laterally spaced between the members **24** is a hand grip **26**. The lower ends of members **24** are anchored to the stationary member **28** of joint **15** while the upper end of tubular member **16** is anchored to the pivoting member **30** of the joint as will hereinafter be described in detail.

In FIG. 3 the two members **28** and **30** of the joint **15** are shown in an exploded detail view. The stationary member **28** has side portions **31** which girdle the ends of tubular members **24**. The members **24** are anchored in place by rivots or other type fastening means through holes **32**. Joining the two girdling side portions **31** is a web **33**. Extending outwardly from one side of the web **33** are a pair of parallel spaced side walls **35** forming a channel to receive member **30**. Passing traversely through both side walls **35** is a pivot pin **36** and a locking pin **37**.

The pivoting member **30** of the joint **14** has a channel-shaped cross-section and is anchored to the tubular member **16** (not shown in FIG. 3) by rivets or a similar type of fastening means through holes **38**. Located in the web portion **40** of member **30** is an opening **41** for fastening the end of spring **42**. Integral with web **40** are a pair of side walls **44** which make up the channel cross-section. The upper end of each wall **44** has a curved surface **45** with a diameter equal to the width of the side wall **44**. The curved surface **45** is tangent to the web **40** and the outer edge **46** of the wall **44**. Concentric with surface **45** is circular opening **47**, which when the crutch is assembled, receives pivot pin **36** as seen in FIGS. 4 and 5. Intersecting the opening **47** is a slot **48** having a width approximate the radius of opening **47** with one edge of the slot tangent with said opening. Located inwardly from the end of wall **44** is a second slot **50** longitudinally aligned with the first mentioned slot **48**. One end of slot **50** has an opening **51** through the outer edge **46** of the wall. The distance A between either the pivot pin **36** or locking pin **37** and the web **33**, as seen in FIG. 5, is less than half of the width of the wall **44**. This restriction causes the pivoting axis of member **30** to move from side to side as member **30** is rotated from its FIG. 5 to its FIG. 4 position.

OPERATION

When the crutch is in the extended locked position, as illustrated in FIGS. 2 and 4, a rigid joint without play is provided between the two sections. The outer edge **46** of the pivoting member **30** is held snugly against the web **33** of the stationary member by pins **36** and **37** positioned in their respective slots. Since locking pin **37** is out of alignment with opening **51** of slot **50**, member **30** is locked against any pivotal movement about pin **36**.

Pivotal movement is also prevented by the non-concentric position of pin **36** with respect to surface **45**. Member **30** is held in this position by tension spring **42** urging member **30** upward so that the bottoms of slots **48** and **50** are in contact with pins **36** and **37**. To unlock the lower section **14**, member **30** is first pulled outward against the tension of spring **42**. The two pins **36** and **37** will slide upward to the opposite ends of their respective slots **48** and **50**. Pin **37** now being laterally disposed with respect to opening **50**, the member **30** is free to rotate about pin **36**. As member **30** rotates, pin **36** is forced to follow the edge of larger opening **47**. This is caused by the limited space A between the pin **36** and the web **40** being approximately the same as the width of the side wall **44** between the opening **47** and the curved surface **45**. When the lower section **14** of the crutch is completely folded, as shown in FIG. 5, the pivot pin **36** has moved to the opposite side of opening **47**, out of alignment with slot **48**. This prevents the pin **36** from riding up in slot **48** and locking the sections in the folded position. The crutch is therefore much easier to unfold.

FIGURES 6, 7 AND 8

In the previous embodiment just described, the upper and lower sections of the crutch, **12** and **14**, are longitudinally offset from each other, as best seen in FIG. 2. The joint **15A** of the present embodiment is so constructed that the sections are aligned with each other as shown in FIG. 8. The stationary member **52** of the joint comprises a web **58** joining two side portions **60** which girdle the ends of tubular members **24**. Centrally disposed in web **58** is a recessed channel-shaped portion **54** having side walls **55**. The two portions of the web **58** lie in separate planes, joining their respective side walls **55** at an acute angle. A slot **62** is provided in web **58** for the ingress and egress of pivot pin **36**.

The pivotal member **53** of the joint has a channel-shaped upper portion **64** with identical slots and openings **48**, **50**, **51** and **47**, as previously described in FIG. 3. The lower portion **65** of member **53** receives tubular member **16** and is offset from the upper portion so that in the extended position the tubular members **16** in the lower section are longitudinally aligned with the tubular members **24** in the upper section (FIG. 8). When the crutch is in the folded position of FIG. 7, the tubular member **16** of the lower section is offset away from the tubular member **24** of the upper section so that the two sections can lie in parallel relation when in the folded position. The function of slots **48** and **50**, and their related openings, are identical to those described in FIG. 3.

Having described the invention with sufficient clarity to enable those familiar with the art to construct and use it, I claim:

1. A foldable full length crutch comprising:
upper and lower sections (**12**, **14**);
a pivotal locking joint (**15**) connecting the sections including a stationary member (**28**) connected to the upper section and a pivoting member (**30**) connected to the lower section;
the stationary member having side walls (**35**) joined by a web (**33**) forming a channel;
the pivoting member (**30**) positioned within the channel of the stationary member, having side walls (**44**) terminating at one end in a curved end surface (**45**);
a traverse arcuate opening (**47**) in the side walls (**44**) concentric with the curved end surface;
a first traverse slot (**48**) in the side walls (**44**) extending from one end longitudinally into the arcuate opening offset from the longitudinal centerline of the side walls (**44**);
a second traverse slot (**50**) in the side walls (**44**) extending longitudinally from one end toward the first slot, an opening (**51**) through an edge of the side walls (**44**) into the slot (**50**);
pivot means (**36**) for joining the two sections anchored laterally to the side walls (**35**) extending through the arcuate opening in the pivoting member allowing pivotal movement between the sections from an extended to a folded position as long as the pivot means does not enter the first slot (**48**);
locking means (**37**) anchored to the side walls (**35**) in alignment with the opening (**51**) when the sections are pivoted from the folded to the extended position; and
spring means (**42**) connecting the two sections urging the pivot means and locking means toward said ends of the respective first and second slots whereby the sections will slide longitudinally with respect to each other into a locked position.

2. A foldable full length crutch as set forth in claim **1** wherein, the upper section includes a pair of tubular members (**24**) held in parallel spaced apart relation by a shoulder rest (**25**) at the upper ends thereof and the stationary member (**28**) of the pivoting joint at the bottom ends with a hand grip (**26**) spaced therebetween; and the lower section includes a tubular member anchored to the pivoting member (**30**) at one end and a ground-engaging foot at the opposite end.

3. A foldable full length crutch as set forth in claim **1** wherein, the upper section includes a pair of tubular members (**24**) held in parallel spaced apart relation by a shoulder rest (**25**) at the upper ends thereof and the stationary member (**28**) of the pivoting joint at the bottom ends with a hand grip (**26**) spaced therebetween; and the lower section including a first tubular member (**16**) anchored to the pivoting member of the joint, a second tubular member (**18**) held in telescoping relation with the first tubular member by an adjustable fastening means (**22**) so that the height of the crutch can be varied for the height of the user.

4. A foldable full length crutch as set forth in claim **1** wherein, the upper section includes a pair of tubular members (**24**), the stationary member of the joint having side portions (**31**) extending from each side of the channel, the tubular members being anchored to the side portions in a plane offset from the axis of rotation of the pivoting means (**36**).

5. A foldable full length crutch as set forth in claim **1** wherein, the upper section includes a pair of tubular members (**24**), the stationary member of the joint having side portions (**31**) extending from each side of the channel, the tubular members being anchored to the side portions in a plane offset from the axis of rotation of the pivoting means (**36**), the lower section includes a tubular member (**16**) anchored to the pivoting member (**53**) of the joint in an offset manner so that the tubular members of the upper and lower sections lie in the same longitudinal plane when in the extended position and are offset from each other in the folded position.

6. A foldable full length crutch as set forth in claim **1** wherein, the first and second traverse slots are longitudinally axially aligned with each other offset from the centerline of the side walls (**44**) toward the edge having the opening therein.

7. A foldable full length crutch as set forth in claim **1** wherein, the first and second traverse slots are offset from the longitudinal centerline of the side walls (**44**) toward the edge having the openings therein, the pivoting means (**36**) being spaced from the web (**33**) of the stationary member a distance substantially equal to the width of the side wall (**44**) between the first traverse slot and said edge of the side wall (**44**) whereby the said edge of the side wall is in contact with the web of the stationary member when the pivoting means is located in the first traverse slot.

8. A foldable full length crutch as set forth in claim **1** wherein, the first and second traverse slots are offset from the longitudinal centerline of the side walls (**44**) toward the edge having the opening therein, the width of the side wall (**44**) between the arcuate opening and the

curved end surface being substantially uniform and equal to the width of the side wall (44) between the first traverse slot and said edge of the side wall (44).

9. A foldable full length crutch as set forth in claim 1 wherein, the first and second traverse slots are longitudinally axially aligned with each other offset from the centerline of the side walls (44) toward the edge having the opening therein, the pivoting means (36) being spaced from the web (33) of the stationary member a distance substantially equal to the width of the side wall (44) between the arcuate opening and the curved end surface whereby the curved end surface co-acts with the web (33) in a camming action to force the pivot means into the arcuate opening out of longitudinal alignment with slot 48 when the sections are rotated to the folded position.

10. A foldable full length crutch as set forth in claim 1 wherein, the arcuate opening is circular in shape with a diameter greater than the width of the first slot, with one edge of the first slot tangent to the arcuate opening.

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