

April 13, 1926.

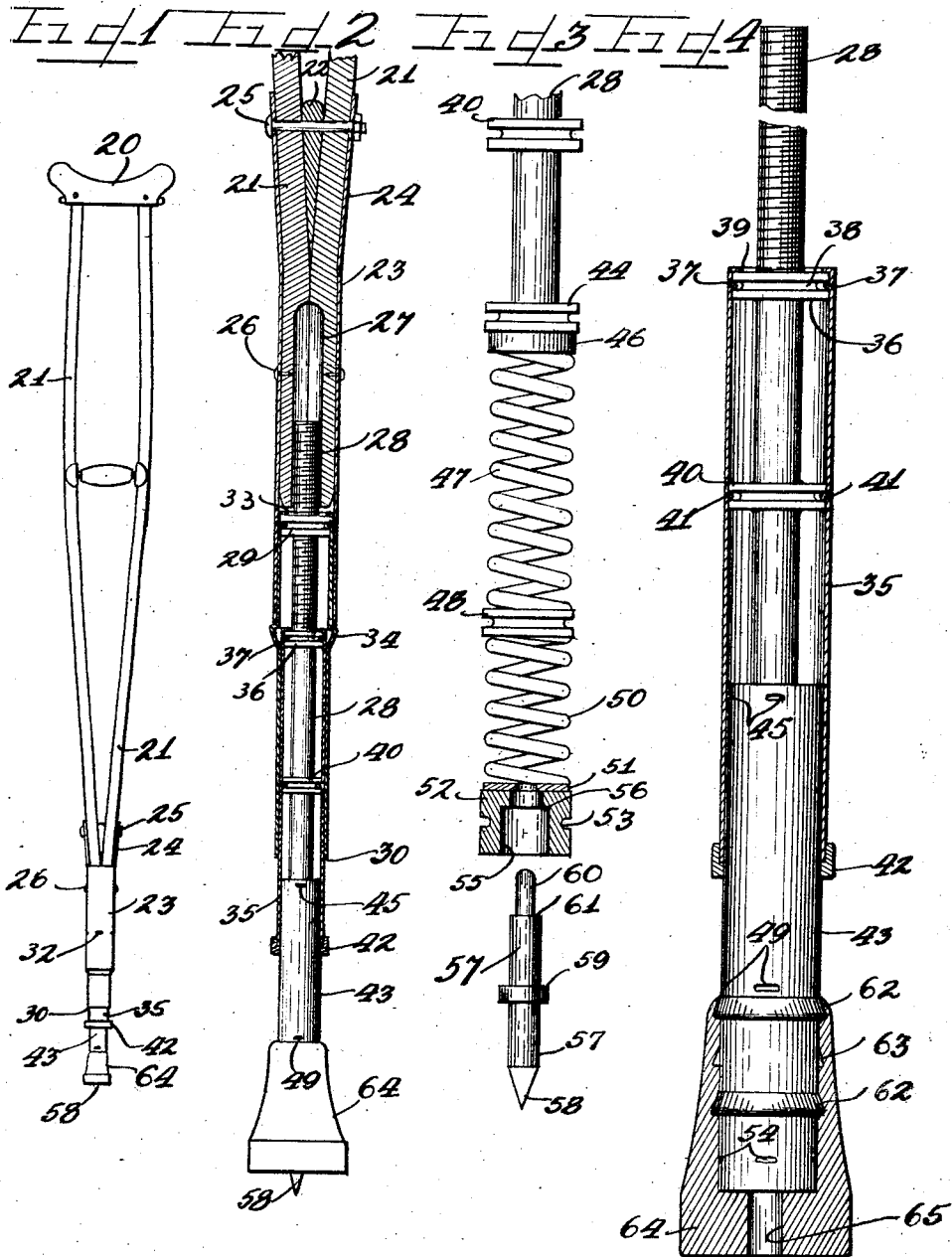
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J. B. GLOWACKI

ADJUSTABLE RESILIENT NONSKID CRUTCH

Filed March 12, 1923

3 Sheets-Sheet 1



Witnesses
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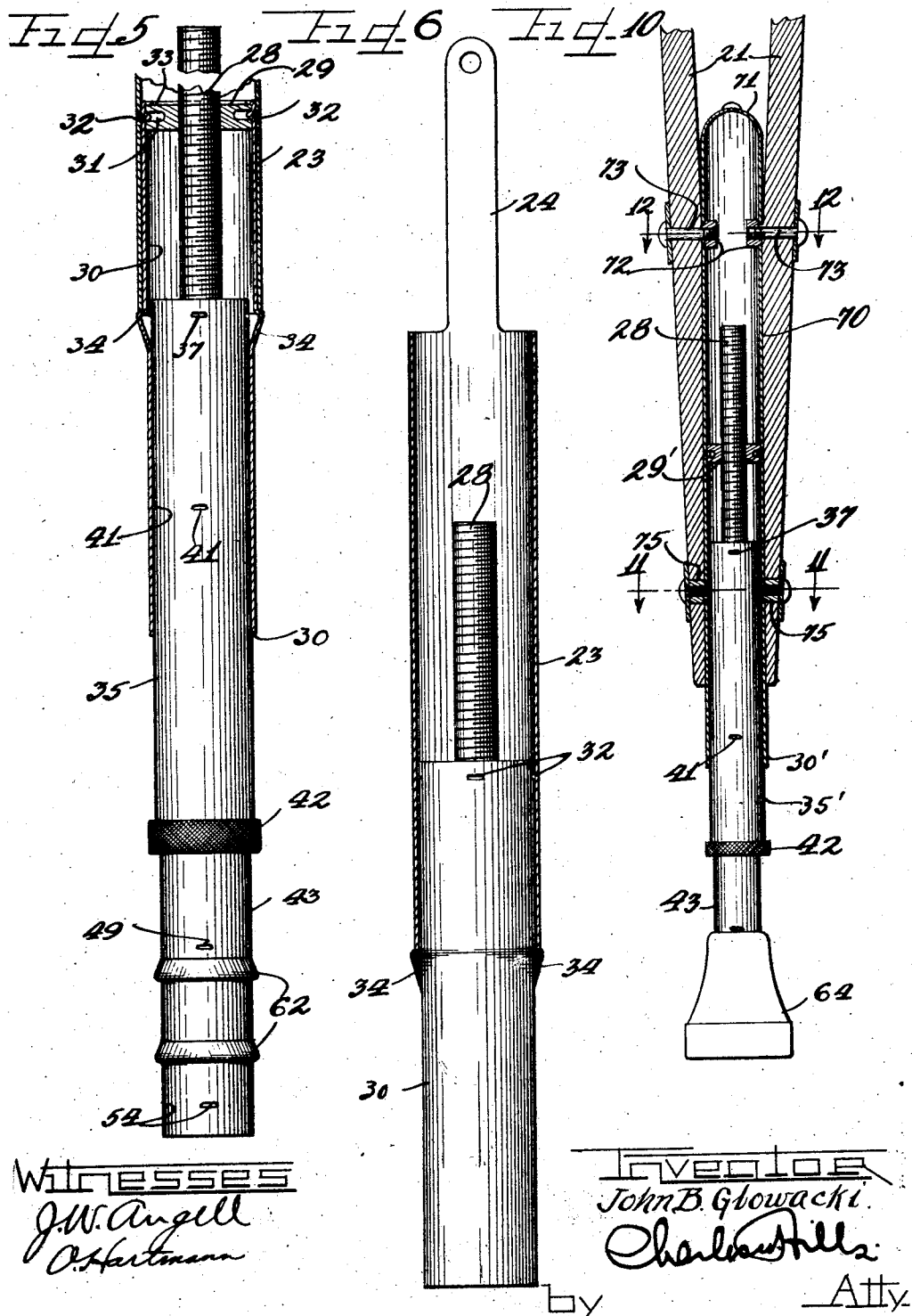
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Fig. 9

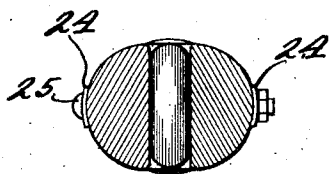
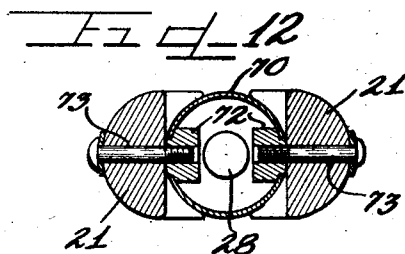


Fig. 7

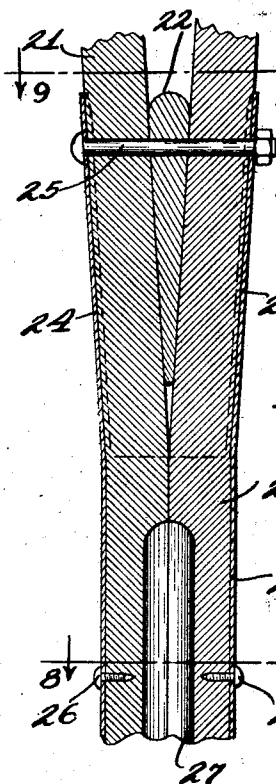


Fig. 8

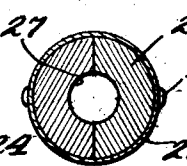


Fig. 11

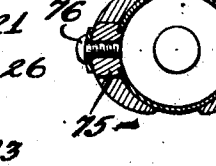


Fig. 13

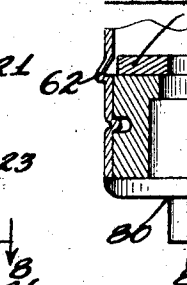
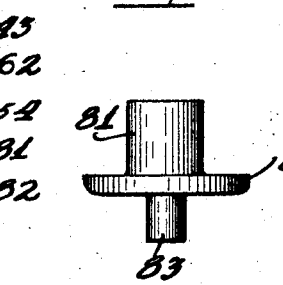


Fig. 14



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UNITED STATES PATENT OFFICE.

JOHN B. GLOWACKI, OF CHICAGO, ILLINOIS.

ADJUSTABLE RESILIENT NONSKID CRUTCH.

Application filed March 12, 1923. Serial No. 624,315.

To all whom it may concern:

Be it known that I, JOHN B. GLOWACKI, a citizen of the United States, and a resident of the city of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in an Adjustable Resilient Nonskid Crutch; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the numerals of reference marked thereon, which form a part of this specification.

This invention is a continuation in part of my application Serial No. 366,865, filed March 18, 1920, and in part a continuation of my application Serial No. 366,866, filed the same date.

This invention relates to crutches of the type in which the foot of the crutch is resiliently connected to the crutch proper so that the connections will serve as a shock absorber. In crutches of this type the foot is ordinarily connected to the crutch by telescoping parts.

It is an object of this invention to so design the resilient connection and the telescopic housings for the same that the whole may be very quickly and inexpensively manufactured and easily assembled.

It is a further object of my invention to provide a graduated resilient resistance to the weight put upon the crutch so that a progressively increasing stiffness will result as the telescoping parts are forced together.

It is a further object of my invention to provide a removable prong in the foot of the crutch and a rubber tip which serves the double purpose of giving good frictional engagement with the ground and also holding the prong in place.

It is a further object of this invention to provide a protruding means for the prong of less resistance than the means which prevents telescoping of the parts of the housing, so that as the weight is put upon the crutch the prong will be driven inward and afterwards the telescoping parts will be moved inward.

It is a further object of this invention to provide a spacing block near the upper end of the housing and to utilize the means that fastens the spacing block in place for securing the housing to the crutch. The upper member of the housing may even itself form the spacing block.

Other and further important objects of this invention will be apparent from the disclosures in the specification and the accompanying drawings.

The invention (in a preferred form) is illustrated in the drawings and hereinafter more fully described.

On the drawings:

Figure 1 is a side view of the whole crutch.

Figure 2 is a view partly in vertical section of the lower part of the crutch.

Figure 3 is a view partly in section and partly disassembled of the contents of the lowermost parts of the housing.

Figure 4 is a view upon an enlarged scale partly in section of the lowermost part of the crutch with the uppermost part of the housing omitted.

Figure 5 is a similar view with the rubber tip omitted and the uppermost part of the housing shown in section.

Figure 6 is a view showing in section the uppermost part of the housing and in elevation the part of the housing next to it.

Figure 7 is a view upon an enlarged scale of the upper part of Figure 2.

Figure 8 is a section upon the line 8—8 of Figure 7.

Figure 9 is a section upon the line 9—9 of Figure 7.

Figure 10 is a vertical section through a modified form.

Figure 11 is a section upon the line 11—11 of Figure 10.

Figure 12 is a section upon the line 12—12 of Figure 10.

Figure 13 is a section of the lower end of the crutch showing a modified form of tip.

Figure 14 is an elevation of said tip.

As shown on the drawings:

The crutch 20 has two uprights 21. Between the legs 21 a spacing block 22 is inserted which is wedge-shaped in order to give the lower ends of the uprights the proper direction with respect to one another. These ends are surrounded by a tubular member 23. At the outside of each of the uprights 21 the housing 23 has an ear 24 which extends to about the height of the spacing block 22. A bolt 25 goes through these two ears 24, and two legs 21 and the spacing block 22 thus securing these parts together. The housing 23 is further secured to the ends of the legs 21 by screws 26 which go through the wall of the tubular part of

the housing 23 and enter the portion of the legs 21 which are parallel and in contact with one another.

These portions of the legs 21 form a cylindrical lower end to the wooden part of the crutch. They are hollowed out as shown at 27 to provide room for the upper end of a rod 28. This rod is threaded for about half of its length, beginning at the upper end. Upon the threaded part of this rod there travels a nut 29 whose outer edge is circular to fit the interior of the housing 23. The diameter of the nut, however, is not sufficient to extend to this housing but there is between them a tube 30 which telescopically fits the housing 23. The nut 29 has around its periphery a groove 31. The tubes 23 and 30 are fastened to the nut 29 by having portions forced into the groove 31. This may be done by striking the metal inward with a prick punch or other device at a number of points around the circumference as indicated at 32 in Figure 1 or the whole circumference may be depressed by a spinning or other operation. The metal shown at 32 in Figure 5 as forced into the groove 31 represents either of these ways of fastening the tubes to the nut. Preferably the inner tube 30 is additionally secured to the nut by having its upper end turned over the upper face of the nut by spinning or other means, as is shown at 33. Relative motion between the housing 23 and the tube 30 is prevented by the punch marks or spun depression 32.

This relative motion is further prevented by a shoulder 34 upon the sleeve 30 in contact with the lower edge of the tubular housing 23. The tube 30 extends below the shoulder 34 farther than from the nut 29 to this shoulder which, in the adjustment of the crutch illustrated in Figure 2, makes the tube 30 cover considerably more than half of a third tube 35.

For the purpose of securing the tube 35 to the rod 28, the unthreaded part of this rod is provided with two plates or washers 36 and 40 secured thereto in any desirable way, for example by brazing. The upper one 36 of these washers is situated at the upper end of the tube 35 and this tube is secured thereto by punching or spinning as indicated at 37, the plate 36 being provided with a groove 38 for this purpose. Preferably also the upper end of the tube 35 is turned over against the upper side of the plate 36 as indicated at 39. As illustrated in Figure 2, this plate 36 and the indentations of the tube 35 for fastening it thereto are opposite the shoulder 34, but as the device is adjusted this position will change and these parts are not necessarily opposite one another. The plate 36 is at the lower end of the threaded part of the rod 28.

The plate 40 is secured to the unthreaded

part of the rod 28 at about the middle thereof by brazing or any other desired means. Its circumference fits the inner diameter of the tube 35 and the tube 35 is fastened to the plate 40 by punched places 41 or by being spun as already explained. Thus the tube 35 is secured to the rod 28 at two well separated points so that the tube and rod are effectively held in line. The tube 35 co-operates with the nut 29 to afford two well separated bearings for keeping the sleeve 30 in line with the rod 28, although only the upper one of these bearings is a fastening, because during the adjustment of the parts the tube 35 rotates in the tube 30. At the lower end of the tube 35 it is provided with a milled thimble or ring 42 for convenience in rotating it.

The lower end of the tube 35 is occupied by a slidable housing 43 which constitutes a foot piece protruding from the bottom of the crutch. This housing 43 extends up over the lowest end of the rod 28. The upper end of the slidable sleeve 43 is secured to a washer 44 by means of indentations 45 or by spinning, the plate 44 being provided with a circumferential groove for this purpose similar to the grooves in the other plates already described. This plate 44 is not, however, secured to the rod 28 but is slidable thereon. The lower end of the rod 28 is provided with a flange or head 46, which is of the same diameter as the plate 44 and occupies the whole cross-section of the interior of the sliding sleeve 43 at the upper end thereof.

A spring 47 bears against the under face of the head 46. The other end of this spring bears against a grooved plate 48, similar to the plates already described except that it needs no central opening, for the rod 28 does not extend down as far as this plate. The plate 48 is secured to the sleeve 43 by punch marks 49 or, if desired, by spinning. Against the under face of the plate 48 is a second spring 50 which is both shorter and lighter than the spring 47. The lower end of the spring 50 contacts with a washer 51 which is not supplied with any circumferential groove and therefore is thinner than the plates which have such grooves.

Under the washer 51 is a block 52 which is provided with a circumferential groove 53. This groove co-operates with punch marks 54 or with a spun place by which the block 52 is secured in the lower end of the sleeve 43. The block 52 has a central opening 55. Near the top of the block this opening is contracted to afford a shoulder 56. The hole in the washer 51 is smaller than the contracted part of the hole 55.

A prong 57 with a pointed end 58 is provided for the bottom of the crutch. The shank of this prong is of a size to fit the contracted part of the hole 55. The shank has a flange 59 of a diameter to fit the larger

part of the hole 55, and the upper end of the prong has a reduced portion 60 to enter the hole in the washer 51. This reduced portion affords a shoulder 61 which will contact with the washer 51 and move the same upward when the prong is forced upward.

The lower end of the tube 43 is provided with a number of outstanding ribs or shoulders 62 for the purpose of securing a rubber tip 64 of the usual thimble form. The interior of the rubber tip is provided with grooves 63 to co-operate with the ribs 62 to hold the tip in place. The bottom of the tip 64 extends beneath the lower end of the block 52 and by contacting with the flange 59 prevents the prong 57 from falling out. A hole 65 through the bottom of the rubber tip provides for the protrusion of the prong.

In the modification illustrated in Figure 10, no wooden spacing block is used, but the upper sleeve of the housing 30', corresponding to both the sleeves 23 and 30 in the modification first described, is continued upward between instead of outside the wooden uprights 21 and forms a tube 70 which is secured to the nut 29' corresponding to the nut 29 in the first-described modification. The upper end of this tube is closed as shown at 71, which adds to its strength so that it affords a good foundation for the fastening of the lower end of the wooden uprights 21.

This fastening is afforded by means of screw threaded bosses 72 which are fastened to the tube 70 by swedging or in any other desired way. These bosses project inward and so do not add to the room occupied by the upper part of the tube 70. Bolts 73, preferably having long unthreaded shafts and supplied with the usual washers, co-operate with the threaded bosses 72 to secure the uprights 21 to the tube 70 at this point. A second pair of bosses 75 are secured in a similar way to the lower part 30' of the tube 70, but these bosses are made to project outward so that they do not interfere with the motion of the tube 35', which like the tube 35 is secured to the rod 28 by fastenings 41 and 37. The bosses 75 project through the wood of the lower end of the uprights 21. At this part of the uprights they have been cut away to be fitted to the circular tube between them so that their cross section is crescent-shaped, and the bosses 75 go through the thickest part of the crescent, holes in the wood being provided to receive them. Screws 76 co-operate with these bosses in the usual way and secure the ends of the uprights 21 in place. Washers of course are provided as usual. In the lower end of the tube 35' is a tube 43 similar to that already described which is provided with a tip 64 or, if preferred a tip and a prong.

In the modified arrangement for the lower end of the crutch shown in Figures 13 and 14, the tube 43 has in place of the prong 57 a

block of rubber 80 provided with a cylindrical part 81 adapted to fit the larger part of the hole 55 as far as the shoulder 56, leaving the smaller part of the hole unoccupied. The block of rubber 80 has a flange 82 which extends as far as the outer surface of the sleeve 43. Preferably also the rubber has a downwardly projecting peg 83 to assist in preventing slipping.

In the assembly of the device the head 46 is secured on the rod 28 and the slidable plate 44 is then placed on the rod. The sleeve or foot piece 43 is then slipped over the head 46 and fastened to the sliding plate 44. The spring 47, plate 48, spring 50, washer 51 and block 53 are then put into the tube 43 in the order named and the plate 48 and block 53 fastened to it. Next the plates 40 and 36 are secured on the rod in the order named. Next the tube 35 has the ring 42 forced onto its lower end. It is then slipped over the top of the rod 28 and secured in place by fastening it to the plates 40 and 36. The tube 23 is placed outside of the tube 30 and the two are secured to the nut 29 by punching or spinning the two thicknesses of metal at once. The tube 23, with the tube 30, and nut 29, are then secured to the crutch by the fastenings 26 and 25. The tube 35 and all the parts within it are now put in place by running the end of the rod 28 up the tube 30 until it meets the nut 29 and then rotating it by turning the milled ring 42. The spike 57 is then inserted and the tip 65 added over it.

In the modification illustrated in Figure 10 there is no tube strictly corresponding to the tube 30. The lower end of the tube 70 performs both the functions of the tube 23 and the tube 30. Except for the way of connecting the tube 70 to the crutch, the method of assembly is the same.

In the operation of the device, when the user puts his weight upon the crutch the upward thrust of the ground first drives the prong 57 upward lifting the washer 51 and compressing the spring 50. When this spring has been compressed enough so that the thrust therein is sufficient to overcome the stronger spring 47, the member 48 moves upward carrying with it the tube 43 which telescopes within the tube 35 and causes the plate 44 to travel along the rod 28. If the strength of the spring 50 is not sufficient to overcome the stiffness of the spring 47 before the prong 57 has traveled upward far enough to cause the flange 59 to contact the shoulder 56, the upward movement of the tube 43 in response to the pressure of the flange 59 against the shoulder 56 will contract the spring 47 without any further compression of the spring 50.

When the tube 43 moves upward and the plate 44 connected to its upper end travels along the rod 28, the compression of the

spring 47 is between the head 46 and the plate 48 which is rigid with the tube 43, but the height of the rod 28 relative to the crutch is not altered by the action of the springs, and the adjustment of this height does not change the tension of the springs. When it is desired to adjust the position of the rod 28 for the sake of affecting the length of the crutch, the milled ring 42 is turned which rotates the tube 35 and so rotates the rod 28 causing it to travel through the nut 29 and so move the tube 35 and the tube 43 lengthwise relative to the crutch.

The operation of the modified form illustrated in Figure 10 is so similar that it need not be described in detail.

I am aware that numerous details of construction may be varied through a wide range without departing from the principles of this invention, and I therefore do not purpose limiting the patent granted otherwise than necessitated by the prior art.

I claim as my invention:

1. A metal tube, a threaded shaft within said tube, collars on said shaft of substantially the same diameter as the interior of the tube, a groove on the periphery of each collar, and a depression in the wall of the tube at each collar whereby the material of the wall extends into the grooves and the collars are held in place, a second tube, a nut in said second tube, a groove in the periphery of said nut, and a depression in the wall of said second tube whereby the material of said wall extends into said tube and said nut is held in place, the threads on said shaft co-operating with said nut to cause the tubes to telescope when one is rotated relative to the other.

2. In a crutch, two downwardly converging supporting members a tube between said members, a resilient cushioning device mounted in said tube, said tube having apertures in the walls thereof, internally threaded bosses, one for each aperture, and bolts co-operating with said bosses to secure the tube to the supporting members, the upper bosses projecting inward from the wall of said tube and the lower bosses projecting outward from the wall of said tube.

3. In a crutch, two supporting members, a tube between said members, a resilient cushioning mechanism in the lower part of said tube, a length adjusting mechanism in the upper part of said tube, bosses on each of said parts of the tube, and bolts through the supporting members co-operating with said bosses, the bosses in the upper part of said tube extending inward and the bosses

in the lower part of said tube extending outward.

4. In a device of the class described, a prong, a flange on said prong, a tubular footpiece telescopically mounted in a crutch, a stopper block at the lower end of said tube having a hole therein adapted to receive said flange, a shoulder in said hole against which said flange will stop, a washer in said foot-piece above said stopper block, a prolongation on said prong extending through said washer whereby a shoulder is provided on said prong contacting with said washer, a plate secured in said tubular foot-piece, a spring between said plate and said washer, a second spring within said foot-piece on the opposite side of said plate, a head within said foot-piece contacting with the end of said last-named spring farthest from said plate, a rod secured to said head and adjustably mounted in said crutch, and a plate slidably mounted on said rod and secured to the upper end of said tubular foot-piece.

5. A crutch including two upright wooden members, a fastening device for the lower ends of said members including a tubular part, a nut secured in said tubular part, a rod having threaded engagement with said nut, a tubular sleeve telescoping said tubular part and secured to said rod at two points spaced apart and having at its lower end a milled ring for rotation of said rod, a plate slidably mounted on said rod below the lower one of said securing means, a telescoping foot-piece secured to said plate, and means within said foot piece for resiliently holding it in protruded position.

6. A crutch, a fastening device at the lower end of the wooden part of said crutch including a tubular metallic portion, an adjustable extension partly within said metallic portion including a tube provided at its outer end with a milled ring for rotation thereof to perform said adjustment, a tubular foot-piece telescopically projecting from said milled end of the tube and resiliently held in protruding position, ribs surrounding said foot piece, a rubber cap over the lower end of said foot piece, said cap having recesses co-operating with said ribs to hold the cap in position, a prong projecting from said foot piece through the cap, and resilient means more yieldable than the first named resilient means for holding said prong in protruding position.

In testimony whereof I have hereunto subscribed my name.

JOHN B. GLOWACKI.