Feb. 23, 1954 E. SANGUINETI 2,670,120

COLLAPSIBLE LADDER, DOUBLE LADDER, AND STEPLADDER

Filed May 12, 1950

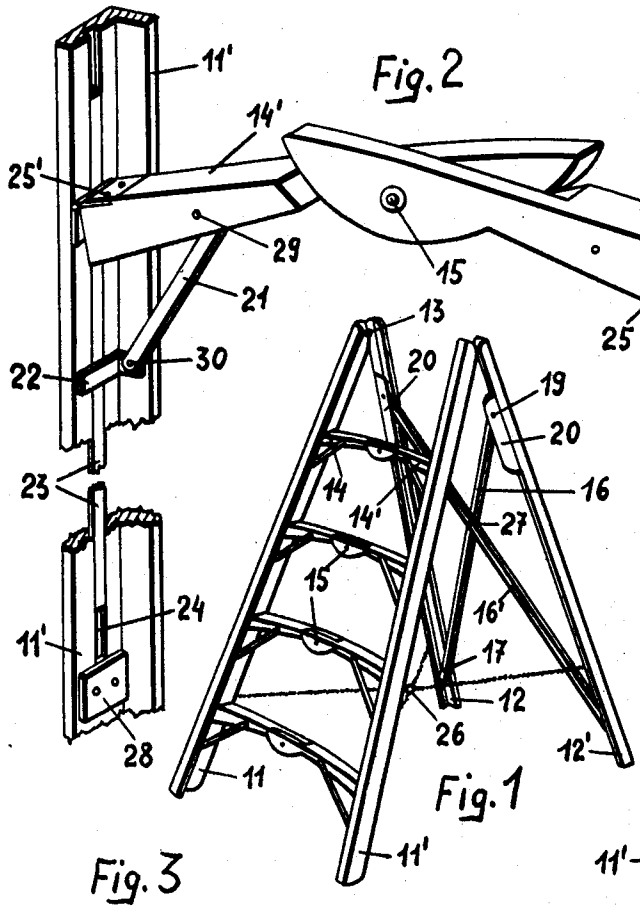


Fig. 2

Fig. 1

Fig. 4

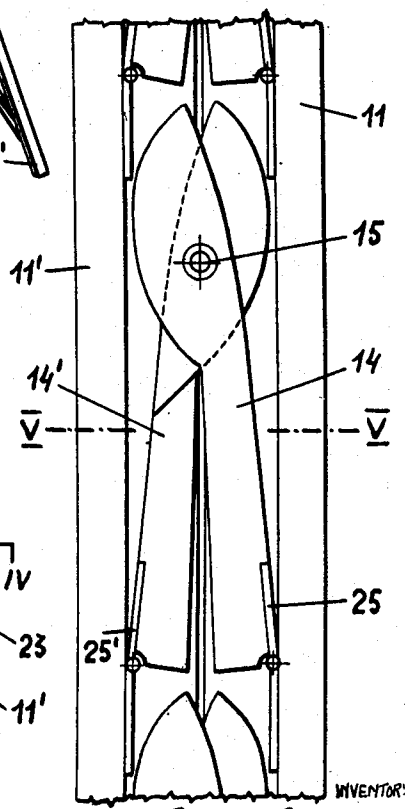
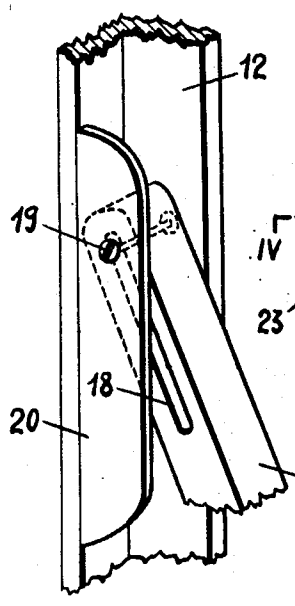


Fig. 3



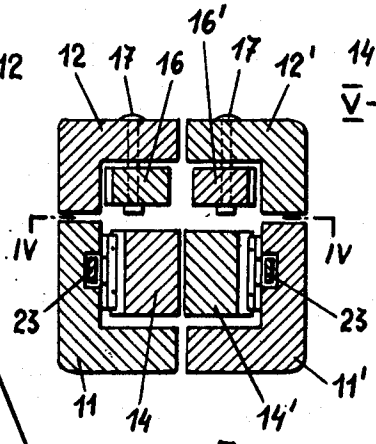


Fig. 5

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Patented Feb. 23, 1954 2,670,120

UNITED STATES PATENT OFFICE

2,670,120

COLLAPSIBLE LADDER, DOUBLE LADDER, AND STEPLADDER

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Application May 12, 1950, Serial No. 161,543

Claims priority, application Italy May 16, 1949

2 Claims. (Cl. 228—37)

1

This invention relates to ladders, double ladders and stepladders and aims to provide ladders which are collapsible and, when in collapsed position, assume the form of a short post or beam and thus are easily transportable and occupy very little place when stored.

Simple collapsible ladders are known, but they are generally constituted by a pair of uprights connected together by hinged rungs. These ladders do not generally possess a great stability, are generally not self-supporting and, when in collapsed position, the ends of the two uprights lie at different heights, so that the uprights must be tied together, as otherwise the collapsed ladder, if stored in substantially upright position, tends to open.

The main object of the invention is to overcome the drawbacks of the known collapsible ladders by making the steps or rungs in two parts hinged together in a central position and by providing means for stiffening and staying the rungs in opened or service position.

Another object of the invention is to employ the above collapsible ladder for constructing double ladders and stepladders of very rugged construction and very compact when collapsed.

The invention will be better understood by the following specification of an embodiment of collapsible stepladder according to the invention, said stepladder being shown in the annexed drawing in which:

Figure 1 is a perspective view of a collapsible stepladder in opened position, ready for use;

Figures 2 and 3 show in perspective and enlarged some details of a ladder forming part of the stepladder shown in Figure 1;

Figure 4 is a fragmental sectional elevational view of a collapsed stepladder taken on line IV—IV of Figure 5 and

Figure 5 is a cross sectional plan view of the collapsed stepladder, taken on line V—V of Figure 4.

The collapsible ladder shown in the drawings comprises a pair of angle-shaped uprights 11—11' connected together by rungs made of two pieces 14—14' hinged together at 15 and to the uprights 11—11 as at 25—25'.

The rung sections are so connected together and to the ladder uprights as to permit their angular shifting only in one direction and until their upper or step faces come to be substantially at right angles to the uprights and in line with the other rung section, but not beyond that position. This end is attained both by providing a tongue and groove or like connection of the

2

rung halves by the hinge pin 15 and by cutting the ends of the rungs substantially at right angles, as shown in Figure 2 and hinging same as by leaf hinges 25—25' to the uprights.

In order to stiffen the connection between the rung halves and the uprights, tie rods or braces 21 are hinged by one end to an intermediate part 29 of each of the rung halves 14 or 14', while the other end is hinged to an angle plate 22 welded or otherwise secured to a bar 23 slidably mounted in a groove 24 provided in each of the ladder uprights 11—11' and closed at the lower end by an abutment plate 28. Bars 23 are held within the grooves by the leaf of the hinges 25 or 25' which is fastened to the ladder uprights.

The just described construction constitutes a rugged collapsible simple ladder.

This may be employed also for constructing a stepladder like that shown in Figure 1. When such a stepladder should be constructed, to the upper end of the upright pair 11—11' a pair of angle-shaped props 12—12' is hinged as at 13. Props 12—12' are connected together by cross braces 16—16' hinged by one end, as shown at 17, to props 12—12' and together in the middle as at 17, while the other end is provided with slots 18 engaging guide pins 19 fastened to bracket plates 20 fitted to props 12 and 12'. Uprights 11—11' and props 12—12' are tied together by four equal chain lengths anchored to a central ring 26, as shown.

When the step ladder is in closed position, the parts assume the position as shown in Figures 4 and 5 and the whole stepladder resembles a short square post. When the parts 11—12 and 11'—12' are pulled apart and then turned about the upper hinges 13, until this is permitted by the chains tying the parts 11, 11', 12 and 12' together, the ladder assumes the position shown in Figure 1. In this position, bars 23 shifted by tie rods 21 hinged to the rung sections abut with their ends against their respective abutment member 28, and thus through rods 21 stiffen the rung sections which thus are able to securely support the weight for which they are designed.

From the foregoing it is apparent that a collapsible step ladder has been provided which is very rugged in construction and very compact in its collapsed position.

It is apparent that the invention might be embodied in many other ways, without departing from the spirit of the invention or the scope of the appended claims.

Thus, by hinging together as at 13 a pair of collapsible ladders comprising uprights 11—11',

a set of rungs made of hinged halves 14—14' and annexed parts, a double ladder result.

The ladder may be constructed of wood, metal or other suitable material.

I claim:

1. A collapsible step ladder comprising in combination a pair of ladder uprights having an angle section, each upright being formed with a longitudinal groove, bars slidably mounted within said grooves, means for limiting the sliding of said bars within said grooves; rung sections hinged at like intervals to each of said uprights, means for hinging the rung sections hinged to one of the uprights to the corresponding rung section of the companion upright of the pair, means for limiting the angular movement of the rung sections from a position adjacent to the respective uprights in upward direction to a position substantially at right angles to the uprights, tie rods attached by one of their ends to said slidable bars and by their other end to a rung section, a prop having an angle section hinged at the top end of each of the ladder uprights, a pair of cross tie bars hinged together at their middle and to the props at one of their ends, longitudinal slots in the other ends of said cross tie bars, bracket plates fastened near the top ends of said props, pins fastened to said bracket plates and engaging the slots at the ends of the cross tie bars; and flexible tie means connecting the uprights and props near their lower ends so as to prevent excessive swinging apart of the hinged ladder uprights and props.

2. A collapsible ladder, comprising in combination, a pair of uprights, each of said uprights formed with a longitudinal groove; rung sections hinged to each of said uprights and adapted to rotate from a position at right angles to said uprights to an upwardly extending position adjacent to the upright to which it is hinged; means hinging together each rung section attached to one upright to the corresponding rung section attached to the other upright; bars slidably mounted within said grooves in said uprights; a plurality of tie rods, each of said tie rods hinged at one end to a rung section and at the other end to one of said bars; abutment means blocking downward sliding of said bars in said grooves when the same reach a position in which said rung sections are supported in a horizontal position by said tie rods.

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