Dec. 15, 1953 L. E. BRONSON 2,662,680

STEPLADDER

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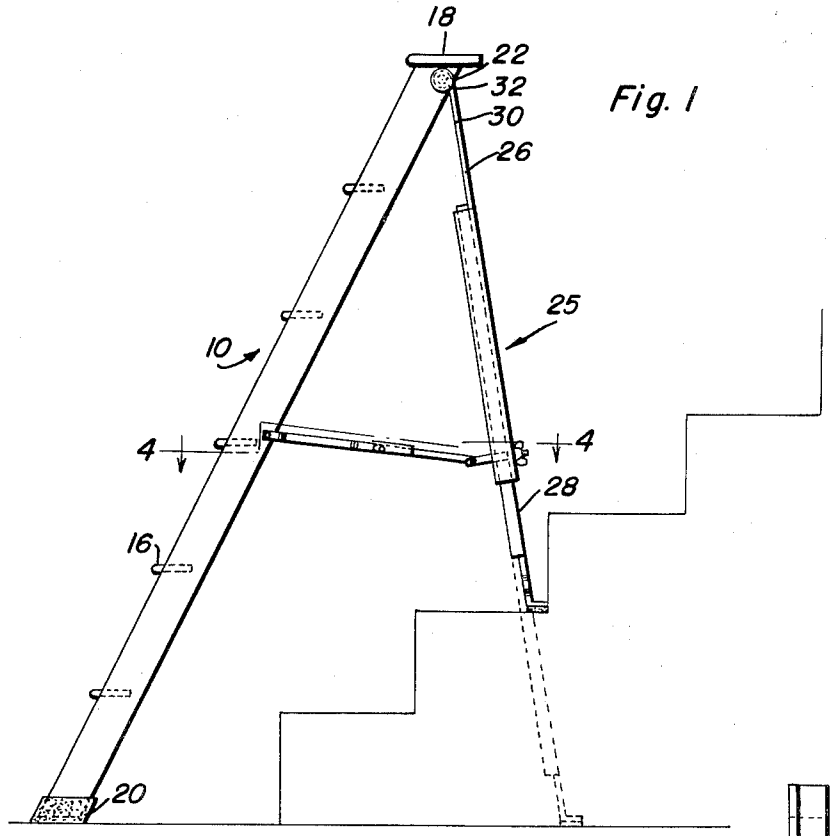


Fig. 1

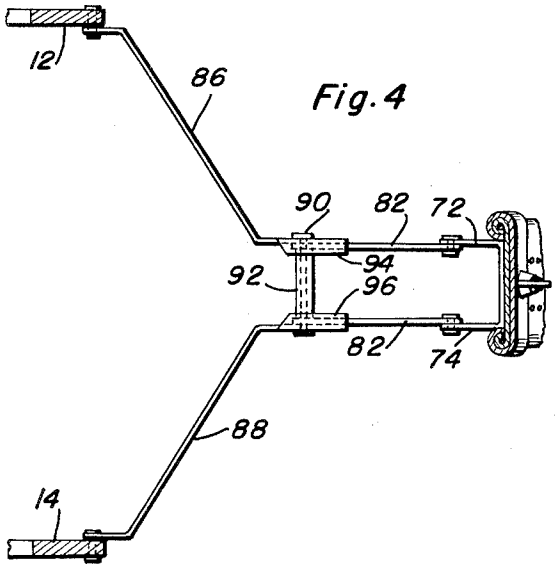


Fig. 4

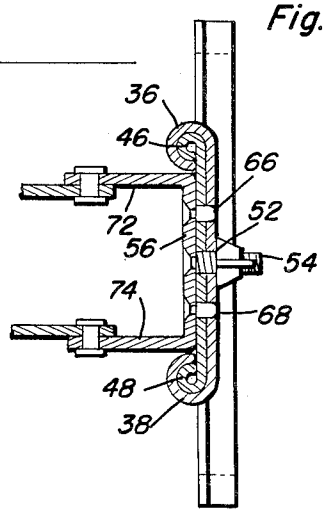


Fig. 5

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Fig. 2

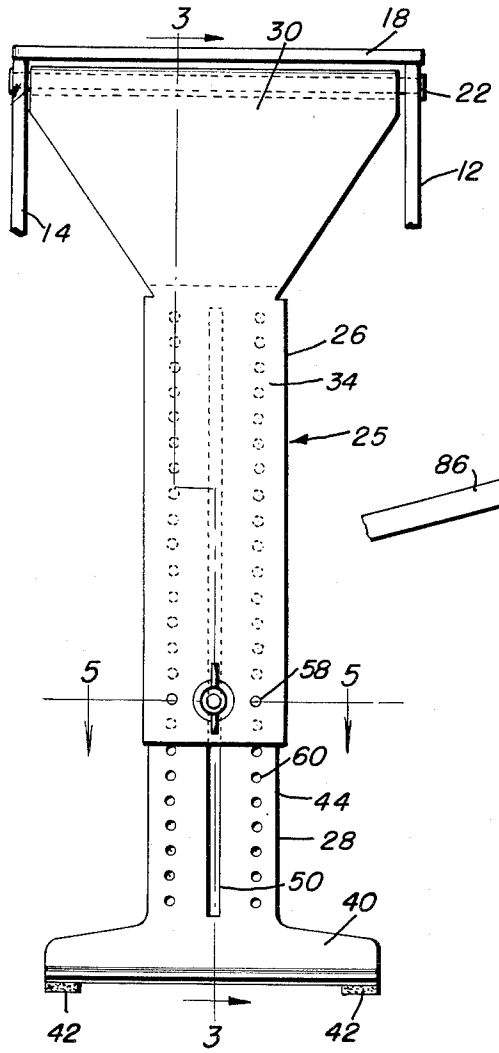


Fig. 3

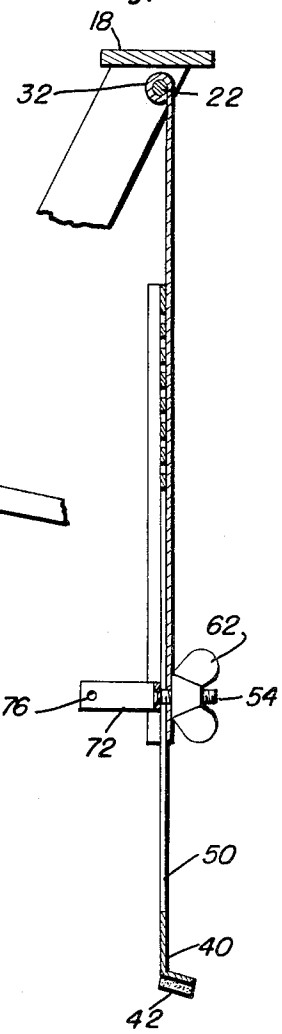


Fig. 6

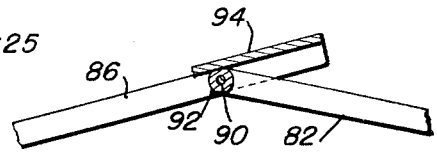
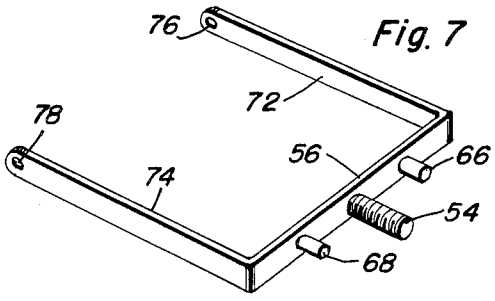


Fig. 7



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STEPLADDER

Lawrence E. Bronson, Glendive, Mont.

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8 Claims. (Cl. 228—21)

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This invention relates to an improved step ladder and particularly for a step ladder having an adjustable rear leg for use on stairways or other uneven surfaces.

When using step ladders it is frequently desirable to use them in places such as stairways or other uneven places where ordinary step ladders are impossible to use. It has heretofore been proposed to use an adjustable back leg or supporting leg on such step ladders when such legs have heretofore been unsuccessful in that they have been weak and the adjustment frequently has been loose and allows the step ladder to fall.

This invention provides an improved step ladder having an adjustable supporting leg which can be rigidly locked so that it is incapable of being misadjusted in use. The invention accomplishes this by providing a rear leg constructed of a sheet of stock material having the edges rolled to provide an upper leg section having guide channels along the edge thereof and a lower leg section having guide rails slidable in these guide channels and a locking mechanism having studs extending through openings in the overlapping members and rigidly connected thereto.

It is accordingly an object of this invention to provide an improved step ladder.

It is a further object of this invention to provide a step ladder having an adjustable rear leg.

It is a further object of this invention to provide an adjustable rear leg having a lower member telescoping in an upper leg member.

It is a further object of this invention to provide a locking member for rigidly securing an adjustable leg together.

It is a further object of this invention to provide an improved locking frame for maintaining a step ladder in open position.

Other objects and many of the attendant advantages of this invention will be apparent from the following detailed description taken in conjunction with the accompanying drawing in which:

Figure 1 is a side elevation of the adjustable step ladder according to this invention;

Figure 2 is a rear elevation of the adjustable leg;

Figure 3 is a vertical section through the adjustable leg taken substantially on the planes indicated by the line 3—3 in Figure 2;

Figure 4 is a horizontal section showing the locking brace taken substantially on the plane indicated by the line 4—4 of Figure 1;

Figure 5 is a cross-sectional view of the adjustable leg taken substantially on the plane indicated by the line 5—5 of Figure 2;

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Figure 6 is an enlarged cross-section of the brace lock; and,

Figure 7 is a perspective view of the adjusting lock.

In the exemplary embodiment of this invention an improved step ladder 10 has a pair of front step stiles 12 and 14 which are spaced apart and have connected therebetween a plurality of steps 16 and a cap step or platform 18 for rigidly connecting stiles 12 and 14 to each other. Usually the stiles 12 and 14 are provided with an anti-slip footing such as a rubber foot 20 on each of the stiles 12 and 14. A journal rod 22 extends between the stiles 12 and 14 adjacent the top thereof and has journaled thereon the adjustable back leg or brace generally indicated at 25. The adjustable leg 25 includes an upper leg section 26 and a lower leg section 28. The upper leg section 26 has a flat top portion 30 having a rolled upper edge providing a substantially tubular portion 32 embracing the journal rod 22. The upper flat portion 30 gradually reduces then to an intermediate upper leg portion of reduced width. The reduced portion 34 of the upper leg portion has its edges turned over to provide a plurality of guide channels 36 and 38 substantially tubular in formation. The lower leg section 28 is provided with an extended foot portion 40 having non-slip pads 42 attached thereto. The foot portion 40 merges in the reduced lower leg portion 44 and has the edge portion turned over to provide guide rails 46 and 48. The guide rails 46 and 48 are slidably engaged in the substantially tubular guide channels 36 and 38. Sliding engagement of the lower leg portion in the upper leg portion allows the brace leg to be adjusted to any desired length.

The improved locking mechanism for rigidly connecting the upper and lower leg portions together provides a longitudinally extending slot 50 in the lower leg portion and an overlying hole 52 in the upper leg portion through which extends a stud 54 of a locking member 56. The locking member 56 extends across the back of the inner side of the channels 36 and 38 and it contacts the back of the lower leg 28. The pair of spaced apart holes 58 is provided in the upper leg member 26 and the holes 58 being on opposite sides of the holes 54. The lower leg member 28 is provided with a series of pairs of hole members 60 which cooperate and are coextensive with the hole members 28 in the upper leg member. The locking member 56 carries a pair of studs

which enter into the holes 60 and 58 and are of sufficient length to extend through the overlying members 26 and 28.

The threaded stud 54 is of sufficient length that a threaded fastener such as the wing nut 62 may be extended along the shank of the stud 54 a sufficient distance so that the studs 66 and 68 may be completely withdrawn from the overlapping members 26 and 28 so that the members may be relatively telescoped without interference of the studs cooperating in the holes 58 or 60. When the members 26 and 28 have been telescoped to the desired adjusted length the studs 66 and 68 are engaged with the respective holes 58 and 60 and the wing nut screwed down to properly adjust the stud so that the members 26 and 28 are rigidly connected to each other with the studs 66 and 68 preventing longitudinal motion of the overlying portion.

The locking member 56 is provided with a pair of upstanding arms 72 and 74 having openings 76 and 78 adjacent the forward ends thereof. An improved safety brace member comprises a pair of articulated brace members having a rear section journaled on the arms 72 and 74 and a front section 86 and 88 journaled on the stiles 12 and 14 respectively. The rear of the brace sections 82 and 84 are hingedly connected to the respective front brace sections 86 and 88 by means of a hinge pin 90 extending through the overlapped brace end and having heads to prevent lateral separation of the brace members. A spacer 92 is placed on the pin 90 and extends between the rear brace sections 82 and 84 to rigidly space them with respect to each other. The front brace sections 86 and 88 are provided with inturned flanges 94 and 96 which overlie the front ends of the rear brace sections 82 and 84 and are so spaced with respect to the hinge pin 90 that the brace sections are slightly past center when the flanges 94 and 96 make contact with the edges of the rear brace members 82 and 84 so that it is necessary to raise the hinge pin 90 slightly above center before the rear brace sections may be journaled into proximity with the front step section. In operation of the improved step ladder, the wing nut 62 will be run out on the stud 54 a sufficient distance to disengage the studs 66 and 68 from the opening 58 so that the upper and lower brace members may be relatively telescoped to the desired length after which the studs will be engaged in the opening 58 and the wing nut rigidly screwed down to properly lock and brace the leg portions as a rigid unit. The adjusted leg will then be swung away from the front step portions until the safety brace falls into position and the locking flanges 94 and 96 make contact after which the ladder becomes a rigid unit which may be safely set in any desired position.

While for purposes of exemplification a particular embodiment of the invention has been shown and described according to the best present understanding thereof, it will be apparent that many changes and modifications can be made therein without departing from the true spirit of the invention.

Having described the invention, what is claimed as new is:

1. A step ladder comprising a front step portion, a journal rod secured in said step portion adjacent the top end thereof, an adjustable supporting leg, said leg including a flat tapered top portion having the end rolled to provide a tubular member embracing said journal rod, a reduced upper leg portion, said top portion merging into said upper leg portion, inturned edge portions on said upper leg portion, said inturned edges providing guide channels, a lower leg portion, said lower leg portion including a foot, a reduced leg member, inturned edges on said lower leg member providing guide rails on said lower leg member, said guide rails being slidably engaged in said guide channels, locking means for locking said leg members in a selected position.

2. A step ladder comprising a front step portion, a journal rod secured in said step portion adjacent the top end thereof, an adjustable supporting leg, said leg including a flat tapered top portion having the end rolled to provide a tubular member embracing said journal rod, a reduced upper leg portion, said top portion merging into said upper leg portion, inturned edge portions on said upper leg portion, said inturned edges providing guide channels, a lower leg portion, said lower leg portion including a foot, a reduced leg member, inturned edges on said lower leg member providing guide rails on said lower leg member, said guide rails being slidably engaged in said guide channels, a longitudinally extending slot in said lower leg member, said top leg member having a hole therein overlying said slot, a locking member including a threaded stud extending through said slot and said hole, a threaded fastener on said stud.

3. A step ladder comprising a front step portion, a journal rod secured in said step portion adjacent the top end thereof, an adjustable supporting leg, said leg including a flat tapered top portion having the end rolled to provide a tubular member embracing said journal rod, a reduced upper leg portion, said top portion merging into said upper leg portion, inturned edge portions on said upper leg portion, said inturned edges providing guide channels, a lower leg portion, said lower leg portion including a foot, a reduced leg member, inturned edges on said lower leg member providing guide rails on said lower leg member, said guide rails being slidably engaged in said guide channels, a longitudinally extending slot in said lower leg member, said top leg member having a hole therein overlying said slot, a locking member including a threaded stud extending through said slot and said hole, a threaded fastener on said stud, a pair of spaced apart studs on said locking member, said upper leg member having holes adapted to receive said studs, said lower leg member having a series of holes adapted to receive said studs, said studs being of sufficient length to extend through overlapped leg portions.

4. A step ladder having a front step section including a pair of stiles, a plurality of steps secured between said stiles, an adjustable leg journaled between said stiles adjacent the top thereof, said leg including an upper leg portion, a lower leg portion, the edges of said upper leg portion being rolled providing substantially tubular guide channels, the edges of said lower leg portion being rolled providing substantially tubular guide rails, said guide rails being slidably received in said guide channels, a lock member selectively securing said portions in rigid fixed position, an articulated brace having rear brace portions journaled on said lock member and front brace portions journaled on said stiles.

5. A step ladder having a front step section including a pair of stiles, a plurality of steps secured between said stiles, an adjustable leg journaled between said stiles adjacent the top there-

of, said leg including an upper leg portion, a lower leg portion, the edges of said upper leg portion being rolled providing substantially tubular guide channels, the edges of said lower leg portion being rolled providing substantially tubular guide rails, said guide rails being slidably received in said guide channels, a longitudinally extending slot in said lower leg portion, a plurality of pairs of holes in said lower leg portion, said upper leg portion having a pair of holes selectively matching any pair of said plurality of pair of holes and a hole overlying said slot, a lock member including a pair of studs for engaging said pairs of holes and a threaded stud extending through said slot and said overlying hole, an articulated brace having rear brace portions journaled on said lock member and front brace portions journaled on said stiles.

6. A step ladder comprising a front step portion, a journal rod secured in said step portion adjacent the top end thereof, an adjustable supporting leg, said leg including a flat tapered top portion having the end rolled to provide a tubular member embracing said journal rod, a reduced upper leg portion, said top portion merging into said upper leg portion, inturned edge portions on said upper leg portion, said inturned edges providing guide channels, a lower leg portion, said lower leg portion including a foot, a reduced leg member, inturned edges on said lower leg member providing guide rails on said lower leg member, said guide rails being slidably engaged in said guide channels, a longitudinally extending slot in said lower leg member, said top leg member having a hole therein overlying said slot, a locking member including a threaded stud extending through said slot and said hole, a threaded fastener on said stud, a pair of spaced apart studs on said locking member, said upper leg member having holes adapted to receive said studs, said lower leg member having a series of holes adapted to receive said studs, said studs being of sufficient length to extend through overlapped leg portions, said threaded stud being of sufficient length to allow said studs to clear said overlapped leg portions while said threaded stud slides in said slot.

7. A step ladder comprising a front step portion, a journal rod secured in said step portion adjacent the top end thereof, an adjustable supporting leg, said leg including a flat tapered top portion having the end rolled to provide a tubular member embracing said journal rod, a reduced upper leg portion, said top portion merging into said upper leg portion, inturned edge portions on said upper leg portion, said inturned edges providing guide channels, a lower leg portion, said lower leg portion including a foot, a reduced leg member, inturned edges on said lower leg member providing guide rails on said lower leg member, said guide rails being slidably engaged in said guide channels, a longitudinally extending slot in one of said leg members, the other of said leg members having a hole therein overlying said slot, a locking member including a threaded stud extending through said slot and said hole, a threaded fastener on said stud, a pair of spaced apart studs on said locking member, said leg member having said first mentioned hole having a pair of holes adapted to receive said studs, said other leg member having a series of holes adapted to receive said studs, said studs being of sufficient length to extend through overlapped leg portions, said threaded stud being of sufficient length to allow said studs to clear said overlapped leg portions while said threaded stud slides in said slot, an articulated cross brace including a pair of brace members having one end journaled on said step portion, and the other ends journaled on said locking means.

8. A step ladder comprising a front step portion, a journal rod secured in said step portion adjacent the top end thereof, an adjustable supporting leg, said leg including a flat tapered top portion having the end rolled to provide a tubular member embracing said journal rod, a reduced upper leg portion, said top portion merging into said upper leg portion, inturned edge portions on said upper leg portion, said inturned edges providing guide channels, a lower leg portion, said lower leg portion including a foot, a reduced leg member, inturned edges on said lower leg member providing guide rails on said lower leg member, said guide rails being slidably engaged in said guide channels, a longitudinally extending slot in said lower leg member, said top leg member having a hole therein overlying said slot, a locking member including a threaded stud extending through said slot and said hole, a threaded fastener on said stud, said locking member including a cross member, upstanding arms on said cross member, a pair of articulated brace members journaled on said arms, the front ends of said brace members being journaled on said step portion.

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