June 11, 1968 D. T. SWANN 3,387,618

WALKING AID APPLIANCES

Filed April 27, 1967 3 Sheets-Sheet 1

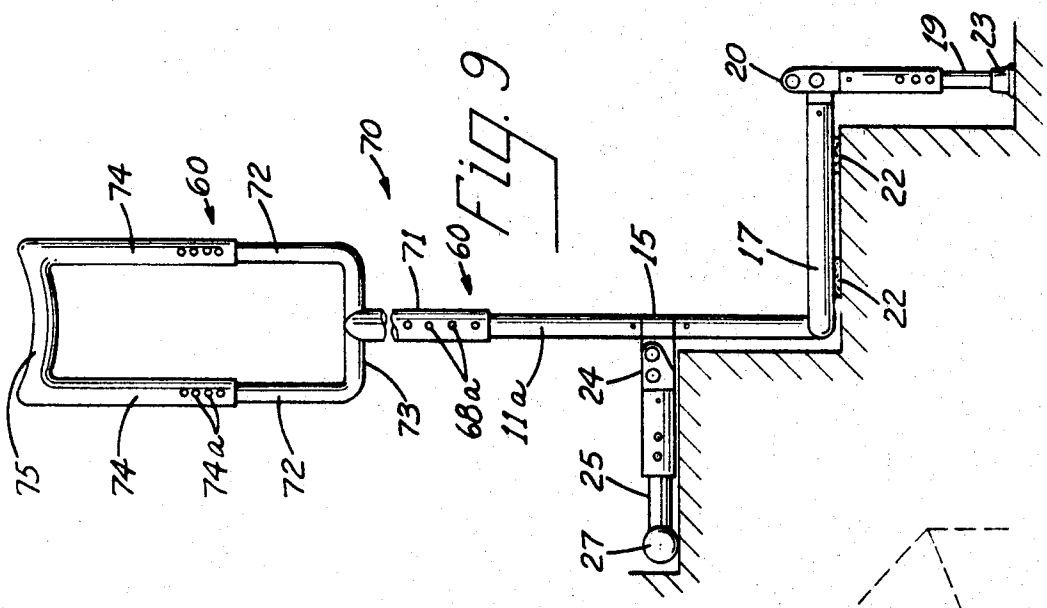



Fig. 9

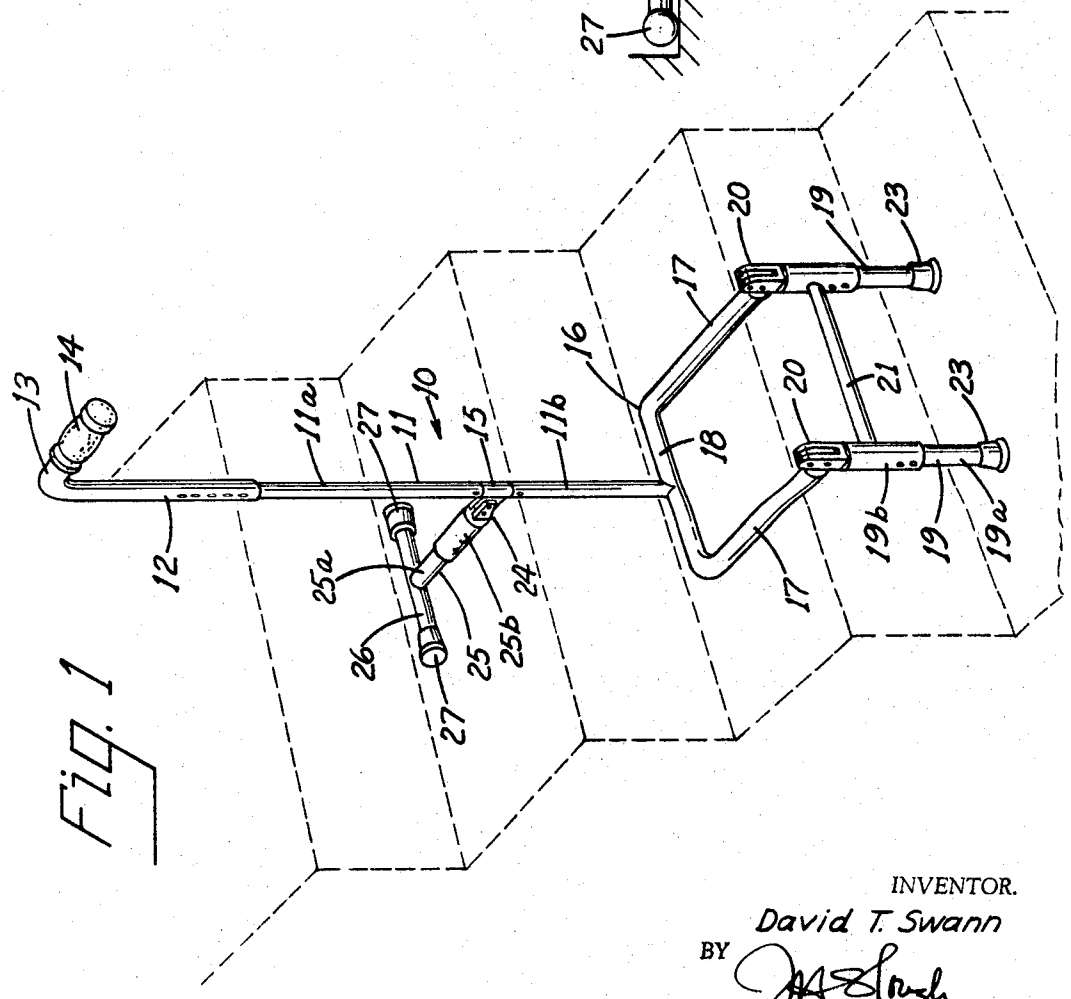



Fig. 1

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WALKING AID APPLIANCES

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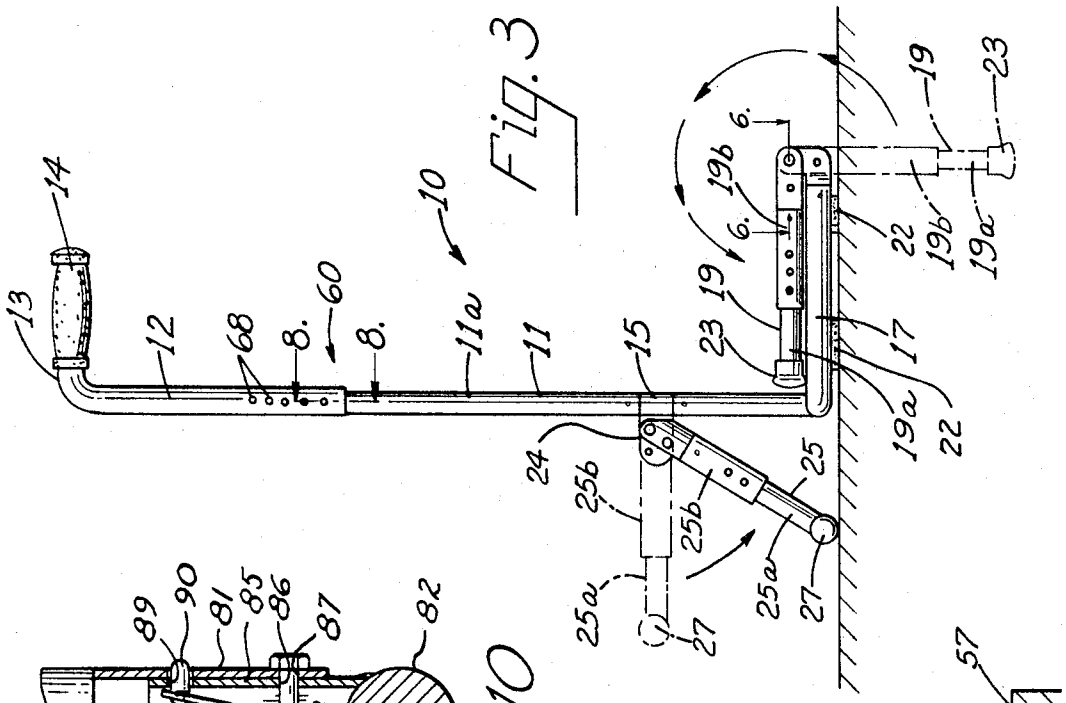


Fig. 3

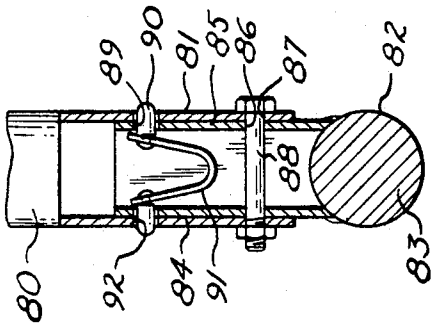


Fig. 10



Fig. 2

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WALKING AID APPLIANCES

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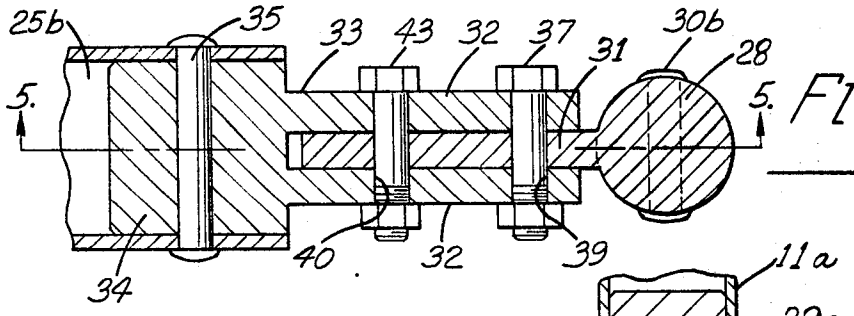



Fig. 4

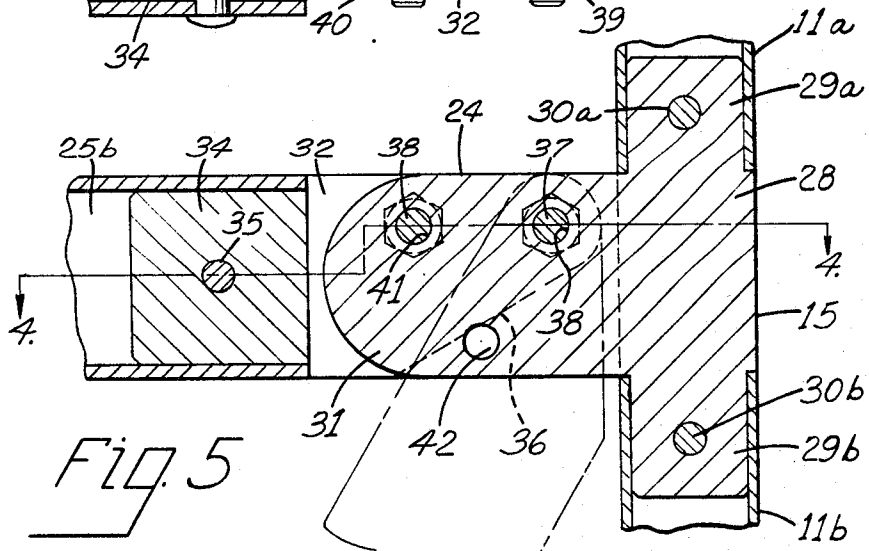



Fig. 5

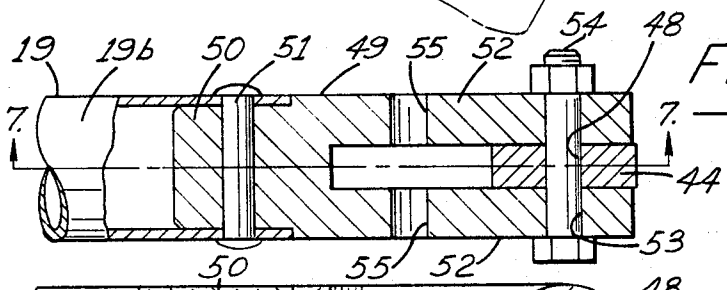



Fig. 6

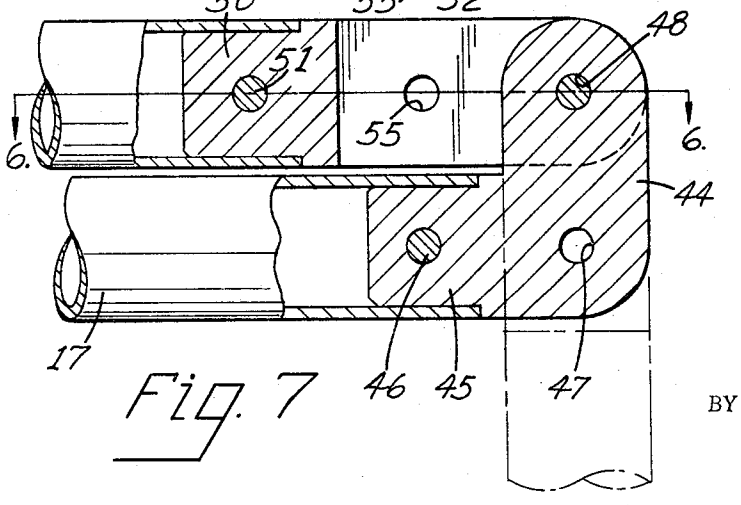



Fig. 7

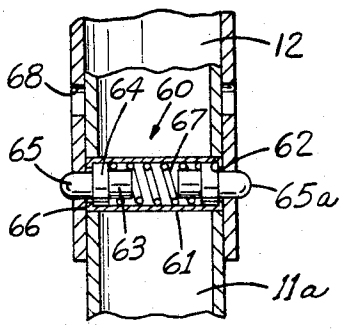



Fig. 8

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3,387,618

# WALKING AID APPLIANCES

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7 Claims. (Cl. 135—45)

## ABSTRACT OF THE DISCLOSURE

There is disclosed herein a walking aid appliance for use by the disabled in walking on either flat surfaces or stairways. The appliance disclosed has an upright portion for grasping by the user and means for contacting three adjacent stairs treads simultaneously when ascending and descending stairs, said means being adjustable to a position for contacting a flat surface only.

This invention relates to walking aid appliances such as canes, crutches, and the like and relates particularly to a cane or crutch adapted for use by the disabled in ascending and descending stairways as well as walking on flat surfaces.

Climbing and descending conventional stairways found in public buildings, institutions, and homes presents a particularly hazardous problem for certain handicapped people who must have some firmly seated or anchored object to hold onto. Many stairways are constructed with a handrail only on one side thereof or are of such width as to make it impossible for the average person to reach handrails disposed on both sides of the stairway. Conventional canes and walkers are not adapted for use on stairways although they may be quite satisfactory on level surfaces. The present invention concerns a solution to the problem of providing a cane or crutch for use on stairways and has for its primary object the provision of such a cane or crutch.

Another object of this invention is to provide a cane or crutch as set forth above which is also adapted for use on a flat surface or floor.

Another object of the invention is to provide such a cane or crutch which provides bracing against forward, rearward, and lateral tilting of the cane or crutch regardless of whether it is used on a flat surface or on a stairway.

Yet another object of the invention is to provide a cane or crutch having the above features and characteristics which, when adapted for use on a stairway, provides means for contacting three adjacent steps at the same time.

Still another object of the invention is to provide a cane or crutch as set forth above which is fully adjustable to the height of the user and the height of a stairway riser.

Other objects of the invention and a number of its advantages will be readily understood from the following description of the invention and the accompanying drawings, in which:

FIGURE 1 is a perspective view of the invention embodied in the form of a cane, said cane being shown in its adjusted position for use on a stairway;

FIGURE 2 is a side plan view of the cane shown in FIGURE 1;

FIGURE 3 is a side plan view of the cane similar to



that shown in FIGURE 2 but showing the parts thereof in an adjusted position for use on a flat surface;

FIGURE 4 is a horizontal section through a pivot means of the cane taken along the line 4—4 of either FIGURE 2 or FIGURE 5;

FIGURE 5 is a longitudinal section taken along the line 5—5 of FIGURE 4;

FIGURE 6 is a horizontal section through another pivot means of the cane taken along the line 6—6 of either FIGURE 3 or FIGURE 7;

FIGURE 7 is a longitudinal section taken along the line 7—7 of FIGURE 6;

FIGURE 8 is a vertical section taken along the line 8—8 of FIGURE 3;

FIGURE 9 is a side elevation similar to FIGURE 2 showing the present invention embodied in the form of a crutch; and

FIGURE 10 is a view similar to FIGURE 4 showing an alternate construction adapted for use at either the pivot means of FIGURES 4 and 5 or the pivot means of FIGURES 6 and 7.

Referring now to the drawings in all of which like parts are designated by like reference numerals, the cane of FIGURES 1–3 is generally indicated at **10** and comprises a vertical shaft **11** having a vertically slidable sleeve portion **12** telescoped over the upper end portion of said vertical shaft. The sleeve portion **12** has a right angularly bent handle **13** which carries a suitable grip **14** made of rubber, plastic or the like. The cane **10** as herein disclosed is preferably of sturdy, metallic construction, both the vertical shaft **11** and the sleeve portion **12** being tubular in form.

The vertical shaft **11**, as herein illustrated, comprises two aligned sections, an upper section **11***a* and a lower section **11***b*. The sections **11***a* and **11***b* are rigidly connected to each other by a connector member **15** which will be hereinlater fully described in detail. The lower end **11***b* of the shaft section **11** is welded or otherwise suitably secured to a platform means in the form of a yoke member **16** having rearwardly directed, horizontally disposed arms **17** connected at their forward ends by a crossarm **18**. The lower end **11***b* of the shaft section **11** is secured centrally of the crossarm **18** at right angles thereto and at right angles to the arms **17**, whereby said crossarm and said arms **17** provide a firm base for the upright shaft **11**, bracing the same against lateral tilting in either direction or rearward tilting. It will be noted that the handle **13** is also directed rearwardly whereby pressure applied downwardly thereon would naturally tend to tilt said shaft in a rearward direction.

The rearwardly directed ends of the arms **17** carry bracing means in the form of short legs **19** connected thereto by means of pivot members **20**. Each leg **19** comprises a lower section **19***a* which is slidably telescoped into an upper sleeve section **19***b*. The sleeve sections **19***b* are transversely connected together by a horizontal brace **21** whereby said legs **19** pivot as a unit about the pivot members **20** between the lowered position of FIGURES 1 and 2 and the folded position of FIGURE 3. FIGURE 3 illustrates the lowered position in broken line and the folded position in full line with arrows indicating the direction of pivot for folding said legs. In the folded position, the legs **19** are disposed directly above and substantially parallel with the arms **17**. With respect to FIGURES 2 and 3, it will be further noted that the lower sur-

faces of the arms 17 may be provided with suitable pads or bumpers 22 which are preferably made of rubber or other resilient material to absorb shock when the arms 17 strike a solid, horizontal surface and also to minimize the possibility of skidding or slipping of said arms. The lower ends of the legs 19 are also preferably provided with suitable resilient tips as indicated at 23.

The connector member 15 carries a bearing portion 31 of a pivot member 24 (FIGURES 4 and 5) which said pivot member, in turn, carries bearing means in the form of an upper leg 25 comprising an outer section 25*a* and a sleeve section 25*b*. The leg 25 projects forwardly of the vertical shaft 11 and carries a crossarm 26 at its forwardly directed end. The crossarm 26 is rigidly secured to the outer section 25*a* in any suitable manner; and the distal ends of said crossarm 26 are preferably provided with suitable resilient tips 27. As shown in FIGURES 1 and 2, the upper leg 25 is disposable in a horizontal plane with the crossarm 26 also disposed in a horizontal plane, and as shown in FIGURE 3, said leg 25 is pivotable downwardly from the broken-line to the full-line position whereby the crossarm 26 is disposed at substantially the same level as the rearwardly directed arms 17.

The pivot member 24 is so constructed that the upper leg 25 can be locked in either the broken-line position or the full-line position of FIGURE 3. The connector member 15 and associated pivot member 24 are detailed in FIGURES 4 and 5 wherein it is shown that said connector member comprises a cylindrical body portion 28 of the same diameter as the tubular sections 11*a* and 11*b*, said body portion having longitudinally upwardly and downwardly directed, diametrically reduced shank portions 29*a* and 29*b* adapted to closely interfit the lower and upper ends, respectively, of said sections 11*a* and 11*b*. Rivets 30*a* and 30*b* project through suitably aligned openings in the sections 11*a* and 11*b* and their associated shank portions 29*a* and 29*b* whereby said sections 11*a* and 11*b* are securely fastened to the connector member 15 and are rigidly connected with respect to each other.

The bearing portion 31 of the connector member 15 projects forwardly and is relatively thin in a transverse direction whereby it is adapted to project between arms 32 of a clevis 33. Said clevis has a shank 34 which is disposed within the sleeve section 25*b* of the upper leg 25, said shank being securely fixed in place by a rivet 35 projecting through suitably aligned openings in said shank and the surrounding portion of said sleeve section.

As shown in FIGURE 5, the arms 32 of clevis 33 have upwardly and forwardly directed tapers 36 on their bottom surfaces and are pivotally secured to the bearing portion 31 adjacent to their upper edges and forwardly projecting ends by means of a nut-and-bolt assembly 37 the bolt of which projects through suitably aligned openings 38 and 39 in the bearing portion 31 and the arms 32, respectively. The nut-and-bolt assembly 37 affords the pivot by means of which the upper leg 25 is pivotable between the broken- and full-line positions of FIGURE 3, and the tapers 36 afford clearance at the underside of the arms 32 whereby said leg 25 can pivot downwardly as shown in detail in FIGURE 5.

The arms 32 are also provided with aligned openings 40 which are spaced inwardly from the forwardly directed ends of said arms and adapted to be aligned with either an upper opening 41 or a lower opening 42 in the bearing portion 31, the openings 41 and 42 being disposed the same radial distance from the opening 38. When the leg 25 is in the forwardly projecting, horizontal position, the aligned openings 40 of the arms 32 are aligned with the opening 41 of the bearing portion 31 and adapted to receive a nut-and-bolt assembly 43 whereby said leg 25 is rigidly maintained in said horizontal position. In the downwardly angled position, the openings 40 of said arms are aligned with the opening 42 in bearing portion 31 whereby said leg 25 may be rigidly fixed in the full-line position of FIGURE 3.



The legs 19 carried by the arms 17 of the yoke member 16 may also be locked in their downwardly projecting position of FIGURES 1 and 2. The arms 17 are preferably of tubular construction, the ends of which carry bearing portions 44 as detailed in FIGURES 6 and 7. Each bearing portion 44 is preferably flat, vertically disposed, and projects upwardly above the level of its associated arm 17, the lower portion thereof having a shank 45 secured to said associated arm by a rivet 46. Each bearing portion 44 is provided with an opening 47 disposed substantially at the centerline of its associated arm 17 and a second opening 48 spaced vertically upwardly above said first mentioned opening. Each sleeve portion 19*b* of the legs 19 carries a clevis 49 having a shank 50 which projects into said sleeve section 19*b*. A rivet 51 secures the shank 50 in place, the clevis 49 having longitudinally projecting arms 52 suitably apertured at 53 to receive a nut-and-bolt assembly 54 the bolt of which projects through said apertures 53 and the aforementioned opening 48 of the bearing portion 44. The arms 52 of each clevis 49 are also provided with aligned apertures 55 which are disposed on the same radius as the associated aperture 47 of the bearing portion 44 whereby when the legs 19 are pivoted downwardly to the adjusted position of FIGURES 1 and 2, said legs can be securely fixed in position by suitable nut-and-bolt assemlies such as that shown at 56 in FIGURE 2. Upon removal of the nut-and-bolt assemblies 56, the legs 19 can be readily folded upwardly to the position shown in FIGURE 3 and detailed in FIGURE 7.

FIGURE 10 shows a sectional detail of an alternate construction of the pivot member 24 of the upper legs 25, it being understood that the same general modification can be made to the pivot members 20 of the legs 19. In the alternate construction, the sleeve section of the upper leg is shown at 80 and is provided with rearwardly projecting, laterally spaced, generally flat arms 81 which may be formed out of the metal of the tubing or separately fastened thereto. A modified connector member for the vertical shaft 11 is shown at 82 and comprises a body portion 83 similar in form to the body portion 28 of the connector member 15. Said body portion 83 carries a forwardly projecting bearing portion 84 constructed of rectangular hollow tubing having flat, parallel side walls 85 coaxially apertured at 86. The arms 81 overlap the outer sides of the side walls 85 and are coaxially apertured at 87, said apertures 87 being aligned with the apertures 86 whereby a nut-and-bolt assembly 88 is projected therethrough to provide a pivot similar to the pivot provided by the nut-and-bolt assembly 37 of FIGURE 4.

The side walls 85 of the bearing portion 84 are provided with aligned openings 89 disposed radially outwardly from the nut-and-bolt assembly 88 and adapted to slidably receive a pair of bullet shaped detents 90 which are spring biased outwardly from within said bearing portion by a U-shaped leaf spring 91. The arms 81 have aligned openings 92 therein adapted to receive the outwardly projecting detents 90 to lock the upper leg 25 in one adjusted position. It will be readily understood that a second pair of openings arcuately spaced from the openings 92 are provided in the arms 81 whereby the upper leg 25 is adjustable to the two positions shown in FIGURE 3 by depressing the detents 90, pivoting the said upper leg to the other position, and allowing said detents to snap outwardly at said other position. It is anticipated that this same type of detent retaining mechanism may be readily used at the pivot members 20.

In use of the cane 10 of this invention for ascending and descending stairways, the upper leg 25 is secured in the horizontal position, and the legs 19 are secured in the lower position as illustrated in FIGURES 1 and 2. The cane is so positioned as the user progresses upwardly or downwardly of the stairway that the horizontal arms 17 are disposed flatwise on one tread 57 of the stairway 58 with the upper leg 25 overlying and paralled with the next tread disposed above said first-mentioned tread and

the lower ends of the legs **19** resting upon the next tread disposed immediately below said first mentioned tread. The cane is thus given stability against sidewise tilting by the laterally spaced arms **17** and by the crossarm **26** while at the same time it is prevented from tilting forwardly by the leg **25** and rearwardly by the legs **19**. As the user progresses upwardly or downwardly of the stairway, the cane is progressively moved upwardly or downwardly a step at a time, always simultaneously contacting three adjacent treads **57**. In this manner, the user has a firm, nontilting support with each step he takes until he has completely ascended or descended the stairway.

When it is desired to use the cane on a flat surface such as a floor, the leg **25** and the legs **19** are pivoted to the full-line positions shown in FIGURE 3, the leg **25** being locked into position whereby it prevents forward tilting of the cane. Rearward tilting and lateral tilting are, of course, prevented by the laterally spaced arms **17** and the crossarm **18**.

It is preferred that the vertical shaft **11** of the cane **10** be vertically adjustable and that the legs **25** and **19** be longitudinally adjustable to accommodate treads of different widths and risers of different heights. FIGURE 8 illustrates in detail the adjustment means associated with the vertical shaft **11**, and it will be understood that this means is identical with like means associated with said legs.

In FIGURE 8, a detent mechanism **60** is carried by the upper section **11***a*, said detent mechanism comprising a tubular housing **61** disposed transversely through suitable, diametrically opposed openings **62** in the walls of said section **11***a*. The housing **61** carries a pair of laterally outwardly-based plungers **63** having radially projecting flanges **64** and laterally outwardly projecting, bullet-shaped detent portions **65**. The ends of the housing **61** are provided with interned lips or flanges **66** which radially overlap the flanges **64** of the plungers **63** thereby retaining said plungers captively within said housing. A coil spring **67** is disposed between the flanges **64** of the plungers **63** and biases said plungers laterally, outwardly whereby the detent portions **65** project outwardly beyond the outer periphery of the shaft section **11***a*.

The sleeve portion **12** is provided with a plurality of pairs of diametrically aligned openings **68** spaced longitudinally along said sleeve portion whereby the detent portions **65** can project outwardly into suitable aligned openings in said sleeve portion at different levels. By manually pressing the detent portions **65** inwardly and exerting longitudinal pressure on the sleeve portion **12**, said sleeve portion can be moved upwardly or downwardly to align any selected pair of the openings **68** with the detent mechanism **60**, the detent portions **65** automatically snapping outwardly into a selected pair of openings **68** upon alignment therewith. It will be noted that the outer ends of said detent portions **65**, as indicated at **65***a*, are rounded whereby when they are pressed inwardly to the level of the outer periphery of the sleeve **12**, longitudinal movement of said sleeves will cam them all the way into the outer periphery of the section **11***a*.

It will be readily understood that in the manner set forth above, the legs **19** and **25** are adjustably extendible and retractable.

FIGURE 9 illustrates the present invention embodied in the form of a crutch. The crutch is generally indicated at **70** and is identical in all respects with the cane **10** except that instead of the sleeve portion **12** it has a modified sleeves portion **71**. The sleeve portion **71** is preferably somewhat longer than the sleeve portion **12** and is surmounted by a U-shaped member having upwardly projecting arms **72** spaced apart in the forward and rearward direction and connected at their lower ends by a horizontal member **73**. The upper end of the sleeve portion **71** is preferably welded or otherwise suitably secured centrally of the horizontal member **73**, and said arms **72** are telescoped within tubular arms **74** connected at their upper ends by a curved arm rest portion **75**. A detent mechanism **60** of the type hereinbefore described is carried by the upper shaft section **11***a* as in FIGURES 1–3 and 8 for selective engagement with suitable apertures **68***a* of the sleeve portion **71**. In a similar manner, detent mechanisms are carried by both of the arms **72** for selective engagement with suitable apertures **74***a* of the tubular arms **74**.

The appliance of this invention may, of course, be readily changed from a cane to a crutch by entirely removing the sleeve portion **12** and replacing it with a sleeve portion **71** and associated parts.

From the foregoing it will be readily seen that the present invention provides a walking aid appliance which is adapted for use both as a cane and crutch and both on a level surface and for ascending and descending stairways. Means are provided for quickly and easily modifying the appliance for its different uses, and in either form of the invention, the cane or crutch is readily adjustable to meet the needs of persons of different sizes. It will be further understood that many changes in the details of the invention as herein described and illustrated may be made without, however, departing from the spirit thereof or the scope of the appended claims.

What I claim is:

**1.** A walking aid appliance for use by the disabled in walking on flat surfaces and stairways, said appliance comprising a generally vertical support member; horizontal platform means carried at the lower end of said support member, said support member being rigidly secured adjacent to a forward edge of said platform means; lower bracing means pivotally mounted adjacent to a rearward edge of said platform means, said lower bracing means being pivotable between a downwardly directed position and a folded position on top of and parallel with said platform means; upper bracing means pivotally mounted to said support member above said platform means, said upper bracing means being pivotable between a substantially horizontal, forwardly projecting position and a forwardly and downwardly angled position, the lower end of said upper bracing means being disposed at substantially the level of said platform means in said angled position; means for locking said lower bracing means in said downwardly directed position; and means for selectively locking said upper bracing means in said forwardly projecting and angled positions, said appliance adapted for use on a level surface when said upper bracing is in said angled position and said lower bracing is in said folded position, said appliance adapted for use on a stairway when said upper bracing is in said forwardly projecting position and said lower bracing is in said downwardly directed position whereby when said platform means is on one tread of a stairway, said upper bracing overlies the tread thereabove and said lower bracing rests on the tread therebelow.

**2.** A walking aid appliance as set forth in claim **1**; said support being of elongated, rodlike construction; said platform means comprising a laterally directed, elongated, horizontal cross member carried at the lower end of said support member, said support member being rigidly secured to said cross member intermediate the ends of said cross member, and a pair of generally rearwardly directed, horizontal arms rigidly secured to the ends of said cross member; said lower bracing means comprising lower legs, pivotally mounted to the rearward ends of said arms; and said upper bracing means comprising an upper leg pivotally mounted to the front of said support.

**3.** A walking aid appliance as set forth in claim **2**; a second elongated cross member disposed parallel with said first mentioned cross member and carried by the distal end of said upper leg, said upper leg being rigidly secured to said second cross member intermediate the ends of said second cross member.

**4.** A walking aid appliance as set forth in claim **3**;

means carried by the upper end of said support for contact by a disabled person to aid him in walking; and said support having means for longitudinal adjustment thereof to adapt said appliance for use by persons of different size.

5. A walking aid appliance as set forth in claim 4; said lower legs having means for longitudinal adjustment thereof to adapt said legs to stairways having different height risers; and said upper leg having means for longitudinal adjustment thereof for adjusting said upper leg with respect to the floor in said angled position.

6. A walking aid appliance as set forth in claim 4;



said means carried by the upper end of said support being removable whereby it can be replaced with walking aid means of different types.

7. A walking aid appliance as set forth in claim 2; means rigidly connecting said lower legs to each other whereby they pivot as a unit.

No references cited.

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